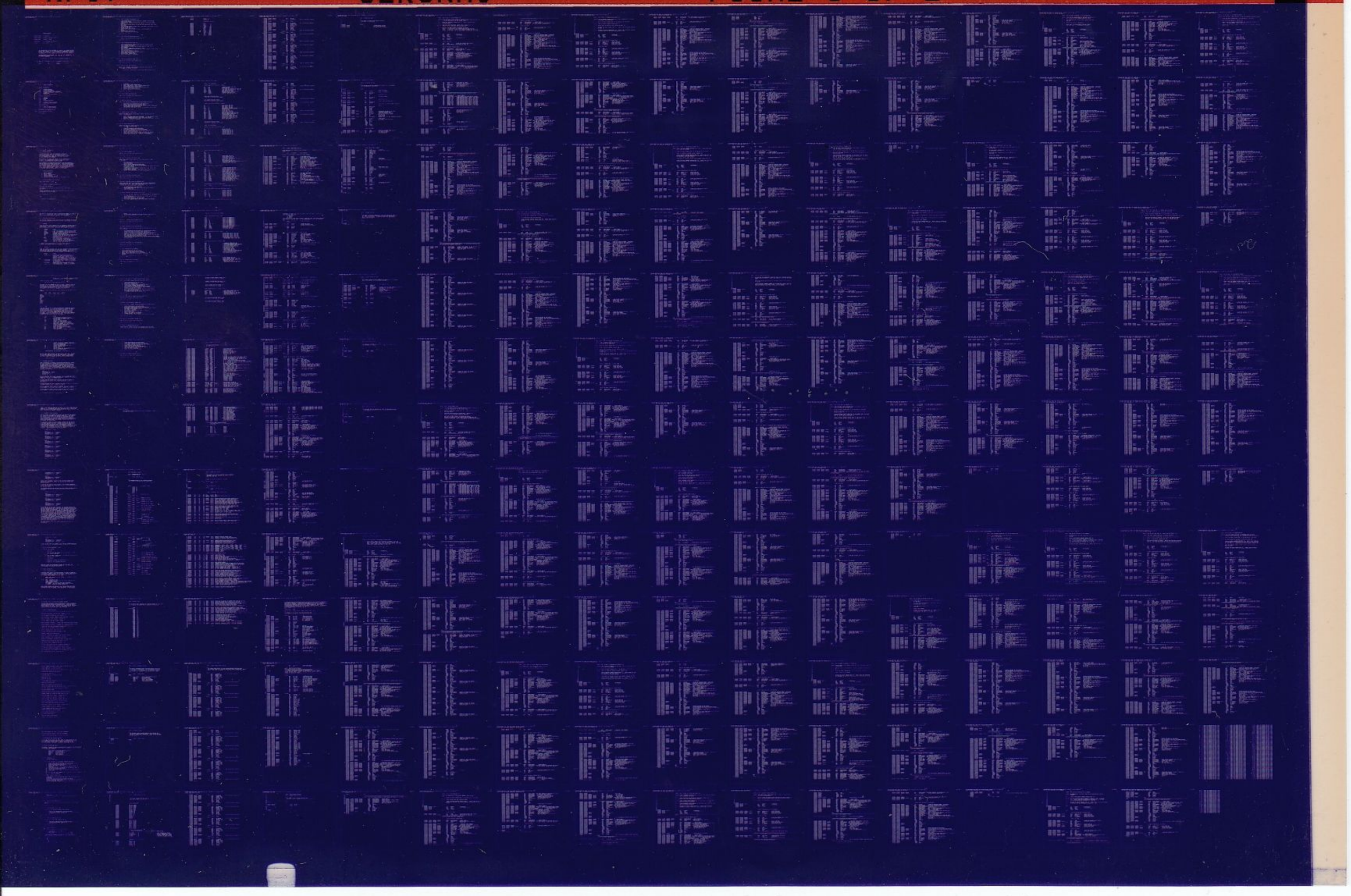
RP07

DUAL PORT TEST
CZRJNAO

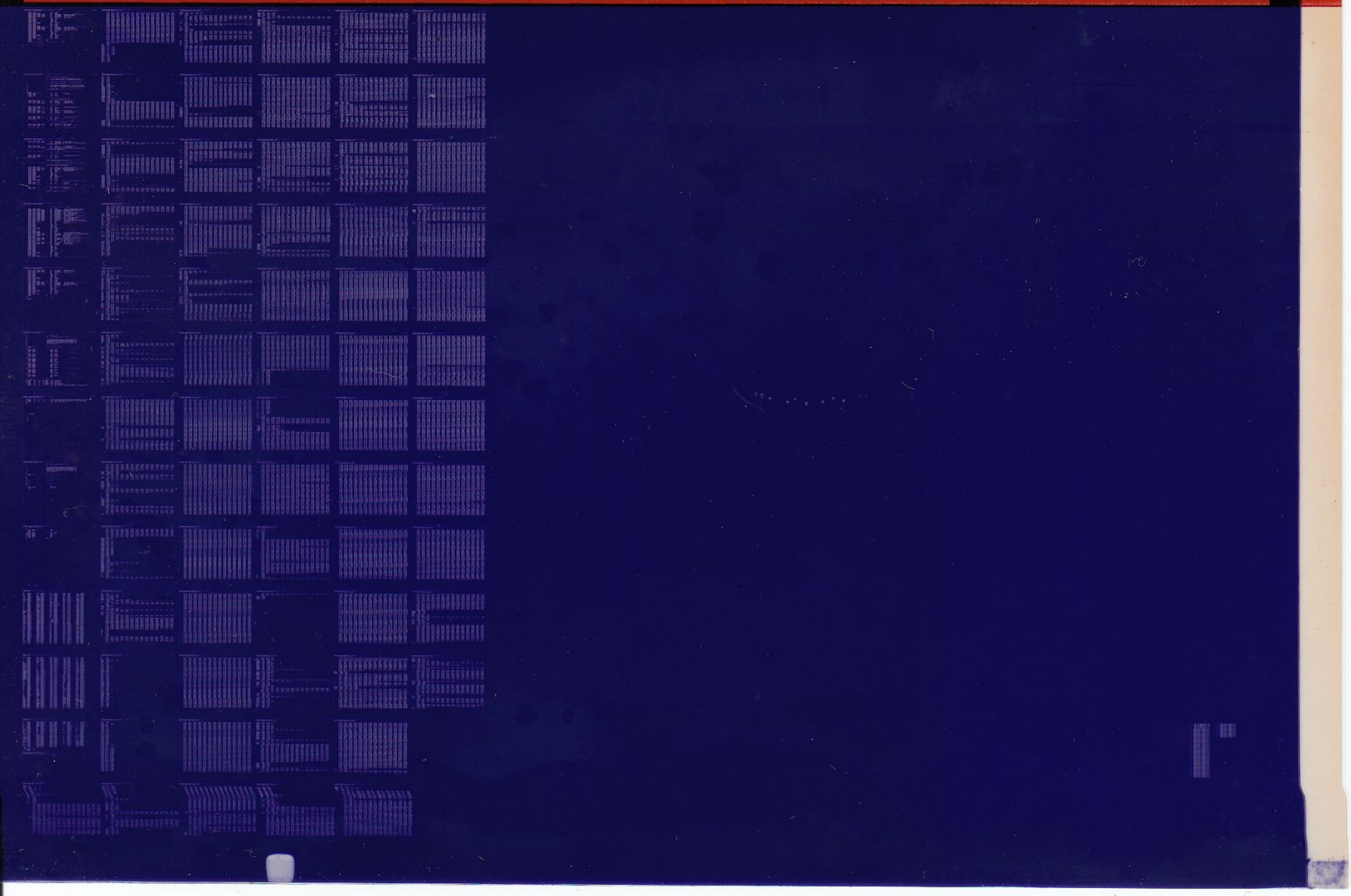
AH-F963A-MC
FICHE 1 OF 2



RP07

DUAL PORT TEST
CZRJNA0

AH-F963A-MC
FICHE 2 OF 2



.REM @

IDENTIFICATION

PRODUCT CODE: AC-F962A-MC

PRODUCT NAME: CZRJNA0 RP07 DUAL PORT TEST

PRODUCT DATE: JANUARY 1, 1983

MAINTAINER: CX DIAGNOSTIC ENGINEERING

AUTHOR: MIKE LEAVITT

```
.REM @
```

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT
1.2 SYSTEM REQUIREMENTS
1.3 RELATED DOCUMENTS AND STANDARDS
1.4 DIAGNOSTIC HIERARCHY PREREQUISITES
1.5 ASSUMPTIONS
1.6 HARDWARE TEST REQUIREMENTS

2.0 OPERATING INSTRUCTIONS

2.1 COMMANDS
2.2 SWITCHES
2.3 FLAGS
2.4 HARDWARE QUESTIONS
2.5
2.6 EXTENDED P-TABLE DIALOGUE
2.7 QUICK STARTUP PROCEDURE

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES
3.2 SPECIFIC ERROR MESSAGES

4.0 PERFORMANCE AND PROGRESS REPORTS

5.0 DEVICE INFORMATION TABLES

6.0 TEST SUMMARIES

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE RP07 DUAL PORT LOGIC TEST PERFORMS A SERIES OF TESTS WHICH VERIFY THAT THE RP07 DUAL PORT LOGIC IS FUNCTIONING PROPERLY. ONLY THE CONTROL LOGIC IS TESTED BY THIS PROGRAM; DATA HANDLING IN THE DUAL PORT MODE IS NOT TESTED BY THIS PROGRAM.

BOTH PORTS OF THE DRIVE ARE CABLED TO THE SAME MASSBUS BY A CABLE. THIS ARRANGEMENT ALLOWS THE DUAL PORT LOGIC TO BE TESTED FROM ONE PDP-11/RH11 OR RH70.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

1. PDP-11 PROCESSOR
2. 28K OF MEMORY
3. KW11-L OR KW11-P CLOCK
4. CONSOLE TERMINAL
5. RH11 OR RH70 WITH AN RP07
6. STANDARD RP07 DRIVE TO DRIVE INTERCONNECT CABLE

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL - CHQUS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

RP07 FRONT END DIAGNOSTIC

THE PREREQUISITE SOFTWARE MUST BE RUN TWICE: ONCE FROM EACH PORT.

DYNAMIC OPERATION OF THE DUAL PORT OPTION IS TESTED BY THE RP07 PERFORMANCE EXERCISER PROGRAM.

1.5 ASSUMPTIONS

NONE

1.6 HARDWARE TEST REQUIREMENTS

EACH PORT OF THE RP07 MUST HAVE A UNIQUE DRIVE NUMBER, IE; PORT A = 0, PORT B = 1. IN ADDITION, PORT A 'OUT' MUST BE CONNECTED TO PORT B 'IN'. PORT B 'OUT' MUST BE CONNECTED TO A TERMINATOR.

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED

IN THE LIST. LIST EXAMPLE - /UNITS:0:5:10-12
USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)

EXAMPLE OF SWITCH USAGE:

START/TESTS:1-5/PASS:1000/EOP:100

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
ZFLAGS					
EXIT					

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)

ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

* ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
/FLAGS:LOE:IER:BOE
```

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT.

```
UNIT 0
RPCS1 ADRS (O)  176700 ?
VECTOR ADRS (O)  254 ?
BR LEVEL (O)  5 ?
DRIVE # (O)  0 ?
```

THE 1ST QUESTION "RPCS1 ADRS" REQUIRES THAT THE USER INPUT THE ADDRESS OF RPCS1 OF THE CONTROLLER WHICH IS CONNECTED TO THE DRIVE UNDER TEST. DEFAULT IS 176700 (OCTAL).

THE 2ND QUESTION "VECTOR ADRS" REQUIRES THE USER TO INPUT THE INTERRUPT VECTOR ADDRESS OF THE RHXX CONTROLLER. DEFAULT IS 254 (OCTAL).

THE 3RD QUESTION "BR LEVEL" REQUIRES THE USER TO INPUT THE CONTROLLER INTERRUPT PRIORITY LEVEL. DEFAULT IS LEVEL 5.

THE 4TH QUESTION "PORT B DRIVE #" REQUIRES THE USER TO SPECIFY THE DRIVE NUMBER OF THE DRIVE TO BE TESTED. DEFAULT IS 0 (OCTAL).

THE 5TH QUESTION "PORT B DRIVE #" REQUIRES THE USER TO SPECIFY THE DRIVE NUMBER OF THE DRIVE TO BE TESTED. DEFAULT IS 1 (OCTAL).

THE FOLLOWING MESSAGE WILL THEN BE PRINTED:

"PORT A "OUT" MUST BE CONNECTED TO PORT B "IN" PORT B "OUT" MUST BE CONNECTED TO A TERMINATOR DRIVE MUST BE ONLINE, WRITE ENABLED AND READY PORT SELECT SWITCH MUST BE IN THE A/B POSITION. EACH PORT SHALL HAVE A UNIQUE DRIVE NUMBER. CONTINUE" (L)

2.6 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A FICTIONAL DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  1<CR>
Q-FACTOR (O) 1 ?  0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  5<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 7
```

```
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 8
CSR ADDRESS (O)  160000<CR>
SUB-DEVICE # (O) ?  7<CR>
Q-FACTOR (O) 1 ?  <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON-DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER. LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION FEATURE.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0,1<CR>
Q-FACTOR (O) 0 ?  1,0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2-5<CR>
Q-FACTOR (O) 0 ?  0<CR>

UNIT 7
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6,7<CR>
Q-FACTOR (O) 0 ?  1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE "-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0-7<CR>
Q-FACTOR (O) 0 ?  0,1,0,,,,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME  TYPE  NUMBER  ON UNIT NUMBER  TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

,WHERE; NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES

ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

****

DRIVE NOT IN NEUTRAL AFTER RELEASE - REQUEST NOT SET

REGISTER WRONG AFTER RELEASE WITH REQUEST SET

DRIVE SEIZED BY RELEASE COMMAND ISSUED WHEN DRIVE IN NEUTRAL

DRIVE IN NEUTRAL AFTER RELEASE - REQUEST SET

ATTN BIT WRONG AFTER RECALIBRATE COMMAND

DRIVE RETURNED TO NEUTRAL IF DRIVE CLEAR GIVEN WHILE DRIVE SEIZED

DRIVE RETURNED TO NEUTRAL IF MASSBUS INIT GIVEN WHILE DRIVE SEIZED

TIMEOUT ONE SHOT WAS RETRIGGERED WITHOUT REGISTER ACCESS

TIMEOUT HAS NOT OCCURRED WITHIN 2 SECONDS

DRIVE IS NON-EXISTENT ('NED' BIT SET)

ATTN BIT FOR PORT NOT RESET BY MASSBUS CLEAR

TIMEOUT CLEARED THE ATTENTION BIT

DRIVE NOT IN NEUTRAL OR SEIZED AFTER ATTN BIT WRITTEN

DRIVE IN NEUTRAL AFTER ATTENTION BIT WRITTEN

WRITING ATTENTION BIT (IN RPAS) DID NOT SET PORT REQUEST

CONTROLLER SELECT SWITCH ON DRIVE NOT IN "A/B"

CAN'T ACCESS DRIVE THROUGH EITHER PORT

ATTN BIT FOR SEIZING PORT NOT CLEARED BY MASSBUS INIT

ATTN BIT FOR OPPOSITE PORT CLEARED BY DRIVE CLEAR

ATTN BIT NOT CLEARED BY MASSBUS INIT, DRIVE IN NEUTRAL

THE ATTN BIT SET AFTER TIMEOUT WITH NO REQUEST AND "ERR" SET

RPAS REGISTER BITS SET BY WRITING ATA BIT

RELEASE COMMAND RECOGNIZED WHEN ISSUED BY NON-SEIZING PORT

TIMEOUT ONE-SHOT IS LESS THAN 500 MS

TIMEOUT ONE-SHOT NOT WITHIN SPEC (EXPECTED: 750 < 'TIME' < 1250 (MS))

ATTENTION NOT RESET BY WRITING RPAS

ATTENTION NOT RESET BY GO

ATTENTION RESET BY GO WHEN NOT SEIZED

WRONG DRIVE TYPE

DRIVE NOT ON LINE

SERIAL NUMBER READ THROUGH EACH PORT NOT THE SAME

DRIVE NOT SEIZED BY PORT

WRONG STATUS SEEN BY THE SEIZING PORT

REGISTER CONTENTS WERE SEEN BY OPPOSITE PORT - DRIVE WAS SEIZED

REGISTER CONTENTS WRONG AFTER RELEASE OR TIMEOUT

REGISTER CONTENTS WRONG

CONTROL BUS PARITY ERROR READING INDICATED REGISTER

COMMAND ISSUED WITH DRIVE IN ERROR STILL SETS GO BIT

ATTN BIT WRONG AFTER TIMEOUT - REQUEST NOT SET

ATTN BIT WRONG AFTER RELEASE - REQUEST SET

ATTN BIT WRONG AFTER RELEASE - REQUEST NOT SET

DRIVE NOT SEIZED WHEN ATTN BIT FOR PORT CLEARED

DRIVE SEIZED WHEN ZERO WRITTEN IN ATTN BIT

DRIVE NOT IN NEUTRAL AFTER TIMEOUT - REQUEST NOT SET

TIMEOUT CLEARED THE DRIVE'S ERROR BIT

RELEASE COMMAND RELEASED DRIVE WITH ERRORS SET

TIMEOUT ONE-SHOT DID NOT RETRIGGER

DRIVE CANNOT BE SEIZED BY WRITING ATA BIT

ILF ERROR CANNOT BE SET

DRIVE NOT READY AFTER RELEASE

CANNOT CLEAR ERROR BY DRIVE CLEAR

BOTH PORT NUMBERS THE SAME - TESTS NOT PERFORMED

NO CLOCK FOUND ON SYSTEM - TESTS NOT PERFORMED

WRONG SYSTEM CONFIGURATION - TESTS NOT PERFORMED

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

5.0 DEVICE INFORMATION TABLES

THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES.

```
.WORD 176700 ;RPCS1 BASE REGISTER ADDRESS
.WORD 254    ;VECTOR ADDRESS
.WORD 240    ;BR LEVEL 5 DEVICE
.WORD 0      ;PORT A DRIVE #
.WORD 1      ;PORT B DRIVE #
.WORD 1      ;CONFIGURATION IS ALL RIGHT
```

6.0 TEST SUMMARIES

TEST 1: NEUTRAL ACCESS TEST

VERIFY THAT THE DRIVE IS ACCESSABLE THROUGH BOTH PORTS.

1. SELECT DRIVE PORT BY WRITING THE DRIVE NUMBER IN RPCS2,
2. ACCESS A REMOTE DRIVE REGISTER; IE: RPDS,
3. VERIFY THAT 'NED' IS NOT SET,
4. VERIFY THAT DRIVE IS DUAL PORTED BY READING DRIVE TYPE REGISTER,
5. VERIFY THAT DRIVE IS IN NEUTRAL BY READING MOL, PGM, VV, DPR AND DRY THROUGH BOTH PORTS,
6. VERIFY THAT SERIAL NUMBER IS THE SAME WHEN READ THROUGH BOTH PORTS.

FAULT LIST: J11, J12, J13, JUMPER CABLE, DUAL PORT JUMPER, INCORRECT START-UP SEQUENCE.

TEST 2: PORT A SEIZE/TIMEOUT TEST

1. SEIZE PORT A BY WRITING RPDA AND VERIFY THAT SEIZE OPERATION DID OCCUR.
2. SELECT PORT B BY WRITING DRIVE NUMBER INTO RPCS2,
3. READ ALL REGISTERS EXCEPT RPCS1 (EXPECT REGISTERS TO =0, EXCEPT RPDT AND RPAS WHEN READ FROM PORT B),
4. VERIFY THAT RELEASE TIMEOUT IS GREATER THAN 500 MSEC BUT LESS

THAN 2 SEC.
5. VERIFY THAT DRIVE IS IN THE NEUTRAL STATE AFTER RELEASE.

FAULT LIST: J11, J12

TEST 3: PORT B SEIZE/TIMEOUT TEST

SAME AS TEST 2 EXCEPT THAT THE SEIZE OPERATION IS DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 4: SEIZE/RELEASE TEST - PORT A

VERIFY THAT THE RELEASE COMMAND WORKS PROPERLY.

1. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS,
2. ISSUE RELEASE COMMAND THROUGH PORT A AND VERIFY DRIVE IS IN NEUTRAL AFTER A 40 MSEC DELAY.

FAULT LIST: J11, J12

TEST 5: PORT B SEIZE/RELEASE TEST

SAME AS TEST 4 BUT DONE THROUGH PORT B.

1. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS,
2. ISSUE RELEASE COMMAND THROUGH PORT B AND VERIFY DRIVE IS IN NEUTRAL AFTER A 40 MSEC DELAY.

FAULT LIST: J13, J12

TEST 6: PORT A SEIZE TEST

SEIZE PORT A USING THE FOLLOWING PROCEDURES:

1. WRITE RPDS,
2. WRITE RPAS (UNIT UNDER TEST),
3. READ RPCS1.

ISSUE A RELEASE COMMAND BETWEEN EACH SEIZE OPERATION AND VERIFY THAT THE DRIVE DID RETURN TO THE NEUTRAL STATE.

FAULT LIST: J11, J12

TEST 7: PORT B SEIZE TEST

SAME AS TEST 6 BUT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 8: PORT A RELEASE INTERFERENCE TEST

1. CLEAR ATTENTION BITS FOR BOTH PORTS BY ISSUING A DRIVE CLEAR THROUGH BOTH PORTS,
2. ISSUE RELEASE COMMAND FOR EACH PORT AND WAIT 40 MS AFTER EACH RELEASE,
3. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS AND VERIFY THAT SEIZE DID OCCUR,
4. ISSUE RELEASE COMMAND THROUGH PORT A AND VERIFY THAT DRIVE IS STILL SEIZED TO PORT B,
5. RELEASE DRIVE FROM PORT B,
6. VERIFY THAT DRIVE IS SEIZED TO PORT A WHEN RELEASED BY PORT B,
7. RELEASE DRIVE FROM PORT A,
8. VERIFY THAT DRIVE IN IN NEUTRAL.

FAULT LIST: J11, J12

TEST 9: PORT B RELEASE INTERFERENCE TEST

1. SAME AS TEST 8 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 10: PORT A RELEASE WITH ERROR TEST

1. CLEAR ATTENTION BITS THROUGH BOTH PORTS BY ISSUING A DRIVE CLEAR THROUGH BOTH PORTS,
2. ISSUE A RELEASE COMMAND FOR EACH PORT AND WAIT 40MS AFTER EACH COMMAND,
3. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS,
4. ISSUE ILLEGAL COMMAND THROUGH PORT A. AFTER A DELAY OF 40MS, VERIFY THAT ILF IS SET,
5. ISSUE RELEASE COMMAND TO PORT A,
6. VERIFY THAT PORT IS STILL SEIZED TO PORT A,
7. CLEAR ERRORS THROUGH PORT A,
8. RELEASE DPIVE THROUGH PORT A,
9. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 11: PORT B RELEASE WITH ERROR TEST

SAME AS TEST 10 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 12: PORT A SEIZE AND CLEAR TEST

VERIFY THAT A MASSBUS CLEAR OR DRIVE CLEAR WILL NOT CAUSE THE SEIZING PORT TO RELEASE THE DRIVE.

1. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS AND VERIFY THAT

IT SEIZED,
2. ISSUE DRIVE CLEAR THROUGH PORT A,
3. VERIFY THAT DRIVE IS STILL SEIZED THROUGH PORT A,
4. ISSUE MASSBUS CLEAR THROUGH PORT A,
5. VERIFY THAT DRIVE IS STILL SEIZED THROUGH PORT A,
6. RELEASE DRIVE THROUGH PORT A,
7. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 13: PORT B SEIZE AND CLEAR TEST

SAME AS TEST 12 EXCEPT DONE THROUGH PORT B,

FAULT LIST: J13, J12

TEST 14: SEIZE BY RPAS TEST

VERIFY THAT WRITING APPROPRIATE BIT IN RPAS SEIZES THE DRIVE.

1. WRITE RPAS WITH ATTENTION BITS FOR BOTH PORTS,
2. VERIFY THAT EITHER PORT HAS SEIZED DRIVE,
3. RELEASE DRIVE FROM SEIZED PORT AND VERIFY, AFTER A 40MS DELAY, THAT OPPOSITE PORT SEIZES DRIVE,
4. RELEASE DRIVE AND VERIFY THAT IT IS IN NEUTRAL, AFTER 40MS.

FAULT LIST: J11, J12, J13

TEST 15: INHIBIT SEIZE BY RPAS TEST

VERIFY THAT DRIVE IS NOT SEIZED WHEN A ZERO IS WRITTEN INTO THE DRIVE'S ATTENTION BIT.

1. VERIFY THAT BOTH PORTS ARE IN NEUTRAL. IF THEY ARE NOT, ISSUE RELEASE COMMANDS AND VERIFY THAT PORTS DID RELEASE,
2. WRITE ALL ATTENTION BITS, EXCEPT FOR DRIVE BEING TESTED, IN RPAS,
3. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12, J13

TEST 16: SET PORT A REQUEST TEST

VERIFY THAT WRITING A DRIVE REGISTER SETS PORT REQUEST WHEN THE DRIVE IS SEIZED BY OPPOSITE PORT.

1. CLEAR ATTENTION BITS FOR BOTH PORTS.
2. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS,
3. SET PORT REQUEST PORT A BY WRITING RPDS FROM PORT A,
4. RELEASE DRIVE FROM PORT B,
5. VERIFY THAT DRIVE SEIZES TO PORT A BY PORT A'S ATA BIT.
6. VERIFY THAT PORT B IS NOT SEIZED BY TESTING RPDS = 0,
7. RELEASE DRIVE FORM PORT A. VERIFY IT IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 17: SET PORT B REQUEST TEST

SAME AS TEST 16 EXCEPT DONE THROUGHT PORT B.

FAULT LIST: J13, J12

TEST 18: RESET ATTENTION A BY DRIVE CLEAR

VERIFY THAT DRIVE CLEAR CLEARS ONLY THE ATTENTION BIT OF THE SEIZED PORT.

1. SET ATTENTION BITS FOR BOTH PORTS BY WRITING PAT BIT IN RPCS2 FROM BOTH PORTS.
2. WRITE A REMOTE REGISTER FOR EACH PORT.
3. VERIFY THAT ATA BIT IS SET ON EACH PORT.
4. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS AND VERIFY THAT DRIVE IS SEIZED TO PORT A.
5. ISSUE A DRIVE CLEAR COMMAND THROUGH PORT A AND VERIFY THAT ATTENTION BIT IS RESET.
6. RELEASE DRIVE FROM PORT A AND VERIFY THAT IT IS IN NEUTRAL.
7. VERIFY THAT ATTENTION BIT IS STILL SET ON PORT B.

FAULT LIST: J11, J12

TEST 19: RESET ATTENTION B BY DRIVE CLEAR

SAME AS TEST 18 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 20: RESET ATTENTION A AND B BY MASSBUS INIT

VERIFY THAT BOTH PORTS ARE IN NEUTRAL AND THAT EACH CORRESPONDING ATTENTION BIT IS SET. WITH THESE CONDITIONS PRESENT, VERIFY THAT A MASSBUS INIT WILL RESET BOTH ATTENTION BITS

1. SET ATTENTION BITS FOR BOTH PORTS.
2. RELEASE BOTH PORTS AND VERIFY THAT THEY ARE IN NEUTRAL.
3. ISSUE MASSBUS INIT.
4. VERIFY THAT BOTH ATTENTION BITS DID RESET.

TEST 21: RESET ATTENTION A BY SETTING 'GO' BIT

VERIFY THAT THE 'GO' BIT CLEARS ONLY THE ATTENTION BIT OF THE SEIZED PORT.

1. SET ATTENTION BITS FOR BOTH PORTS BY ISSUING OFFSET COMMAND THROUGH BOTH PORTS.
2. VERIFY THAT ATA IS SET FOR BOTH PORTS.
3. SEIZE DRIVE THROUGH PORT A AND VERIFY THAT IT IS SEIZED.
4. ISSUE NOP COMMAND THROUGH PORT A AND VERIFY THAT ATA BIT IS

RESET,
5. RELEASE DRIVE FROM PORT A AND VERIFY THAT IT IS IN NEUTRAL,
6. VERIFY THAT ATTENTION BIT IS STILL SET ON PORT B.

FAULT LIST: J11, J12

TEST 22: RESET ATTENTION B BY SETTING 'GO' BIT

SAME AS TEST 21 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 23: RESET ATTENTION "A" BY WRITING RPAS

VERIFY THAT ATA CAN BE RESET BY WRITING THE APPROPRIATE BIT IN THE RPAS REGISTER.

1. SET ATTENTION BIT ON BOTH PORTS BY ISSUING OFFSET COMMAND THROUGH BOTH PORTS AND VERIFY THAT THEY ARE SET,
2. VERIFY THAT DRIVE IS IN NEUTRAL BY LOOPING ON THE CONTENTS OF RPDS. THE DRIVE IS IN NEUTRAL WHEN RPDS IS NOT 0.
3. WRITE RPAS BIT FOR PORT A AND VERIFY THAT ATA BIT FOR THAT PORT IS RESET AND THAT ATA BIT FOR PORT B IS SET,
4. CLEAR ATTENTION BIT FOR PORT B BY ISSUING A DRIVE CLEAR COMMAND, THEN A RELEASE COMMAND AND WAITING 40MS AFTER THE RELEASE COMMAND HAS BEEN ISSUED.

FAULT LIST: J11, J12

TEST 24: RESET ATTENTION "B" BY WRITING RPAS

SAME AS TEST 23 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 25: SET ATTENTION "A" BY COMMAND

1. CLEAR ATTENTION BITS FOR BOTH PORTS,
2. SELECT PORT A AND ISSUE A RECAL COMMAND
3. VERIFY THAT ATTENTION BIT IS SET FOR PORTA,
4. RELEASE DRIVE FROM PORT A AND VERIFY THAT DRIVE IS IN NEUTRAL,
5. VERIFY THAT ATTENTION BIT IS NOT SET FOR PORT B.

FAULT LIST: J11, J12

TEST 26: SET ATTENTION "B" BY COMMAND

SAME AS TEST 25 EXCEPT DONE THROUGH PORT B

FAULT LIST: J13, J12

TEST 27: TEST THAT PORT "A" TIMEOUT DOES NOT RESET DRIVE

VERIFY THAT A PORT TIMEOUT DOES NOT INITIALIZE DRIVE.

1. CLEAR ATTENTION BIT FOR BOTH PORTS,
2. LOAD PORT A INTO RPCS2,
3. SEIZE DRIVE THROUGHT PORT A BY WRITING RPDS = 0,
4. ISSUE ILLEGAL COMMAND THROUGH PORT A,
5. WAIT FOR DRIVE TO TIMEOUT AND RETURN TO NEUTRAL,
6. SELECT PORT A AND READ COMPOSITE ERROR IN RPDS, ILF BIT IN RPER1, AND ATA BIT IN RPDS,
7. VERIFY THAT DRIVE IS IN NEUTRAL AND THAT THE ATTENTION BIT IS NOT SET FOR PORT B,
8. ISSUE NOP TO PORT "B" AND VERIFY THAT ATTENTION SETS DUE TO COMPOSITE ERROR BEING PREVIOUSLY SET.

FAULT LIST: J11, J12

TEST 28: TEST THAT PORT B TIMEOUT DOES NOT RESET DRIVE

SAME AS TEST 27 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 29: PORT "A" RETRIGGER BY DEMAND TEST

VERIFY THAT PORT A TIMEOUT CAN BE RETRIGGERED BY MASSBUS DEMAND.

1. CLEAR ATTENTION BITS FOR BOTH PORTS,
2. SEIZE DRIVE THROUGH PORT A WAIT FOR 500 MSEC.
3. RETRIGGER TIMEOUT ON-SHOT BY READING RPDS (DRIVE SHOULDN'T HAVE GONE TO THE NEUTRAL STATE),
4. SET TIMER = 2 SECONDS,
5. SELECT PORT B AND WAIT FOR TIMER TO TIMEOUT,
6. READ ELAPSED TIME,
7. VERIFY THAT DRIVE IS IN NEUTRAL,
8. COMPARE ELAPSED TIME TO LIMITS,
9. IF ELAPSED TIME IS NOT WITHIN LIMITS, REPORT THE ERROR.

FAULT LIST: J11, J12

TEST 30: PORT "B" RETRIGGER BY DEMAND TEST

SAME AS TEST 29, EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 31: PORT "A" TIMEOUT/RELEASE TEST

VERIFY THAT THE TIMEOUT ONE-SHOT IS TRIGGERED WHEN THE DRIVE SWITCHES PORTS AND THAT SEIZING PORT PERFORMS NO REGISTER ACCESS.

1. CLEAR ATTENTION BITS FOR BOTH PORTS,
2. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS,
3. SET REQUEST FOR PORT A BY WRITING RPDS THROUGH PORT A,
4. ISSUE RELEASE THROUGH PORT B,
5. VERIFY THAT DRIVE IS SEIZED BY PORT A,
6. LOAD TIME WITH AN ACTUAL MEASURED TIMEOUT + 25%,
7. WAIT FOR TIMER TO EXPIRE,
8. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 32: PORT "B" TIMEOUT/RELEASE TEST

SAME AS TEST 31 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

HISTORY

```
.REM @

        VERSION (CZRJN-A-0)

            1.  THIS VERSION IS THE STARTING POINT FOR CX DIAGNOSTIC SUPPORT OF
                THE RP07 DISK DRIVE.

@
```

HISTORY

```
                                ;*LAST REVISION 01-JAN-83
                                
                                .TITLE  CZRJNA0 RP07 DUAL PORT TEST
                                .SBTTL  PROGRAM HEADER
                                
000000                                  .ENABL  AMA,ABS
002000                                  .       =       2000
                                
                                ;++
                                ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                                ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                                ;--
                                
                                
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000  103                             .ASCII /C/
002001  132                             .ASCII /Z/
002002  122                             .ASCII /R/
002003  112                             .ASCII /J/
002004  116                             .ASCII /N/
002005  000                             .BYTE   0
002006  000                             .BYTE   0
002007  000                             .BYTE   0
002010                          L$REV::                 ;REVISION LEVEL
002010  101                             .ASCII  /A/
002011                          L$DEPO::                ;0
002011  060                             .ASCII  /0/
002012                          L$UNIT::                ;NUMBER OF UNITS
002012  000001                          .WORD   T$PTHV
002014                          L$TIML::                ;LONGEST TEST TIME
002014  000200                          .WORD   200
002016                          L$HPCP::                ;POINTER TO H.W. QUES.
002016  100066                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  000000                          .WORD   0
002022                          L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002226                          .WORD   L$HW
002024                          L$SPTP::                ;PTR. TO S.W. PTABLE
002024  000000                          .WORD   0
002026                          L$LADP::                ;DIAG. END ADDRESS
002026  101040                          .WORD   L$LAST
002030                          L$STA::                 ;RESERVED FOR APT STATS
002030  000000                          .WORD   0
002032                          L$CO::
002032  000000                          .WORD   0
002034                          L$DTYP::                ;DIAGNOSTIC TYPE
002034  000000                          .WORD   0
002036                          L$APT::                 ;APT EXPANSION
002036  000000                          .WORD   0
002040                          L$DTP::                 ;PTR. TO DISPATCH TABLE
002040  002124                          .WORD   L$DISPATCH
002042                          L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
002042  000000                          .WORD   0
002044                          L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
002044  000000                          .WORD   0
002046                          L$EXP1::                ;EXPANSION WORD
```

PROGRAM HEADER

```
002046  000000                  .WORD   0
002050                  L$MREV::                ;SVC REV AND EDIT #
002050     003          .BYTE   C$REVISION
002051     003          .BYTE   C$EDIT
002052                  L$EF::                  ;DIAG. EVENT FLAGS
002052  000000          .WORD   0
002054  000000          .WORD   0
002056                  L$SPC::
002056  000000          .WORD   0
002060                  L$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  002532          .WORD   L$DVTYP
002062                  L$REPP::                ;PTR. TO REPORT CODE
002062  000000          .WORD   0
002064                  L$EXP4::
002064  000000          .WORD   0
002066                  L$EXP5::
002066  000000          .WORD   0
002070                  L$AUT::                 ;PTR. TO ADD UNIT CODE
002070  000000          .WORD   0
002072                  L$DUT::                 ;PTR. TO DROP UNIT CODE
002072  000000          .WORD   0
002074                  L$LUN::                 ;LUN FOR EXERCISERS TO FILL
002074  000000          .WORD   0
002076                  L$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  002540          .WORD   L$DESC
002100                  L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
002100  104035          EMT     E$LOAD
002102                  L$ETP::                 ;POINTER TO ERRTBL
002102  000000          .WORD   0
002104                  L$ICP::                 ;PTR. TO INIT CODE
002104  016730          .WORD   L$INIT
002106                  L$CCP::                 ;PTR. TO CLEAN-UP CODE
002106  017302          .WORD   L$CLEAN
002110                  L$ACP::                 ;PTR. TO AUTO CODE
002110  017300          .WORD   L$AUTO
002112                  L$PRT::                 ;PTR. TO PROTECT TABLE
002112  016722          .WORD   L$PROT
002114                  L$TEST::                ;TEST NUMBER
002114  000000          .WORD   0
002116                  L$DLY::                 ;DELAY COUNT
002116  000000          .WORD   0
002120                  L$HIME::                ;PTR. TO HIGH MEM
002120  000000          .WORD   0
971
```

```
                                .SBTTL  DISPATCH TABLE

                                ;++
                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                ;--

002122  000040                          .WORD   32
002124                          L$DISPATCH::
002124  017400                          .WORD   T1
002126  021156                          .WORD   T2
002130  023104                          .WORD   T3
002132  025032                          .WORD   T4
002134  026360                          .WORD   T5
002136  027706                          .WORD   T6
002140  030732                          .WORD   T7
002142  031756                          .WORD   T8
002144  033532                          .WORD   T9
002146  035306                          .WORD   T10
002150  036756                          .WORD   T11
002152  040426                          .WORD   T12
002154  042232                          .WORD   T13
002156  044036                          .WORD   T14
002160  046732                          .WORD   T15
002162  047604                          .WORD   T16
002164  051064                          .WORD   T17
002166  052344                          .WORD   T18
002170  054244                          .WORD   T19
002172  056144                          .WORD   T20
002174  060034                          .WORD   T21
002176  061724                          .WORD   T22
002200  063350                          .WORD   T23
002202  064566                          .WORD   T24
002204  066004                          .WORD   T25
002206  067200                          .WORD   T26
002210  070374                          .WORD   T27
002212  072134                          .WORD   T28
002214  073674                          .WORD   T29
002216  074716                          .WORD   T30
002220  075740                          .WORD   T31
002222  077012                          .WORD   T32

```

```
      1                                 .SBTTL  DEFAULT HARDWARE P-TABLE
      2
      3                                 ;++
      4                                 ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
      5                                 ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
      6                                 ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
      7                                 ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
      8                                 ;--
      9
     10 002224  000006                          .WORD   L10000-L$HW/2
        002226                          L$HW::
        002226                          DFPTBL::
     11 002226  176700                          .WORD 176700    ;RPCS1 BASE REGISTER ADDRESS
     12 002230  000254                          .WORD 254       ;VECTOR ADDRESS
     13 002232  000240                          .WORD 240       ;BR LEVEL 5 DEVICE
     14 002234  000000                          .WORD   0       ;PORT A DRIVE NUMBER
     15 002236  000001                          .WORD   1       ;PORT B DRIVE NUMBER
     16 002240  000001                          .WORD   1       ;CONFIGURATION IS ALL RIGHT
     17
     27
     28 002242                          L10000:
```

```
                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE
                                ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE
                                ; SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR
                                ; AT RUN TIME.
                                ;--

002242  000000                          .WORD   L10001-L$SW/2
002244                          L$SW::
002244                          SFPTBL::

002244                          L10001:
```

```
                                .SBTTL  GLOBAL EQUATES SECTION

                                ;++
                                ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                                ; ARE USED IN MORE THAN ONE TEST.
                                ;--

                                ;
                                ; BIT DIFINITIONS
                                ;
100000                          BIT15== 100000
040000                          BIT14== 40000
020000                          BIT13== 20000
010000                          BIT12== 10000
004000                          BIT11== 4000
002000                          BIT10== 2000
001000                          BIT09== 1000
000400                          BIT08== 400
000200                          BIT07== 200
000100                          BIT06== 100
000040                          BIT05== 40
000020                          BIT04== 20
000010                          BIT03== 10
000004                          BIT02== 4
000002                          BIT01== 2
000001                          BIT00== 1
                                ;
001000                          BIT9==  BIT09
000400                          BIT8==  BIT08
000200                          BIT7==  BIT07
000100                          BIT6==  BIT06
000040                          BIT5==  BIT05
000020                          BIT4==  BIT04
000010                          BIT3==  BIT03
000004                          BIT2==  BIT02
000002                          BIT1==  BIT01
000001                          BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;
000040                          EF.START==      32.                     ; START COMMAND WAS ISSUED
000037                          EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
000036                          EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
000035                          EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
000034                          EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
                                ;
                                ;
                                ; PRIORITY LEVEL DEFINITIONS
                                ;
000340                          PRI07== 340
000300                          PRI06== 300
000240                          PRI05== 240
000200                          PRI04== 200
000140                          PRI03== 140
000100                          PRI02== 100
```

GLOBAL EQUATES SECTION

```
000040                  PRI01== 40
000000                  PRI00== 0
                        ;
                        ;OPERATOR FLAG BITS
                        ;
000004                  EVL==       4
000010                  LOT==      10
000020                  ADR==      20
000040                  IDU==      40
000100                  ISR==     100
000200                  UAM==     200
000400                  BOE==     400
001000                  PNT==    1000
002000                  PRI==    2000
004000                  IXE==    4000
010000                  IBE==   10000
020000                  IER==   20000
040000                  LOE==   40000
100000                  HOE==  100000
```

```
                        .SBTTL  RHXX REGISTERS

                        ;CONTROL AND STATUS REGISTER 1 (RPCS1)

000100                  IE=     100             ;INTERRUPT ENABLE (BIT #6)
000200                  RDY=    200             ;READY (BIT #7)
000400                  A16=    400             ;HIGH ORDER BUS ADDRESS BIT (BIT #8)
001000                  A17=    1000            ;HIGH ORDER BUS ADDRESS BIT (BIT #9)
002000                  PSEL=   2000            ;PORT SELECT (BIT #10)
020000                  MCPE=   20000           ;MASSBUSS PARITY ERROR (BIT #13)
040000                  TRE=    40000           ;TRANSFER ERROR (BIT #14)
100000                  SC=     100000          ;SPECIAL CONDITION (BIT #15)


                        ;WORD COUNT REGISTER (RPWC)
                        ;(EACH BIT IS CALLED BY BIT NUMBER)


                        ;BUS ADDRESS REGISTER (RPBA)
                        ;(EACH BIT IS CALLED BY BIT NUMBER)


                        ;CONTROL AND STATUS REGISTER 2 (RPCS2)

000001                  U0=     1               ;UNIT SELECT (BIT #0)
000002                  U1=     2               ;UNIT SELECT (BIT #1)
000004                  U2=     4               ;UNIT SELECT (BIT #2)
000010                  BAI=    10              ;BUS ADDRESS INCREMENT INHIBIT (BIT #3)
000020                  PAT=    20              ;MASSBUS PARITY TEST (BIT #4)
000040                  CLR=    40              ;CLEAR (BIT #5)
000100                  IR=     100             ;INPUT READY (BIT #6)
000200                  OR=     200             ;OUTPUT READY (BIT #7)
000400                  MDPE=   400             ;MASS BUS PARITY ERROR (BIT #8)
001000                  MXF=    1000            ;MISSED TRANSFER ERROR (BIT #9)
002000                  PGE=    2000            ;PROGRAM ERROR (BIT #10)
004000                  NEM=    4000            ;NON EXISTENT MEMORY (BIT #11)
010000                  NED=    10000           ;NON EXISTENT DRIVE (BIT #12)
020000                  UPE=    20000           ;UNIBUS PARITY ERROR (BIT #13)
040000                  WCE=    40000           ;WRITE CHECK ERROR (BIT #14)
100000                  DLT=    100000          ;DATA LATE (BIT #15)


                        ;DATA BUFFER REGISTER (RPDB)
                        ;(EACH BIT IS CALLED BY BIT NUMBER)


                        .SBTTL  RP07 REGISTERS

                        ;CONTROL AND STATUS REGISTER #1. (#00)

000001                  GO=     1               ;GO BIT (BIT #0)
000002                  F0=     2               ;FUNCTION CODE BIT #1
000004                  F1=     4               ;FUNCTION CODE BIT #2
000010                  F2=     10              ;FUNCTION CODE BIT #3
000020                  F3=     20              ;FUNCTION CODE BIT #4
000040                  F4=     40              ;FUNCTION CODE BIT #5
004000                  DVA=    4000            ;DEVICE AVAILABLE (BIT #11)
```

```
                                ;DRIVE STATUS REGISTER (RPDS) (#01)

000001                  OM=     1
000002                  EWN=    2
000004                  ILV=    4
000100                  VV=     100
000200                  DRY=    200             ;DRIVE READY (BIT #7)
000400                  DPR=    400             ;DRIVE PRESENT (BIT #8)
001000                  PGM=    1000            ;PROGRAMABLE (BIT #9)
002000                  LBT=    2000            ;LAST SECTOR TRANSFERRED (BIT #10)
004000                  WRL=    4000            ;WRITE LOCK (BIT #11)
010000                  MOL=    10000           ;MEDIUM ON-LINE (BIT #12)
020000                  PIP=    20000           ;POSITIONING OPERATION IN PROGRESS (BIT #13)
040000                  ERR=    40000           ;COMPOSITE ERROR (BIT #14)
100000                  ATA=    100000          ;ATTENTION ACTIVE (BIT #15)


                                ;ERROR REGISTER #01 (RPER1) (#02)

000001                  ILF=    1               ;ILLEGAL FUNCTION (BIT #0)
000002                  ILR=    2               ;ILLEGAL REGISTER (BIT #1)
000004                  RMR=    4               ;REGISTER MODIFICATION REFUSED (BIT #2)
000010                  PAR=    10              ;PARITY ERROR (BIT #3)
000020                  FER=    20              ;FORMAT ERROR (BIT #4)
000040                  WCF=    40              ;WRITE CLOCK FAIL (BIT #5)
000100                  ECH=    100             ;ECC HARD ERROR (BIT #6)
000200                  HCE=    200             ;HEADER COMPARE ERROR (BIT #7)
000400                  HCRC=   400             ;HEADER CRC ERROR (BIT #8)
001000                  AOE=    1000            ;ADDRESS OVERFLOW ERROR (BIT #9)
002000                  IAE=    2000            ;INVALID ADDRESS ERROR (BIT #10)
004000                  WLE=    4000            ;WRITE LOCK ERROR (BIT #11)
010000                  DTE=    10000           ;DRIVE TIMING ERROR (BIT #12)
020000                  OPI=    20000           ;OPERATION INCOMPLETE (BIT #13)
040000                  UNS=    40000           ;DRIVE UNSAFE (BIT #14)
100000                  DCK=    100000          ;DATA CHECK ERROR (BIT 15)


                        ;MAINTAINABILITY REGISTER (RPMR1)(#03)

100000                  DMD=    100000          ;DIAGINOSTIC MODE (BIT #15)


                        ;ATTENTION SUMMARY PSEUDO-REGISTER (RPAS) (#04)

000001                  AT0=    1               ;DEVICE 0 (BIT #0)
000002                  AT1=    2               ;DEVICE 1 (BIT #1)
000004                  AT2=    4               ;DEVICE 2 (BIT #2)
000010                  AT3=    10              ;DEVICE 3 (BIT #3)
000020                  AT4=    20              ;DEVICE 4 (BIT #4)
000040                  AT5=    40              ;DEVICE 5 (BIT #5)
000100                  AT6=    100             ;DEVICE 6 (BIT #6)
000200                  AT7=    200             ;DEVICE 7 (BIT #7)


                        ;DESIRED SECTOR/TRACK ADDRESS REGISTER (RPDA) (#05)
```

```
                                ;(EACH BIT IS CALLED BY BIT NUMBER)


                                ;DRIVE TYPE REGISTER (RPDT) (#06)

000001                          DT00=   1               ;DRIVE TYPE NUMBER BIT 1
000002                          DT01=   2               ;DRIVE TYPE NUMBER BIT 2
000004                          DT02=   4               ;DRIVE TYPE NUMBER BIT 3
000010                          DT03=   10              ;DRIVE TYPE NUMBER BIT 4
000020                          DT04=   20              ;DRIVE TYPE NUMBER BIT 5
000040                          DT05=   40              ;DRIVE TYPE NUMBER BIT 6
000100                          DT06=   100             ;DRIVE TYPE NUMBER BIT 7
000200                          DT07=   200             ;DRIVE TYPE NUMBER BIT 8
000400                          DT08=   400             ;DRIVE TYPE NUMBER BIT 9
004000                          DRQ=    4000            ;DRIVE REQUEST REQUIRED (BIT #11)
020000                          MOH=    20000           ;MOVING HEAD (BIT #13)
040000                          TAP=    40000           ;TAPE DRIVE (BIT #14)
100000                          NBA=    100000          ;NOT BLOCK ADDRESSED (BIT #15)


                                ;LOOK-AHEAD REGISTER (RPLA) (#07)

000100                          SC0=    100             ;SECTOR COUNT FIELD 0 (BIT #6)
000200                          SC1=    200             ;SECTOR COUNT FIELD 1 (BIT #7)
000400                          SC2=    400             ;SECTOR COUNT FIELD 2 (BIT #8)
001000                          SC3=    1000            ;SECTOR COUNT FIELD 3 (BIT #9)
002000                          SC4=    2000            ;SECTOR COUNT FIELD 4 (BIT #10)
000400                          SC5=    400             ;;;SECTOR COUNT FIELD 5 (BIT #11)
001000                          SC6=    1000            ;;;SECTOR COUNT FIELD 6 (BIT #12)


                                ;RP07 ERROR REGISTER #3 (RPER3) (#15)

000001                          DGE=    1               ;;;DIAGNOSTIC ERROR (BIT #0)
000002                          TPE=    2               ;;;TEMPERATURE WARNING ERROR (BIT #1)
000004                          AIR=    4               ;;;AIR SYSTEM WARNING ERROR (BIT #2)
000010                          DPE=    10              ;;;DATA PARITY ERROR (BIT #3)
000020                          BPE=    20              ;;;BUFFER PARITY ERROR (BIT #4)
000040                          DCU=    40              ;;;DC UNSAFE (BIT #5)
000100                          IXU=    100             ;;;INDEX UNSAFE (BIT#6)
000200                          DVC=    200             ;;;DEVICE CHECK (BIT #7)
000400                          TCF=    400             ;;;TACH CALIBRATION FAILURE (BIT #8)
001000                          LCE=    1000            ;;;LOSS OF CYLINDER ERROR (BIT #9)
040000                          SKI=    40000           ;SEEK INCOMPLETE (BIT #14)
100000                          BSE=    100000          ;;;BAD SECTOR ERROR (BIT #15)


                                ;OFFSET REGISTER (RPOF) (#11)

000200                          OFD=    200             ;OFFSET FORWARD (BIT #5)
002000                          HCI=    2000            ;HEADER COMPARE INHIBIT (BIT #10)
004000                          ECI=    4000            ;ERROR CORRECTION CODE INHIBIT (BIT #11)
010000                          FMT16=  10000           ;FORMAT BIT (BIT #12
040000                          MTD=    40000           ;;;MOVE TRACK DISCRIPTOR (BIT #14)
100000                          CMOD=   100000          ;;;COMMAND MODIFIER BIT (BIT #15)
```

RP07 REGISTERS

```
                                ;DESIRED CYLINDER ADDRESS (RPDC) (#12)
                                ;(EACH BIT IS CALLED BY BIT NUMBER)


                                ;CURRENT CYLINDER REGISTER (RPCC) (#13)
                                ;(EACH BIT IS CALLED BY BIT NUMBER)


                                ;SERIAL NUMBER REGISTER (RPSN) (#10)
                                ;(EACH IS CALLED BY BIT NUMBER)


                                ;RP07 ERROR REGISTER #2 (RPER2) (#14)

000400                          WRYUNS= 400             ;;;WRITE READY UNSAFE (BIT #8)
001000                          WOR=    1000            ;;;WRITE OVERRUN (BIT #9)
002000                          RWU1=   2000            ;;;READ/WRITE UNSAFE #1 (BIT #10)
004000                          RWU2=   4000            ;;;READ/WRITE UNSAFE #2 (BIT #11)
010000                          RWU3=   10000           ;;;READ WRITEE UNSAFE #3 (BIT #12)
100000                          PGE=    100000          ;;;PROGRAM ERROR (BIT #15)


                                ;ECC POSITION REGISTER (RPEC1) (#16)
                                ;(EACH BIT IS CALLED BY BIT NUMBER)


                                ;ECC PATTERN REGISTER (RPEC2) (#17)
                                ;(EACH BIT IS CALLED BY BIT NUMBER)
```

```
                                .SBTTL  GLOBAL DATA SECTION

                                ;++
                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ; IN MORE THAN ONE TEST.
                                ;--

002244  000000                  CLKSTA:: .WORD  0               ;CLOCK STATUS (NO CLOCK= 0,KW11-P= 1 OR KW11-L= -1
002246  000000                  PORTA::  .WORD  0               ;ADDRESS OF PORT A
002250  000000                  PORTB::  .WORD  0               ;ADDRESS OF PORT B
002252  000000                  PORTC::  .WORD  0               ;ADDRESS OF DIFFERENT DRIVE
002254  000000                  RQSTA::  .WORD  0               ;REQUEST BIT FOR PORT A
002256  000000                  RQSTB::  .WORD  0               ;REQUEST BIT FOR PORT B
002260  000000                  ASR1::   .WORD  0               ;ATA-A OR ATA-B
002262  000000                  ASRA::   .WORD  0               ;;;ATA-A
002264  000000                  ASRB::   .WORD  0               ;;;ATA-B
002266  000000                  PTNBR::  .WORD  0               ;CONTAINS THE PORT ADDRESS FOR ERROR TYPEOUTS
002270  000000                  SEIZPT:: .WORD  0               ;CONTAINS THE ADDRESS OF THE SEIZING PORT
002272  000000                  OPPRT::  .WORD  0               ;CONTAINS THE ADDRESS OF THE 'OPPOSITE' PORT
002274  000000                  TSTNUM:: .WORD  0               ;NUMBER OF THE CURRENT TEST
002276  000000                  CKERR::  .WORD  0               ;IF -1, A REGISTER MISCOMPARISON OCCURRED
002300  000000                  NOSEIZ:: .WORD  0               ;IF -1, THE PORT IN 'SEIZPT' DID NOT SEIZE THE DRIVE
002302  000000                  RELERR:: .WORD  0               ;IF -1, THE PORT IN 'SEIZPT' DID NOT RELEASE THE DRIVE
002304  000000                  TIME::   .WORD  0               ;ELAPSED TIME COUNTER
002306  000000                  WATCH::  .WORD  0               ;WATCH DOG TIMER LOCATION
002310  000000                  TIMEA::  .WORD  0               ;THE TIMEOUT ONE-SHOT VALUE MEASURED THROUGH PORT A
002312  000000                  TIMEAP:: .WORD  0               ;PORT A TIMEOUT VALUE + 25%
002314  000000                  TIMEAM:: .WORD  0               ;PORT A TIMEOUT VALUE - 25%
002316  000000                  TIMEB::  .WORD  0               ;THE TIMEOUT ONE-SHOT VALUE MEASURED THROUGH PORT B
002320  000000                  TIMEBP:: .WORD  0               ;PORT A TIMEOUT VALUE + 25%
002322  000000                  TIMEBM:: .WORD  0               ;PORT B TIME VALUE - 25%
002324  000000                  TIMES::  .WORD  0               ;STORAGE FOR TIMEOUT ONE-SHOT RETRIGGER TEST
002326  000000                  CNFBAD:: .WORD  0               ;BAD CONFIGURATION MARKER
002330  000000                  ABC::    .WORD  0               ;TIMER
002332  000000                  BADDAT:: .WORD  0               ;USED TO GET BAD DATA
002334  000000                  BADADR:: .WORD  0               ;USED TO GET FAILING REGISTER
002336  000000                  EXPTED:: .WORD  0               ;USED TO GET GOOD DATA
002340  000000                  DRVBAD:: .WORD  0               ;USED TO MARK A SYSTEM FATAL ERROR
002342  000000                  TMP0::   .WORD  0               ;TEMPORARY STORAGE
002344  000000                  TMP1::   .WORD  0               ;TEMPORARY STORAGE
002346  000000                  TMP2::   .WORD  0               ;TEMPORARY STORAGE
002350  000000                  TMP3::   .WORD  0               ;TEMPORARY STORAGE
002352  000000                  TMP4::   .WORD  0               ;TEMPORARY STORAGE

002354  000000                  UNIT::   .WORD  0               ;USED TO SELECT A UNIT #
002356  176700                  RPADR::  .WORD  176700          ;CONTAINS RPCS1 BASE ADDRESS
002360  000254  000240          RPVEC::  .WORD  254,5*32.       ;CONTAINS VECTOR ADDRESS & BR LEVEL
002364  000050                  RHEXT::  .WORD  50              ;CONTAINS RH70 OFFSET TO RPBAE
002366  000000                  RHTYPE::.WORD   0               ;CONTAINS RHXX TYPE; RH11= 0, RH70= 1
002370  000000                  DRVSN::  .WORD  0               ;STORAGE FOR DRIVE S/N DIGITS

002372  176700                  RPCS1::  .WORD  176700          ;BASE ADDRESS USED FOR THE DRIVE
002374  176702                  RPWC::   .WORD  176702          ;WORD COUNT REGISTER
002376  176704                  RPBA::   .WORD  176704          ;BUFFER ADDRESS REGISTER
002400  176706                  RPDA::   .WORD  176706          ;DESIRED SECTOR/TRACK ADDRESS
002402  176710                  RPCS2::  .WORD  176710          ;RP07 STATUS REGISTER
002404  176712                  RPDS::   .WORD  176712          ;RP07 DRIVE STATUS
```

GLOBAL DATA SECTION

```
     58 002406  176714                RPER1:: .WORD   176714          ;RP07 ERROR REGISTER #1
     59 002410  176716                RPAS::  .WORD   176716          ;RP07 ATTENTION SUMMARY PSEUDO REGISTER
     60 002412  176720                RPLA::  .WORD   176720          ;RP07 LOOK AHEAD REGISTER
     61 002414  176722                RPDB::  .WORD   176722          ;RP07 DATA BUFFER
     62 002416  176724                RPMR1:: .WORD   176724          ;RP07 MAINTENANCE REGISTER #1
     63 002420  176726                RPDT::  .WORD   176726          ;DRIVE TYPE REGISTER
     64 002422  176730                RPSN::  .WORD   176730          ;RP07 SERIAL NUMBER
     65 002424  176732                RPOF::  .WORD   176732          ;RP07 OFFSET REGISTER
     66 002426  176734                RPDC::  .WORD   176734          ;RP07 DESIRED CYLINDER
     67 002430  176736                RPCC::  .WORD   176736          ;RP07 CURRENT CYLINDER
     68 002432  176742                RPER2:: .WORD   176742          ;RP07 ERROR REGISTER #2
     69 002434  176742                RPER3:: .WORD   176742          ;RP07 ERROR REGISTER #3
     70 002436  176744                RPEC1:: .WORD   176744          ;RP07 ERROR-POSITION
     71 002440  176746                RPEC2:: .WORD   176746          ;RP07 ERROR PATTERN
     72 002442  176750                RPBAE:: .WORD   176750          ;BUFFER ADDRESS EXTENDED (RH70)
     73 002444  176752                RPCS3:: .WORD   176752          ;STATUS REGISTER (RH70)
     74
     75                             ;ATTENTION BITS TABLE (ATABIT=8 BYTES)
     76                                     ;THIS TABLE CONTAINS THE CORRESPONDING BIT TO EACH DRIVES
     77                                     ;ATTENTION BIT
     78
     79 002446      001             ATABIT::.BYTE   1               ;DRIVE 0
     80 002447      002                     .BYTE   2               ;DRIVE 1
     81 002450      004                     .BYTE   4               ;DRIVE 2
     82 002451      010                     .BYTE   10              ;DRIVE 3
     83 002452      020                     .BYTE   20              ;DRIVE 4
     84 002453      040                     .BYTE   40              ;DRIVE 5
     85 002454      100                     .BYTE   100             ;DRIVE 6
     86 002455      200                     .BYTE   200             ;DRIVE 7
     87
     88                             ; STORAGE FOR DEVICE REGISTERS
     89                             ;
     90 002456                      REG::   .BLKW 22.               ;SAVE REGISTERS HERE
     91
```

```
                                .SBTTL  GLOBAL TEXT SECTION

                                ;++
                                ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                ; MORE THAN ONE TEST.
                                ;--

                                ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                ;
002532                          L$DVTYP::
002532  122     120     060             .ASCIZ  /RP07/
                                        .EVEN

                                ; TEST DESCRIPTION
                                ;
002540                          L$DESC::
002540  122     120     060             .ASCIZ  /RP07 DUAL PORT TEST/
                                        .EVEN

                                ; FORMAT STATEMENTS USED IN PRINT CALLS
                                ;

002564  045     116     000     CRLF::  .ASCIZ  /%N/
002567  045     116     045     DSNMSG:: .ASCIZ /%N%ADRIVE %O1%A & %O1%A, PG/
002623  045     124     000     SNDIGT:: .ASCIZ /%T/

002626  045     101     120     FRMT01: .ASCIZ  /%APORT# %O1%A REG ADR= %O6%A CONTENTS= %O6/
002701  045     101     122     FRMT03: .ASCIZ  /%AREG ADR %O6%A PORT A %O1%A PORT B %O1/
002751  045     101     052     FRMT04: .ASCII  /%A*** SEIZE ERROR *** PORT# %O1%A PORT# %O1/
003024  045     116     045             .ASCIZ  /%N%AREG ADR %O6%A GOOD= %O6%A BAD= %O6/
003073  045     101     120     FRMT05: .ASCIZ  /%APORT# %O1%A REG ADR= %O6%A GOOD= %O6%A BAD= %O6/
003155  045     101     052     FRMT07: .ASCII  /%A*** RELEASE ERROR *** PORT# %O1%A PORT# %O1/
003232  045     116     045             .ASCIZ  /%N%AREG ADR= %O6%A GOOD= %O6%A BAD= %O6/

003302  045     101     120     FRMT11: .ASCIZ  /%APORT #%O1%A REG ADR= %O6%A CONTENTS= %O6/
003355  045     101     052     FRMT13: .ASCII  /%A*** SEIZE ERROR *** PORT# %O1%A PORT# %O1/
003430  045     116     045             .ASCIZ  /%N%AREG ADR= %O6%A CONTENTS= %O6/
003471  045     101     106     FRMT14: .ASCIZ  /%AFAULT LIST: J11, J12%N/
003522  045     101     106     FRMT15: .ASCIZ  /%AFAULT LIST: J13, J12%N/
003553  045     101     106     FRMT16: .ASCII  /%AFAULT LIST: J11, J12, J13, MAINT CABLE, DUAL PORT%N/
003640  045     101     112             .ASCIZ  /%AJUMPER, OR AN INCORRECT START-UP SEQUENCE%N/
003716  045     101     106     FRMT17: .ASCIZ  /%AFAULT LIST: J11, J12, J13%N/

003754  045     101     122     FRMT22: .ASCIZ  /%ARELEASING PORT# %O1%A SEIZING PORT# %O1/
004026  045     101     123     FRMT23: .ASCIZ  /%ASEIZE PORT# %O1%A REG ADR= %O6%A CONTENTS= %O6/
004107  045     101     122     FRMT26: .ASCIZ  /%ARELEASING PORT# %O1/

004135  045     101     122     FRMT31: .ASCIZ  /%ARELEASING PORT# %O1%A REQUESTING PORT# %O1/
004212  045     101     120     FRMT36: .ASCIZ  /%APORT# %O1/

004226  045     101     052     FRMT44: .ASCIZ  /%A*** RELEASE ERROR *** PORT# %O1%A PORT# %O1/
004304  045     101     120     FRMT46: .ASCIZ  /%APORT A RPCS1= %O6%A PORT B RPDS= %O6/

004353  045     101     120     FRMT55: .ASCIZ  /%APORT# %O1%A TIMEOUT VALUE= %D5%A (IN MS)/
```

```
     74 004426      045      101      122  FRMT56: .ASCIZ  /%ARPCS1 EXPECTED ADDRESS: %O6/
     75 004464      045      101      120  FRMT57: .ASCII  /%APORT A EXPECTED= %O6%A RECEIVED= %O6/
     76 004532      045      116      045          .ASCIZ  /%N%APORT B EXPECTED= %O6%A RECEIVED= %O6/
     77
     78 004603      045      101      120  FRMT64: .ASCII  /%APORT# %O1%A FAILING REGISTER = RPER1/
     79 004651      045      116      045          .ASCIZ  /%N%AEXPECTED= %O6%A RECEIVED= %O6/
     80 004713      045      101      120  FRMT65: .ASCII  /%APORT# %O1%A FAILING REGISTER = RPCS1/
     81 004761      045      116      045          .ASCIZ  /%N%AEXPECTED= %O6%A RECEIVED= %O6/
     82
     83 005023      045      116      045  FRMT66: .ASCIZ  /%N%ADRIVE   RPCS1   RPWC    RPBA    RPDA    RPCS2   RPDS/
     84 005114      045      116      045  FRMT67: .ASCIZ  /%N%O6%A  %O6%A  %O6%A  %O6%A  %O6%A  %O6%A  %O6/
     85 005174      045      116      045  FRMT70: .ASCIZ  /%N%ARPER1   RPAS    RPLA    RPDB    RPMR1   RPDT    RPSN/
     86 005265      045      116      045  FRMT71: .ASCIZ  /%N%O6%A  %O6%A  %O6%A  %O6%A  %O6%A  %O6%A  %O6/
     87 005345      045      116      045  FRMT72: .ASCIZ  /%N%ARPOF    RPDC    RPCC    RPER2   RPER3   RPEC1   RPEC2/
     88 005437      045      116      045  FRMT73: .ASCIZ  /%N%O6%A  %O6%A  %O6%A  %O6%A  %O6%A  %O6%A  %O6%N/
     89 005521      045      101      122  FRMT74: .ASCIZ  /%ARPBAE   RPCS3/
     90 005541      045      116      045  FRMT75: .ASCIZ  /%N%O6%A  %O6%N/
     91
     92                                    .SBTTL  GLOBAL ASCII MESSAGE SECTION
     93
     94 005560      127      122      117  EM1:    .ASCIZ  /WRONG DRIVE TYPE/
     95 005601      104      122      111  EM2:    .ASCIZ  /DRIVE NOT ON LINE/
     96 005623      123      105      122  EM3:    .ASCIZ  /SERIAL NUMBER READ THROUGH EACH PORT NOT THE SAME/
     97 005705      104      122      111  EM4:    .ASCIZ  /DRIVE NOT SEIZED BY PORT/
     98 005736      127      122      117  EM5:    .ASCIZ  /WRONG STATUS SEEN BY THE SEIZING PORT/
     99 006004      122      105      107  EM6:    .ASCIZ  /REG CONTENTS SEEN BY OPPOSITE PORT - DRIVE WAS SEIZED/
    100 006072      122      105      107  EM7:    .ASCIZ  /REG CONTENTS WRONG AFTER RELEASE OR TIMEOUT/
    101
    102 006146      122      105      107  EM10:   .ASCIZ  /REG CONTENTS WRONG/
    103 006171      103      117      116  EM11:   .ASCIZ  /CONTROL BUS PARITY ERROR READING INDICATED REGISTER/
    104 006255      103      117      115  EM12:   .ASCIZ  /COMMAND ISSUED WITH DRIVE IN ERROR STILL SETS GO BIT/
    105 006342      122      105      101  EM13:   .ASCIZ  /READIN PRESET DOES NOT SET VOLUME VALID FOR THE PORT/
    106 006427      126      117      114  EM14:   .ASCIZ  /VOLUME VALID SET ON THE WRONG PORT/
    107 006472      101      124      124  EM15:   .ASCIZ  /ATTN BIT WRONG AFTER TIMEOUT - REQUEST NOT SET/
    108 006551      101      124      124  EM16:   .ASCIZ  /ATTN BIT WRONG AFTER RELEASE - REQUEST SET/
    109 006624      101      124      124  EM17:   .ASCIZ  /ATTN BIT WRONG AFTER RELEASE - REQUEST NOT SET/
    110
    111 006703      104      122      111  EM20:   .ASCIZ  /DRIVE NOT SEIZED WHEN ATTN BIT FOR PORT CLEARED/
    112 006763      104      122      111  EM21:   .ASCIZ  /DRIVE SEIZED WHEN ZERO WRITTEN IN ATTN BIT/
    113 007036      104      122      111  EM22:   .ASCIZ  /DRIVE NOT IN NEUTRAL AFTER TIMEOUT - REQUEST NOT SET/
    114 007123      124      111      115  EM23:   .ASCIZ  /TIMEOUT CLEARED THE DRIVE'S ERROR BIT/
    115 007171      122      105      114  EM24:   .ASCIZ  /RELEASE COMMAND RELEASED DRIVE WITH ERRORS SET/
    116 007250      124      111      115  EM25:   .ASCIZ  /TIMEOUT ONE-SHOT DID NOT RETRIGGER/
    117 007313      104      122      111  EM26:   .ASCIZ  /DRIVE NOT IN NEUTRAL AFTER RELEASE - REQUEST NOT SET/
    118 007400      122      105      107  EM27:   .ASCIZ  /REGISTER WRONG AFTER RELEASE WITH REQUEST SET/
    119
    120 007456      104      122      111  EM30:   .ASCIZ  /DRIVE SEIZED BY RELEASE COMMAND ISSUED WHEN DRIVE IN NEUTRAL/
    121 007553      104      122      111  EM31:   .ASCIZ  /DRIVE IN NEUTRAL AFTER RELEASE - REQUEST SET/
    122 007630      101      124      124  EM32:   .ASCIZ  /ATTN BIT WRONG AFTER RECALIBRATE COMMAND/
    123 007701      104      122      111  EM33:   .ASCIZ  /DRIVE RETURNED TO NEUTRAL IF DRIVE CLEAR GIVEN WHILE DRIVE SEIZED/
    124 010003      104      122      111  EM34:   .ASCIZ  /DRIVE RETURNED TO NEUTRAL IF MASSBUS INIT GIVEN WHILE DRIVE SEIZED/
    125 010106      124      111      115  EM35:   .ASCIZ  /TIMEOUT ONE SHOT WAS RETRIGGERED WITHOUT REGISTER ACCESS/
    126 010177      124      111      115  EM36:   .ASCIZ  /TIMEOUT HAS NOT OCCURRED WITHIN 2 SECONDS/
    127 010251      104      122      111  EM37:   .ASCIZ  /DRIVE IS NON-EXISTENT ('NED' BIT SET)/
    128
    129 010317      101      124      124  EM40:   .ASCIZ  /ATTN BIT FOR PORT NOT RESET BY MASSBUS CLEAR/
    130 010374      124      111      115  EM41:   .ASCIZ  /TIMEOUT CLEARED THE ATTENTION BIT/
```

GLOBAL ASCII MESSAGE SECTION

```
131 010436  104  122  111  EM42:  .ASCIZ  /DRIVE NOT IN NEUTRAL OR SEIZED AFTER ATTN BIT WRITTEN/
132 010524  104  122  111  EM43:  .ASCIZ  /DRIVE IN NEUTRAL AFTER ATTENTION BIT WRITTEN/
133 010601  127  122  111  EM44:  .ASCIZ  /WRITING ATTENTION BIT (IN RPAS) DID NOT SET PORT REQUEST/
134 010672  103  117  116  EM45:  .ASCIZ  @CONTROLLER SELECT SWITCH ON DRIVE NOT IN 'A/B'@
135 010751  103  101  116  EM46:  .ASCIZ  /CAN'T ACCESS DRIVE THROUGH EITHER PORT/
136 011020  101  124  124  EM47:  .ASCIZ  /ATTN BIT FOR SEIZING PORT NOT CLEARED BY MASSBUS INIT/
137
138 011106  101  124  124  EM50:  .ASCIZ  /ATTN BIT FOR OPPOSITE PORT CLEARED BY DRIVE CLEAR/
139 011170  101  124  124  EM51:  .ASCIZ  /ATTN BIT NOT CLEARED BY MASSBUS INIT, DRIVE IN NEUTRAL/
140 011257  124  110  105  EM52:  .ASCIZ  /THE ATTN BIT SET AFTER TIMEOUT WITH NO REQUEST & 'ERR' SET/
141 011352  122  120  101  EM53:  .ASCIZ  /RPAS REGISTER BITS SET BY WRITING ATA BIT/
142 011424  122  105  114  EM54:  .ASCIZ  /RELEASE COMMAND RECOGNIZED WHEN ISSUED BY NON-SEIZING PORT/
143 011517  124  111  115  EM55:  .ASCIZ  /TIMEOUT ONE-SHOT IS LESS THAN 750 MS/
144 011564  124  111  115  EM56:  .ASCIZ  /TIMEOUT ONE-SHOT NOT WITHIN SPEC (EXPTED: 750MS < 'TIME' < 1250 MS)/
145
146 011670  101  124  124  EM60:  .ASCIZ  /ATTENTION NOT RESET BY WRITING RPAS/
147 011734  101  124  124  EM61:  .ASCIZ  /ATTENTION NOT RESET BY GO/
148 011766  101  124  124  EM62:  .ASCIZ  /ATTENTION RESET BY GO WHEN NOT SEIZED/
149 012034  104  122  111  EM63:  .ASCIZ  /DRIVE CANNOT BE SEIZED BY WRITING ATA BIT/
150 012106  111  114  106  EM64:  .ASCIZ  /ILF ERROR CANNOT BE SET/
151 012136  104  122  111  EM65:  .ASCIZ  /DRIVE NOT READY AFTER RELEASE/
152 012174  103  101  116  EM66:  .ASCIZ  /CANNOT CLEAR ERROR BY DRIVE CLEAR/
153 012236  102  117  124  EM67:  .ASCIZ  /BOTH PORT NUMBERS THE SAME - TESTS NOT PERFORMED/
154
155 012317  116  117  040  EM70:  .ASCIZ  /NO CLOCK  FOUND ON  SYSTEM - TESTS NOT PERFORMED/
156 012400  127  122  117  EM71:  .ASCIZ  /WRONG SYSTEM CONFIGURATION - TESTS NOT PERFORMED/
157
158                         .EVEN
162
173
```

```
      1                                 .SBTTL  GLOBAL ERROR REPORT SECTION
      2
      3                                 ;++
      4                                 ; THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
      5                                 ; USED BY MORE THAN TEST TO OUTPUT ADDITIONAL ERROR INFORMATION.  PRINTB
      6                                 ; (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
      7                                 ;--
      8
      9 012462                          ERR0::
     012462  004737  016276                     JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
     012466  013746  002332                     MOV     BADDAT,-(SP)
     012472  013746  002334                     MOV     BADADR,-(SP)
     012476  013746  002266                     MOV     PTNBR,-(SP)
     012502  012746  002626                     MOV     #FRMT01,-(SP)
     012506  012746  000004                     MOV     #4,-(SP)
     012512  010600                             MOV     SP,R0
     012514  104414                             TRAP    C$PNTB
     012516  062706  000012                     ADD     #12,SP
     012522  004737  016350                     JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
     012526                          L10002:
     012526  104423                             TRAP    C$MSG
    10 012530                          ERR1::
     012530  004737  016276                     JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
     012534  013746  002332                     MOV     BADDAT,-(SP)
     012540  013746  002336                     MOV     EXPTED,-(SP)
     012544  013746  002334                     MOV     BADADR,-(SP)
     012550  012746  002701                     MOV     #FRMT03,-(SP)
     012554  012746  000004                     MOV     #4,-(SP)
     012560  010600                             MOV     SP,R0
     012562  104414                             TRAP    C$PNTB
     012564  062706  000012                     ADD     #12,SP
     012570  004737  016350                     JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
     012574                          L10003:
     012574  104423                             TRAP    C$MSG
    11 012576                          ERR2::
     012576  004737  016276                     JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
     012602  013746  002332                     MOV     BADDAT,-(SP)
     012606  013746  002336                     MOV     EXPTED,-(SP)
     012612  013746  002334                     MOV     BADADR,-(SP)
     012616  013746  002266                     MOV     PTNBR,-(SP)
     012622  013746  002270                     MOV     SEIZPT,-(SP)
     012626  012746  002751                     MOV     #FRMT04,-(SP)
     012632  012746  000006                     MOV     #6,-(SP)
     012636  010600                             MOV     SP,R0
     012640  104414                             TRAP    C$PNTB
     012642  062706  000016                     ADD     #16,SP
     012646  004737  016350                     JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
     012652                          L10004:
     012652  104423                             TRAP    C$MSG
    12 012654                          ERR3::
     012654  004737  016276                     JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
     012660  013746  002332                     MOV     BADDAT,-(SP)
     012664  013746  002336                     MOV     EXPTED,-(SP)
     012670  013746  002334                     MOV     BADADR,-(SP)
     012674  013746  002266                     MOV     PTNBR,-(SP)
     012700  012746  003073                     MOV     #FRMT05,-(SP)
     012704  012746  000005                     MOV     #5,-(SP)
```

```
        012710  010600                          MOV     SP,R0
        012712  104414                          TRAP    C$PNTB
        012714  062706  000014                  ADD     #14,SP
        012720  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
        012724                          L10005:
        012724  104423                          TRAP    C$MSG
    13  012726                          ERR4::
        012726  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
        012732  013746  002332                  MOV     BADDAT,-(SP)
        012736  013746  002334                  MOV     BADADR,-(SP)
        012742  013746  002246                  MOV     PTNBR,-(SP)
        012746  013746  002270                  MOV     SEIZPT,-(SP)
        012752  012746  003355                  MOV     #FRMT13,-(SP)
        012756  012746  000005                  MOV     #5,-(SP)
        012762  010600                          MOV     SP,R0
        012764  104414                          TRAP    C$PNTB
        012766  062706  000014                  ADD     #14,SP
        012772  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
        012776                          L10006:
        012776  104423                          TRAP    C$MSG
    14  013000                          ERR5::
        013000  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
        013004  013746  002332                  MOV     BADDAT,-(SP)
        013010  013746  002334                  MOV     BADADR,-(SP)
        013014  013746  002266                  MOV     PTNBR,-(SP)
        013020  012746  003302                  MOV     #FRMT11,-(SP)
        013024  012746  000004                  MOV     #4,-(SP)
        013030  010600                          MOV     SP,R0
        013032  104414                          TRAP    C$PNTB
        013034  062706  000012                  ADD     #12,SP
        013040  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
        013044                          L10007:
        013044  104423                          TRAP    C$MSG
    15  013046                          ERR6::
        013046  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
        013052  013746  002332                  MOV     BADDAT,-(SP)
        013056  013746  002336                  MOV     EXPTED,-(SP)
        013062  013746  002270                  MOV     SEIZPT,-(SP)
        013066  012746  004713                  MOV     #FRMT65,-(SP)
        013072  012746  000004                  MOV     #4,-(SP)
        013076  010600                          MOV     SP,R0
        013100  104414                          TRAP    C$PNTB
        013102  062706  000012                  ADD     #12,SP
        013106  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
        013112                          L10010:
        013112  104423                          TRAP    C$MSG
    16  013114                          ERR7::
        013114  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
        013120  013746  002266                  MOV     PTNBR,-(SP)
        013124  012746  004212                  MOV     #FRMT36,-(SP)
        013130  012746  000002                  MOV     #2,-(SP)
        013134  010600                          MOV     SP,R0
        013136  104414                          TRAP    C$PNTB
        013140  062706  000006                  ADD     #6,SP
        013144  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
        013150                          L10011:
        013150  104423                          TRAP    C$MSG
```

```
    17 013152
       013152  004737  016276          ERR8::
       013156  013746  002266                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
       013162  013746  002270                  MOV     PTNBR,-(SP)
       013166  012746  003754                  MOV     SEIZPT,-(SP)
       013172  012746  000003                  MOV     #FRMT22,-(SP)
       013176  010600                          MOV     #3,-(SP)
       013200  104414                          MOV     SP,R0
       013202  062706  000010                  TRAP    C$PNTB
       013206  004737  016350                  ADD     #10,SP
       013212                                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                                       L10012:
       013212  104423                          TRAP    C$MSG
    18 013214                          ERR9::
       013214  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
       013220  013746  002332                  MOV     BADDAT,-(SP)
       013224  013746  002334                  MOV     BADADR,-(SP)
       013230  013746  002270                  MOV     SEIZPT,-(SP)
       013234  012746  004026                  MOV     #FRMT23,-(SP)
       013240  012746  000004                  MOV     #4,-(SP)
       013244  010600                          MOV     SP,R0
       013246  104414                          TRAP    C$PNTB
       013250  062706  000012                  ADD     #12,SP
       013254  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
       013260                          L10013:
       013260  104423                          TRAP    C$MSG
    19 013262                          ERR10::
       013262  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
       013266  013746  002270                  MOV     SEIZPT,-(SP)
       013272  012746  004212                  MOV     #FRMT36,-(SP)
       013276  012746  000002                  MOV     #2,-(SP)
       013302  010600                          MOV     SP,R0
       013304  104414                          TRAP    C$PNTB
       013306  062706  000006                  ADD     #6,SP
       013312  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
       013316                          L10014:
       013316  104423                          TRAP    C$MSG
    20 013320                          ERR11::
       013320  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
       013324  013746  002272                  MOV     OPPRT,-(SP)
       013330  013746  002270                  MOV     SEIZPT,-(SP)
       013334  012746  004135                  MOV     #FRMT31,-(SP)
       013340  012746  000003                  MOV     #3,-(SP)
       013344  010600                          MOV     SP,R0
       013346  104414                          TRAP    C$PNTB
       013350  062706  000010                  ADD     #10,SP
       013354  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
       013360                          L10015:
       013360  104423                          TRAP    C$MSG
    21 013362                          ERR12::
       013362  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
       013366  013746  002332                  MOV     BADDAT,-(SP)
       013372  013746  002334                  MOV     BADADR,-(SP)
       013376  013746  002270                  MOV     SEIZPT,-(SP)
       013402  012746  002626                  MOV     #FRMT01,-(SP)
       013406  012746  000004                  MOV     #4,-(SP)
       013412  010600                          MOV     SP,R0
       013414  104414                          TRAP    C$PNTB
```

```
                013416  062706  000012                  ADD     #12,SP
                013422  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013426                          L10016:
                013426  104423                          TRAP    C$MSG
            22  013430                          ERR13::
                013430  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013434  013746  002272                  MOV     OPPRT,-(SP)
                013440  013746  002270                  MOV     SEIZPT,-(SP)
                013444  012746  004226                  MOV     #FRMT44,-(SP)
                013450  012746  000003                  MOV     #3,-(SP)
                013454  010600                          MOV     SP,R0
                013456  104414                          TRAP    C$PNTB
                013460  062706  000010                  ADD     #10,SP
                013464  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013470                          L10017:
                013470  104423                          TRAP    C$MSG
            23  013472                          ERR14::
                013472  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013476  013746  002350                  MOV     TMP3,-(SP)
                013502  013746  002346                  MOV     TMP2,-(SP)
                013506  012746  004304                  MOV     #FRMT46,-(SP)
                013512  012746  000003                  MOV     #3,-(SP)
                013516  010600                          MOV     SP,R0
                013520  104414                          TRAP    C$PNTB
                013522  062706  000010                  ADD     #10,SP
                013526  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013532                          L10020:
                013532  104423                          TRAP    C$MSG
            24  013534                          ERR15::
                013534  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013540  013746  002270                  MOV     SEIZPT,-(SP)
                013544  013746  002272                  MOV     OPPRT,-(SP)
                013550  012746  003754                  MOV     #FRMT22,-(SP)
                013554  012746  000003                  MOV     #3,-(SP)
                013560  010600                          MOV     SP,R0
                013562  104414                          TRAP    C$PNTB
                013564  062706  000010                  ADD     #10,SP
                013570  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013574                          L10021:
                013574  104423                          TRAP    C$MSG
            25  013576                          ERR16::
                013576  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013602  013746  002304                  MOV     TIME,-(SP)
                013606  013746  002270                  MOV     SEIZPT,-(SP)
                013612  012746  004353                  MOV     #FRMT55,-(SP)
                013616  012746  000003                  MOV     #3,-(SP)
                013622  010600                          MOV     SP,R0
                013624  104414                          TRAP    C$PNTB
                013626  062706  000010                  ADD     #10,SP
                013632  004737  016350                  JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013636                          L10022:
                013636  104423                          TRAP    C$MSG
            26  013640                          ERR17::
                013640  004737  016276                  JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013644  013746  002372                  MOV     RPCS1,-(SP)
                013650  012746  004426                  MOV     #FRMT56,-(SP)
                013654  012746  000002                  MOV     #2,-(SP)
```

```
                013660  010600                  MOV     SP,R0
                013662  104414                  TRAP    C$PNTB
                013664  062706  000006          ADD     #6,SP
                013670  004737  016350          JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013674                  L10023:
                013674  104423                  TRAP    C$MSG
            27  013676                  ERR18::
                013676  004737  016276          JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013702  013746  002350          MOV     TMP3,-(SP)
                013706  013746  002346          MOV     TMP2,-(SP)
                013712  013746  002344          MOV     TMP1,-(SP)
                013716  013746  002342          MOV     TMP0,-(SP)
                013722  012746  004464          MOV     #FRMT57,-(SP)
                013726  012746  000005          MOV     #5,-(SP)
                013732  010600                  MOV     SP,R0
                013734  104414                  TRAP    C$PNTB
                013736  062706  000014          ADD     #14,SP
                013742  004737  016350          JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                013746                  L10024:
                013746  104423                  TRAP    C$MSG
            28  013750                  ERR19::
                013750  004737  016276          JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                013754  013746  002332          MOV     BADDAT,-(SP)
                013760  013746  002336          MOV     EXPTED,-(SP)
                013764  013746  002270          MOV     SEIZPT,-(SP)
                013770  012746  004603          MOV     #FRMT64,-(SP)
                013774  012746  000004          MOV     #4,-(SP)
                014000  010600                  MOV     SP,R0
                014002  104414                  TRAP    C$PNTB
                014004  062706  000012          ADD     #12,SP
                014010  004737  016350          JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                014014                  L10025:
                014014  104423                  TRAP    C$MSG
            29  014016                  ERR20::
                014016  004737  016276          JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
                014022  013746  002250          MOV     PORTB,-(SP)
                014026  013746  002246          MOV     PORTA,-(SP)
                014032  013746  002372          MOV     RPCS1,-(SP)
                014036  012746  002701          MOV     #FRMT03,-(SP)
                014042  012746  000004          MOV     #4,-(SP)
                014046  010600                  MOV     SP,R0
                014050  104414                  TRAP    C$PNTB
                014052  062706  000012          ADD     #12,SP
                014056  004737  016350          JSR     PC,DMPREG       ;DUMP THE REGISTER CONTENTS
                014062                  L10026:
                014062  104423                  TRAP    C$MSG
            30
```

```
                                .SBTTL  GLOBAL SUBROUTINES SECTION

                                ;AUTO SIZE FOR RH70 CONTROLLER AND DETERMINE IF IT IS JUMPERED FOR 22 OR
                                ;32 REGISTERS
                                ;CALL
                                ;       JSR     PC,SIZE70       ;CALL ROUTINE
                                ;
                                ;R5 MUST CONTAIN POINTER TO NEW RPCS1 BASE ADDRESS

014064  005037  002364          SIZE70: CLR     RHEXT           ;CLEAR RPBAE OFFSET
014070  005037  002366                  CLR     RHTYPE          ;CLEAR RHXX TYPE REGISTER (RH11)
014074  013746  000004                  MOV     ERRVEC,-(SP)    ;SAVE CONTENTS OF ERROR VECTOR
014100  012737  014150  000004          MOV     #2$,ERRVEC      ;SETUP 'TRAP' RETURN ADDRESS
014106  011500                          MOV     (R5),R0         ;GET RPCS1 ADDRESS
014110  062700  000050                  ADD     #50,R0          ;GET REGISTER OFFSET FOR RH70
014114  012702  000012                  MOV     #10.,R2         ;GET NUMBER OF REGISTERS TO CHECK
014120  005720                          TST     (R0)+           ;TRAP IF NOT A VALID RPBAE
014122  005720                          TST     (R0)+           ;TRAP IF NOT A VALID RPCS3
014124  012737  000050  002364          MOV     #50,RHEXT       ;LOAD OFFSET FOR RPBAE (22 REGISTER RH)
014132  005720                  1$:     TST     (R0)+           ;TRAP IF NOT A VALID REGISTER
014134  005302                          DEC     R2              ;DONE WITH ALL 32 REGISTERS ?
014136  001375                          BNE     1$              ;BR IF NO
014140  012737  000074  002364          MOV     #74,RHEXT       ;LOAD OFFSET FOR RPBAE (32 REGISTER RH)
014146  000403                          BR      3$
014150  012716  014156          2$:     MOV     #3$,(SP)        ;SETUP RETURN ADDRESS
014154  000002                          RTI

014156  011500                  3$:     MOV     (R5),R0         ;GET RPCS1 REGISTER
014160  013702  002364                  MOV     RHEXT,R2        ;GET RPBAE REGISTER OFFSET
014164  001415                          BEQ     4$              ;BR IF NONE
014166  060002                          ADD     R0,R2           ;GET RPBAE REGISTER
014170  052710  001400                  BIS     #A17!A16,(R0)   ;SET EXTENDED ADDRESS BITS IN RPCS1
014174  022712  000003                  CMP     #3,(R2)         ;ARE THE EXTENDED BITS SET IN RPBAE ?
014200  001007                          BNE     4$              ;BR IF NO
014202  005012                          CLR     (R2)            ;CLEAR EXTENDED ADDRESS BITS IN RPBAE
014204  011046                          MOV     (R0),-(SP)      ;SAVE RPCS1 REG CONTENTS
014206  042726  176377                  BIC     #^C<A17!A16>,(SP)+      ;ARE THE EXTEND BITS CLEAR IN RPCS1 ?
014212  001002                          BNE     4$              ;BR IF NO
014214  005237  002366                  INC     RHTYPE          ;SET RHXX TYPE REGISTER (RH70)
014220  012637  000004          4$:     MOV     (SP)+,ERRVEC    ;RESTORE CONTENTS OF ERROR VECTOR
014224  000207                          RTS     PC
```

```
                                        ;DETERMINE IF THERE IS A CLOCK ON SYSTEM. START THE CLOCK. "CLKSTA" WILL
                                        ;INDICATE THE CLOCK TYPE.
                                        ;        0= NO CLOCK
                                        ;       +1= KW11-P
                                        ;       -1= KW11-L
                                        ;THIS ROUTINE WILL ALSO SETUP "TICKMS" (TIME PER CLOCK TICK IN MILLISECONDS)
                                        ;AND "TICKUS" (TIME PER CLOCK TICK IN MICROSECONDS) AS PER LINE FREQUENCY.
                                        ;CALL
                                        ;       JSR     PC,ST.CLK       ;START THE CLOCK
                                        ;       RETURN

014226  005037  002244          ST.CLK: CLR     CLKSTA          ;ASSUME "NO CLOCK"
014232  005037  014454                  CLR     HERTZ           ;ASSUME "UNKNOWN" HERTZ
                                                                ;IS THERE A P-CLOCK PRESENT ?
014236  012700  000120                  MOV     #'P,R0
014242  104462                          TRAP    C$CLCK
014244  010005                          MOV     R0,R5
                                                                ;GO TO 1$ IF NO
014246  103031                          BCC     1$

                                        ;SET P-CLOCK P-TABLE & START P-CLOCK

014250  010537  014430                  MOV     R5,PCLKTB       ;SAVE P-CLOCK TABLE ADDRESS
014254  011537  014432                  MOV     (R5),PKCS       ;GET 'CSR' ADDRESS
014260  011537  014434                  MOV     (R5),PKB        ;MAKE PKB ADDRESS BY
014264  062737  000002  014434          ADD     #2,PKB          ;ADDING 2
014272  012537  014436                  MOV     (R5)+,PKC       ;MAKE PKC ADDRESS BY
014276  062737  000004  014436          ADD     #4,PKC          ;ADDING 4
014304  005725                          TST     (R5)+           ;SKIP OVER 'BR LEVEL'
014306  012537  014440                  MOV     (R5)+,PKV       ;GET 'VECTOR' ADDRESS
014312  012537  014454                  MOV     (R5)+,HERTZ     ;GET 'HERTZ' LINE FREQUENCY
014316  012737  000001  002244          MOV     #1,CLKSTA       ;SET P-CLOCK FLAG
014324  004737  014456                  JSR     PC,ST.PCLK      ;START P-CLOCK AS A WATCH DOG TIMER
014330  000423                          BR      2$
014332                          1$:                             ;IS THERE A L-CLOCK PRESENT ?
014332  012700  000114                  MOV     #'L,R0
014336  104462                          TRAP    C$CLCK
014340  010005                          MOV     R0,R5
                                                                ;GO TO 3$ IF NO
014342  103030                          BCC     3$

                                        ;SET L-CLOCK P-TABLE, START L-CLOCK

014344  010537  014444                  MOV     R5,LCLKTB       ;SAVE L-CLOCK TABLE ADDRESS
014350  012537  014446                  MOV     (R5)+,LKS       ;GET 'CSR' ADDRESS
014354  005725                          TST     (R5)+           ;SKIP OVER 'BR LEVEL'
014356  012537  014450                  MOV     (R5)+,LKV       ;GET 'VECTOR' ADDRESS
014362  012537  014454                  MOV     (R5)+,HERTZ     ;GET 'HERTZ' LINE FREQUENCY
014366  012737  177777  002244          MOV     #-1,CLKSTA      ;L-CLOCK FLAG
014374  004737  014522                  JSR     PC,ST.LCLK      ;START L-CLOCK AS A WATCH DOG TIMER

                                        ;GET THE CLOCK TICK COUNT

014400  012737  000024  014426  2$:     MOV     #20.,TICKMS     ;ASSUME 20.0 MSEC &
014406  023727  014454  000062          CMP     HERTZ,#50.      ;IS IT 50 HERTZ LINE FREQUENCY ?
014414  001403                          BEQ     3$              ;BR IF YES
```

```
     54 014416  012737  000020  014426          MOV     #16.,TICKMS     ;MUST BE 60HZ, 16.666 MSEC &
     55 014424  000207                  3$:     RTS     PC
     56
     57 014426  000020                  TICKMS: .WORD   16.             ;16 MILLISECONDS PER CLOCK TICK
     58
     59                                 ;KW11-P CLOCK TABLE, CSR REG, PKB REG, PKC REG & VEC ADR
     60
     61 014430  000000                  PCLKTB: .WORD   0               ;P-CLK TBL ADR
     62
     63 014432  172540                  PKCS:   .WORD   172540          ;CONTROL & STATUS
     64 014434  172542                  PKB:    .WORD   172542          ;COUNT SET BFR
     65 014436  172544                  PKC:    .WORD   172544          ;COUNTER
     66 014440  000104  000106          PKV:    .WORD   104,106         ;VECTOR
     67
     68                                 ;KW11-L CLOCK TABLE, CSR REG & VEC ADR
     69
     70 014444  000000                  LCLKTB: .WORD   0               ;L-CLK TBL ADR
     71
     72 014446  177546                  LKS:    .WORD   177546          ;CONTROL & STATUS
     73 014450  000100  000102          LKV:    .WORD   100,102         ;VECTOR
     74
     75 014454  000000                  HERTZ:  .WORD   0               ;60 HZ. OR 50 HZ. LINE FREQUENCY
     76
     77 014456                          ST.PCLK:
     78                                                                 ;SETUP VECTOR FOR P-CLOCK
     79 014456  012746  000300                  MOV     #PRI06,-(SP)
        014462  012746  014610                  MOV     #KWSRV,-(SP)
        014466  013746  014440                  MOV     PKV,-(SP)
        014472  012746  000003                  MOV     #3,-(SP)
        014476  104437                          TRAP    C$SVEC
        014500  062706  000010                  ADD     #10,SP
     80 014504  012777  177777  177722          MOV     #-1,@PKB        ;COUNT ONE TICK
     81 014512  012777  000135  177712          MOV     #135,@PKCS      ;"INT.EN.",COUNT UP", 'MODE 1 (REPEAT)",
     82                                                                 ;"LINE FREQ", AND "RUN"
     83 014520  000207                          RTS     PC              ;RETURN
     84
     85 014522                          ST.LCLK:
     86                                                                 ;SETUP VECTOR FOR L-CLOCK
     87 014522  012746  000300                  MOV     #PRI06,-(SP)
        014526  012746  014610                  MOV     #KWSRV,-(SP)
        014532  013746  014450                  MOV     LKV,-(SP)
        014536  012746  000003                  MOV     #3,-(SP)
        014542  104437                          TRAP    C$SVEC
        014544  062706  000010                  ADD     #10,SP
     88 014550  012777  000100  177670          MOV     #100,@LKS       ;START THE KW11-L
     89 014556  000207                          RTS     PC              ;RETURN
     90
     91                                 ;THIS ROUTINE IS USED TO STOP THE SYSTEM CLOCK
     92                                 ;CALL
     93                                 ;       JSR     PC,STOPCK       ;CALL ROUTINE
     94
     95 014560  005737  002244          STOPCK: TST     CLKSTA          ;IS THERE A CLOCK AVAILABLE ?
     96 014564  001410                          BEQ     2$              ;BR IF NO
     97 014566  100404                          BMI     1$              ;BR IF L-CLOCK
     98 014570  042777  000101  177634          BIC     #101,@PKCS      ;STOP THE P-CLOCK
     99 014576  000403                          BR      2$
    100 014600  042777  000100  177640  1$:     BIC     #100,@LKS       ;STOP THE L-CLOCK
```

```
                                2$:     RTS     PC

                                ;KW11 CLOCK INTERRUPT SERVICE ROUTINE

014610  063737  014426  002304  KWSRV:  ADD     TICKMS,TIME     ;ADD TO ELAPSED TIME COUNTER
014616  103003                  1$:     BCC     1$              ;BRANCH IF NO OVERFLOW
014620  012737  177777  002304          MOV     #-1,TIME        ;OVERFLOW - RESTORE MAXIMUM COUNT
014626  005737  002306                  TST     WATCH           ;IS WATCH ALREADY ZERO ?
014632  001406                          BEQ     2$              ;BR IF IT IS
014634  163737  014426  002306          SUB     TICKMS,WATCH    ;SUBTRACT FROM WATCH DOG COUNTER
014642  100002                          BPL     2$              ;BR IF NOT MINUS
014644  005037  002306                  CLR     WATCH           ;CLEAR WATCH DOG COUNTER
014650  000240                  2$:     NOP
014652                          L10027:
014652  000002                          RTI

                                ;ROUTINE TO CALCULATE + AND - 25% TIME TOLERANCE VALUES

014654  162706  000004          TOLER:  SUB     #4,SP   ;SETUP STACK
014660  016616  000004                  MOV     4(SP),(SP)      ;SAVE STACK
014664  013546                          MOV     @(R5)+,-(SP)    ;GET TIME VALUE
014666  011666  000004                  MOV     (SP),4(SP)      ;MOVE TIME VALUE
014672  011666  000006                  MOV     (SP),6(SP)      ;MOVE VALUE AGAIN
014676  006216                          ASR     (SP)            ;DIVIDE BY 2
014700  006216                          ASR     (SP)            ;DIVIDE BY 2 AGAIN (FOR A TOTAL OF 4)
014702  061666  000004                  ADD     (SP),4(SP)      ;CALCULATE UPPER LIMIT FOR TIMEOUT
014706  162666  000004                  SUB     (SP)+,4(SP)     ;CALCULATE LOWER LIMIT FOR TIMEOUT
014712  000205                          RTS     R5              ;RETURN WITH TOLERANCES ON THE STACK

014714  005737  002326          DRVINI: TST     CNFBAD          ;USER LEGAL CONFIGURATION?
014720  001006                          BNE     1$              ;TAKE BRANCH IF GOOD!!
014722  104455                          TRAP    C$ERDF
014724  000003                          .WORD   3
014726  012400                          .WORD   EM71
014730  000000                          .WORD   0
014732  000137  016112                  JMP     12$             ;GET OUT, THE SYSTEM IS BAD!!
014736  005037  002340          1$:     CLR     DRVBAD          ;DEFAULT IS THAT DRIVE IS GOOD!
014742  023737  002246  002250          CMP     PORTA,PORTB     ;2 DIFFERENT DRIVE NUMBERS?
014750  001006                          BNE     2$              ;IF <>, OK
014752  104455                          TRAP    C$ERDF
014754  000001                          .WORD   1
014756  012236                          .WORD   EM67
014760  012576                          .WORD   ERR2
014762  000137  016112                  JMP     12$             ;TAKE BAD RETURN
014766  013737  002246  002252  2$:     MOV     PORTA,PORTC     ;GENERATE A NON-TESTED DRIVE NUMBER
014774  005237  002252          3$:     INC     PORTC           ;FORM A UNIT UNDER TEST
015000  042737  177770  002252          BIC     #^C7,PORTC      ;THROW AWAY UNUSED BITS
015006  023737  002250  002252          CMP     PORTB,PORTC     ;MATCH TO PORT B?
015014  001767                          BEQ     3$              ;DO AGAIN, IF SO.
015016  013701  002246                  MOV     PORTA,R1        ;FROM INDEX
015022  116137  002446  002262          MOVB    ATABIT(R1),ASRA ;GET ATTENTION BIT
015030  116137  002446  002260          MOVB    ATABIT(R1),ASR1 ;GET ATTENTION BIT
015036  013701  002250                  MOV     PORTB,R1        ;GET PORT B ADDRESS AS INDEX
015042  116137  002446  002264          MOVB    ATABIT(R1),ASRB ;GET ATTENTION BIT
015050  156137  002446  002260          BISB    ATABIT(R1),ASR1 ;GET BOTH ATTENTION BITS
015056  005037  002310                  CLR     TIMEA           ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
015062  005037  002312                  CLR     TIMEAP          ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
```

```
        015066  005037  002314                  CLR     TIMEAM          ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
        015072  005037  002316                  CLR     TIMEB           ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
        015076  005037  002320                  CLR     TIMEBP          ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
        015102  005037  002322                  CLR     TIMEBM          ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
    159                                                                  ;SET PRIORITY TO 5
    160 015106  012700  000240                  MOV     #PRIO5,R0
        015112  104441                          TRAP    C$SPRI
    161
                                                ;START THE TIMER

        015114  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
        015120  012737  003720  002306          MOV     #2000.,WATCH    ;SET WATCH TO 2000. MS
    162
                                                ;SEIZE THE DRIVE THROUGH PORT A

        015126  113777  002246  165246          MOVB    PORTA,@RPCS2    ;SELECT PORT A
        015134  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
        015142  005077  165232                  CLR     @RPDA           ;WRITE RPDA

        015146  113777  002250  165226          MOVB    PORTB,@RPCS2      ;SELECT PORT B
        015154  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        015162  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
        015170  017737  165210  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
        015176  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
        015204  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
        015210  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
        015216  001406                          BEQ     64$             ;BR IF IT IS
        015220  104456                          TRAP    C$ERHRD
        015222  000001                          .WORD   1
        015224  005705                          .WORD   EM4
        015226  012576                          .WORD   ERR2
        015230  000137  016112                  JMP     12$             ;BYPASS REST OF THE SUBTEST
        015234                          64$:
        015234  113777  002246  165140          MOVB    PORTA,@RPCS2      ;SELECT PORT A
        015242  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        015250  017737  165130  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
        015256  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
        015264  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
        015272  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
        015300  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
        015304  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
        015312  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
        015320  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
        015326  001404                          BEQ     65$             ;BR IF THEY ARE
        015330  104456                          TRAP    C$ERHRD
        015332  000002                          .WORD   2
        015334  005736                          .WORD   EM5
        015336  012654                          .WORD   ERR3
        015340                          65$:
    163 015340  113777  002250  165034          MOVB    PORTB,@RPCS2      ;SELECT PORT B
        015346  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    164
    165                                         ;WAIT FOR PORT B TO TIME OUT
    166
    167 015354  005777  165024          4$:     TST     @RPDS           ;DRIVE SEIZED YET?
    168 015360  001021                          BNE     5$              ;IF NOT ZERO, YES
    169 015362  005737  002306                  TST     WATCH           ;DID TIMER EXPIRE?
```

```
170 015366  001372                        BNE     4$                ;IF NOT ZERO, NO
171 015370  104456                        TRAP    C$ERHRD
    015372  000035                        .WORD   29
    015374  010177                        .WORD   EM36
    015376  013320                        .WORD   ERR11
172 015400  012746  003716                MOV     #FRMT17,-(SP)
    015404  012746  000001                MOV     #1,-(SP)
    015410  010600                        MOV     SP,R0
    015412  104414                        TRAP    C$PNTB
    015414  062706  000004                ADD     #4,SP
173 015420  000137  016112                JMP     12$               ;TAKE THE BAD RETURN
174 015424                          5$:                             ;SET PRIORITY TO 7
175 015424  012700  000340                MOV     #PRI07,R0
    015430  104441                        TRAP    C$SPRI
176 015432  023727  002304  001356        CMP     TIME,#750.        ;TIME WITHIN LOWEST LIMIT?
177 015440  103404                        BLO     6$                ;TAKE BRANCH IF TIME IS TOO LOW
178 015442  023727  002304  002342        CMP     TIME,#1250.       ;TIME WITHIN UPPER LIMIT?
179 015450  101406                        BLOS    7$                ;TAKE BRANCH IF LEGAL
180 015452                          6$:
    015452  104456                        TRAP    C$ERHRD
    015454  000037                        .WORD   31
    015456  011564                        .WORD   EM56
    015460  013576                        .WORD   ERR16
181 015462  000137  016112                JMP     12$               ;TAKE THE BAD RETURN
182 015466  013737  002304  002310  7$:   MOV     TIME,TIMEA        ;SAVE THE MEASURED TIME
183 015474  004537  014654                JSR     R5,TOLER          ;COMPUTE THE TOLERANCES
184 015500  002310                        .WORD   TIMEA
185 015502  012637  002312                MOV     (SP)+,TIMEAP      ;SAVE THE RESULTS
186 015506  012637  002314                MOV     (SP)+,TIMEAM      ;+ AND - 25%
187                                                                 ;SET PRIORITY TO 5
188 015512  012700  000240                MOV     #PRI05,R0
    015516  104441                        TRAP    C$SPRI
189
                                        ;START THE TIMER

    015520  005037  002304                CLR     TIME              ;CLEAR THE ELAPSED TIME COUNTER
    015524  012737  003720  002306        MOV     #2000.,WATCH      ;SET WATCH TO 2000. MS
190
                                        ;SEIZE THE DRIVE THROUGH PORT B

    015532  113777  002250  164642        MOVB    PORTB,@RPCS2      ;SELECT PORT B
    015540  013737  002250  002270        MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
    015546  005077  164626                CLR     @RPDA             ;WRITE RPDA

    015552  113777  002246  164622        MOVB    PORTA,@RPCS2        ;SELECT PORT A
    015560  013737  002246  002266        MOV     PORTA,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    015566  013737  002246  002272        MOV     PORTA,OPPRT       ;'OPPOSITE' PORT ADDRESS
    015574  017737  164604  002332        MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
    015602  013737  002404  002334        MOV     RPDS,BADADR       ;GENERATE BAD REGISTER ADDRESS
    015610  005037  002336                CLR     EXPTED            ;REGISTER SHOULD BE ZERO
    015614  023737  002336  002332        CMP     EXPTED,BADDAT     ;IS THE REGISTER ZERO
    015622  001406                        BEQ     66$               ;BR IF IT IS
    015624  104456                        TRAP    C$ERHRD
    015626  000001                        .WORD   1
    015630  005705                        .WORD   EM4
    015632  012576                        .WORD   ERR2
    015634  000137  016112                JMP     12$               ;BYPASS REST OF THE SUBTEST
```

```
                015640                          66$:
                015640  113777  002250  164534          MOVB    PORTB,@RPCS2        ;SELECT PORT B
                015646  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                015654  013737  164524  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
                015662  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
                015670  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
                015676  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
                015704  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
                015710  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
                015716  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
                015724  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SE1 ?
                015732  001404                          BEQ     67$             ;BR IF THEY ARE
                015734  104456                          TRAP    C$ERHRD
                015736  000002                          .WORD   2
                015740  005736                          .WORD   EM5
                015742  012654                          .WORD   ERR3
                015744                          67$:
            191 015744  113777  002246  164430          MOVB    PORTA,@RPCS2        ;SELECT PORT A
                015752  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
            192
            193                                         ;WAIT FOR PORT A TO TIME OUT
            194
            195 015760  005777  164420          8$:     TST     @RPDS           ;DRIVE SEIZED YET?
            196 015764  001020                          BNE     9$              ;TAKE BRANCH IF SO
            197 015766  005737  002306                  TST     WATCH           ;CLOCK TIMED OUT?
            198 015772  001372                          BNE     8$              ;TAKE BRANCH IF NOT
            199 015774  104456                          TRAP    C$ERHRD
                015776  000036                          .WORD   30
                016000  010177                          .WORD   EM36
                016002  013320                          .WORD   ERR11
            200 016004  012746  003716                  MOV     #FRMT17,-(SP)
                016010  012746  000001                  MOV     #1,-(SP)
                016014  010600                          MOV     SP,R0
                016016  104414                          TRAP    C$PNTB
                016020  062706  000004                  ADD     #4,SP
            201 016024  000432                          BR      12$             ;TAKE THE BAD RETURN
            202 016026                          9$:                             ;SET PRIORITY TO 7
            203 016026  012700  000340                  MOV     #PRI07,R0
                016032  104441                          TRAP    C$SPRI
            204 016034  023727  002304  001356          CMP     TIME,#750.      ;TIME LOWER THAN SPEC?
            205 016042  103404                          BLO     10$             ;TAKE BRANCH IF SO
            206 016044  023727  002304  002342          CMP     TIME,#1250.     ;TIME GREATER THAN SPEC?
            207 016052  101404                          BLOS    11$             ;TAKE BRANCH IF NOT
            208 016054                          10$:
                016054  104456                          TRAP    C$ERHRD
                016056  000040                          .WORD   32
                016060  011564                          .WORD   EM56
                016062  013576                          .WORD   ERR16
            209 016064  013737  002304  002316  11$:    MOV     TIME,TIMEB      ;SAVE THE MEASURED RELEASE TIME
            210 016072  004537  014654                  JSR     R5,TOLER        ;CALCULATE THE TOLERANCES
            211 016076  002316                          .WORD   TIMEB
            212 016100  012637  002320                  MOV     (SP)+,TIMEBP    ;+25%
            213 016104  012637  002322                  MOV     (SP)+,TIMEBM    ;-25%
            214 016110  000403                          BR      13$             ;TAKE THE GOOD RETURN
            215 016112  012737  177777  002340  12$:    MOV     #-1,DRVBAD      ;MARK THE DRIVE BAD STATUS
            216 016120  000207                  13$:    RTS     PC              ;RETURN
```

```
                        ;;*****************************************************************************
                        ;THIS MODULE CREATES THE TABLES WHICH ARE USED TO SELECT DEVICE PARAMETERS
                        ;USED IN THIS PROGRAM.  INCLUDED IN THE PARAMETER LIST ARE THE FOLLOWING ITEMS:
                        ;BASE REGISTER ADDRESSES FOR THE DEVICE, VECTOR ADDRESS OF THE DEVICE,
                        ;DETERMINATION VIA OPERATOR FOR THE FOLLOWING: CONTROLLER TYPE.  IN ADDITION,
                        ;DIALOGUE DETERMINES THE PRIORITY OF THE CONTROLLER, AND THE SELECTION OF A
                        ;DRIVE NUMBER FOR TEST (PORT A & PORT B).
                        ;*
                        ;INPUTS ARE:    NONE
                        ;
                        ;OUTPUTS ARE:   RPADD, RHTYPE, RPBAE, RPCS3, DRIVE, RPCS1
                        ;*
                        ;THIS MODULE IS CALLED BY: THE INITIALIZATION CODE
                        ;;*****************************************************************************

016122                  TABELD::
016122  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
016124  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
016126  010546                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
016130  012702  000024          MOV     #20.,R2         ;R2 = ITERATION COUNT
016134  012703  002372          MOV     #RPCS1,R3       ;R3 = DATA SINK
016140                  1$:                             ;GET HARDWARE P-TABLE
016140  013700  002354          MOV     UNIT,R0
016144  104442                  TRAP    C$GPHRD
016146  010005                  MOV     R0,R5
016150  103040                  BCC     4$
016152  011346                  MOV     (R3),-(SP)      ;SAVE R3
016154  011546                  MOV     (R5),-(SP)      ;AND THE BASE ADDRESS
016156  166616  000002          SUB     2(SP),(SP)      ;DERIVE NEW ADDRESS
016162  060623          2$:     ADD     (SP),(R3)+      ;LOG IT IN NEW TABLE
016164  005302                  DEC     R2              ;COUNT LOGGING
016166  001375                  BNE     2$              ;R2 NOT ZERO, CONTINUE LOGGING
016170  004737  014064          JSR     PC,SIZE70       ;SEE IF RH70 IS PRESENT
016174  005737  002366          TST     RHTYPE          ;IS IT AN RH70 ?
016200  001406                  BEQ     3$              ;BR IF NO
016202  013702  002364          MOV     RHEXT,R2        ;GET RPBAE OFFSET
016206  061502                  ADD     (R5),R2         ;ADD BASE ADDRESS TO OFFSET
016210  010223                  MOV     R2,(R3)+        ;SAVE NEW RPBAE
016212  005722                  TST     (R2)+           ;ADD 2
016214  010213                  MOV     R2,(R3)         ;SAVE NEW RPCS3

016216  022626          3$:     CMP     (SP)+,(SP)+     ;DONE, RESTORE THE STACK
016220  012537  002356          MOV     (R5)+,RPADR     ;SAVE RPCS1 BASE ADDRESS
016224  012537  002360          MOV     (R5)+,RPVEC     ;SAVE INTERUPT VECTOR ADDRESS
016230  012537  002362          MOV     (R5)+,RPVEC+2   ;SAVE INTERUPT PRIORITY
016234  012537  002246          MOV     (R5)+,PORTA     ;SAVE DRIVE NUMBER FOR PORT A
016240  012537  002250          MOV     (R5)+,PORTB     ;SAVE DRIVE NUMBER FOR PORT B
016244  011537  002326          MOV     (R5),CNFBAD     ;GET THE SYSTEM CONFIGURATION STATUS
016250  000406                  BR      5$              ;SKIP NEXT

016252  005237  002354  4$:     INC     UNIT            ;TRY THE NEXT UNIT #
016256  023727  002354  000007  CMP     UNIT,#7         ;DID WE TRY ALL THE UNIT #'S?
016264  101725                  BLOS    1$              ;BR IF <= 7, NO
016266                  5$:
016266  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
016270  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
```

```
                016272  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
     55         016274  000207                          RTS     PC              ;TAKE THE RETURN
     56
     57                                         .SBTTL  REGISTER BUFFER MODULE
     58                                         ;;*************************************************************************
     59                                         ;THIS MODULE CREATES AN IMAGE OF THE RP REGISTERS.
     60                                         ;IT IS USED FOR DIAGNOSTIC PURPOSES SUBSEQUENT TO A DISK COMMAND.
     61                                         ;INPUTS INCLUDE: RPCS1 - RPCS3.  OUTPUTS INCLUDE: REG+0 - REG + 52.
     62                                         ;MODULE IS CALLED BY: 'ERRO'.
     63                                         ;;*************************************************************************
     64
     65         016276                          SAVRPR:
                016276  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
                016300  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
                016302  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
     66         016304  012702  002372                  MOV     #RPCS1,R2       ;AND THE TRANSFER ADDRESSES
     67         016310  012701  002456                  MOV     #REG,R1         ;OF THE SOURCE AND SINK BUFFERS
     68         016314  012703  000023                  MOV     #19.,R3         ;GET THE ITERATION COUNT
     69         016320  013221                  1$:     MOV     @(R2)+,(R1)+    ;NOW LOG THE DATA
     70         016322  005303                          DEC     R3              ;ONE LESS REGISTER TO GO
     71         016324  003375                          BGT     1$              ;IF >0, KEEP GOING
     72         016326  005737  002366                  TST     RHTYPE          ;WHICH CONTROLLER?
     73         016332  001402                          BEQ     2$              ;IF ZERO, IT'S AN RH11
     74         016334  013221                          MOV     @(R2)+,(R1)+    ;LOG RPBAE
     75         016336  013221                          MOV     @(R2)+,(R1)+    ;LOG RPCS3
     76         016340                          2$:
                016340  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
                016342  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
                016344  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
     77         016346  000207                          RTS     PC              ;RETURN TO MAIN FOR ERROR REPORT
     78
     79         016350                          DMPREG:
                016350  012746  005023                  MOV     #FRMT66,-(SP)
                016354  012746  000001                  MOV     #1,-(SP)
                016360  010600                          MOV     SP,R0
                016362  104415                          TRAP    C$PNTX
                016364  062706  000004                  ADD     #4,SP
     80         016370  013746  002470                  MOV     REG+12,-(SP)
                016374  013746  002466                  MOV     REG+10,-(SP)
                016400  013746  002464                  MOV     REG+6,-(SP)
                016404  013746  002462                  MOV     REG+4,-(SP)
                016410  013746  002460                  MOV     REG+2,-(SP)
                016414  013746  002456                  MOV     REG,-(SP)
                016420  013746  002246                  MOV     PORTA,-(SP)
                016424  012746  005114                  MOV     #FRMT67,-(SP)
                016430  012746  000010                  MOV     #10,-(SP)
                016434  010600                          MOV     SP,R0
                016436  104415                          TRAP    C$PNTX
                016440  062706  000022                  ADD     #22,SP
     81         016444  012746  005174                  MOV     #FRMT70,-(SP)
                016450  012746  000001                  MOV     #1,-(SP)
                016454  010600                          MOV     SP,R0
                016456  104415                          TRAP    C$PNTX
                016460  062706  000004                  ADD     #4,SP
     82         016464  013746  002506                  MOV     REG+30,-(SP)
                016470  013746  002504                  MOV     REG+26,-(SP)
                016474  013746  002502                  MOV     REG+24,-(SP)
```

```
        016500  013746  002500                  MOV     REG+22,-(SP)
        016504  013746  002476                  MOV     REG+20,-(SP)
        016510  013746  002474                  MOV     REG+16,-(SP)
        016514  013746  002472                  MOV     REG+14,-(SP)
        016520  012746  005265                  MOV     #FRMT71,-(SP)
        016524  012746  000010                  MOV     #10,-(SP)
        016530  010600                          MOV     SP,R0
        016532  104415                          TRAP    C$PNTX
        016534  062706  000022                  ADD     #22,SP
     83 016540  012746  005345                  MOV     #FRMT72,-(SP)
        016544  012746  000001                  MOV     #1,-(SP)
        016550  010600                          MOV     SP,R0
        016552  104415                          TRAP    C$PNTX
        016554  062706  000004                  ADD     #4,SP
     84 016560  013746  002524                  MOV     REG+46,-(SP)
        016564  013746  002522                  MOV     REG+44,-(SP)
        016570  013746  002520                  MOV     REG+42,-(SP)
        016574  013746  002516                  MOV     REG+40,-(SP)
        016600  013746  002514                  MOV     REG+36,-(SP)
        016604  013746  002512                  MOV     REG+34,-(SP)
        016610  013746  002510                  MOV     REG+32,-(SP)
        016614  012746  005437                  MOV     #FRMT73,-(SP)
        016620  012746  000010                  MOV     #10,-(SP)
        016624  010600                          MOV     SP,R0
        016626  104415                          TRAP    C$PNTX
        016630  062706  000022                  ADD     #22,SP
     85 016634  005737  002366                  TST     RHTYPE          ;WHICH CONTROLLER?
     86 016640  001424                          BEQ     1$              ;IF ZERO, RH11
     87 016642  012746  005521                  MOV     #FRMT74,-(SP)
        016646  012746  000001                  MOV     #1,-(SP)
        016652  010600                          MOV     SP,R0
        016654  104415                          TRAP    C$PNTX
        016656  062706  000004                  ADD     #4,SP
     88 016662  013746  002530                  MOV     REG+52,-(SP)
        016666  013746  002526                  MOV     REG+50,-(SP)
        016672  012746  005541                  MOV     #FRMT75,-(SP)
        016676  012746  000003                  MOV     #3,-(SP)
        016702  010600                          MOV     SP,R0
        016704  104415                          TRAP    C$PNTX
        016706  062706  000010                  ADD     #10,SP
     89 016712  000207                  1$:     RTS     PC              ;TAKE THE RETURN
     90
     92
```

```
     12                                 .SBTTL MISCELLANEOUS SECTIONS
     13                                 .SBTTL  REPORT CODING SECTION
     41
     43                                 ;++
     44                                 ; THE REPORT CODING SECTION CONTAINS THE
     45                                 ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
     46                                 ;--
     47
     48 016714                          L$RPT::
     49
     61
     62 016714  000167                          .WORD   J$JMP
        016716  000000                          .WORD   L10030-2-.
     63
     75
     76                                         .EVEN
     77
     78 016720                          L10030:
        016720  104425                          TRAP    C$RPT
```

```
                                .SBTTL  PROTECTION TABLE

                                ;++
                                ; THIS TABLE IS USED BY THE RUNTIME SERVICES
                                ; TO PROTECT THE LOAD MEDIA.
                                ;--

016722                          L$PROT::
016722  000000                          0               ;P-TABLE OFFSET OF CSR
016724  177777                          -1              ;NOT A MASS BUS DEVICE
016726  000010                          10              ;P-TABLE OFFSET OF DRIVE #
```

```
                        .SBTTL  INITIALIZE SECTION

                        ;++
                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                        ; AT THE BEGINNING OF EACH PASS.
                        ;--

016730                  L$INIT::
                                                        ;RESET THE WORLD
016730  104433                  TRAP    C$RESET
                                                        ;POWER UP SEQUENCE ?
016732  012700  000034          MOV     #EF.PWR,R0
016736  104447                  TRAP    C$REFG
                                                        ;GO TO 3$ IF YES
016740  103434                  BCS     3$
                                                        ;CONTINUE COMMAND ?
016742  012700  000036          MOV     #EF.CON,R0
016746  104447                  TRAP    C$REFG
                                                        ;GO TO 3$ IF YES
016750  103430                  BCS     3$
                                                        ;'STA', 'RES' OR 'NEW PASS' ?
016752  012700  000035          MOV     #EF.NEW,R0
016756  104447                  TRAP    C$REFG
                                                        ;GO TO 2$ IF NO, MUST BE NEW 'SUB-PASS'
016760  103013                  BCC     2$
016762                  1$:
                                                        ;CR-LF
016762  012746  002564          MOV     #CRLF,-(SP)
016766  012746  000001          MOV     #1,-(SP)
016772  010600                  MOV     SP,R0
016774  104417                  TRAP    C$PNTF
016776  062706  000004          ADD     #4,SP
017002  012737  177777  002354  MOV     #-1,UNIT        ;INITIALIZE FOR UNIT 0 ON STAR;
017010  005237  002354  2$:     INC     UNIT            ;INCREMENT TO NEXT UNIT
017014  004737  016122          JSR     PC,TABELD       ;LOAD THE HARDWARE P-TABLES
017020  023727  002354  000007  CMP     UNIT,#7         ;DID WE TEST THE LAST UNIT?
017026  101401                  BLOS    3$              ;IF <= 7, NO
017030  000754                  BR      1$              ;START AGAIN
017032  012777  000040  163342  3$:     MOV     #CLR,@RPCS2     ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS

017040  004737  014226          JSR     PC,ST.CLK       ;START CLOCK
017044  005737  002244          TST     CLKSTA          ;IS THERE A CLOCK AVAILABLE ?
017050  001006                  BNE     4$              ;BR IF YES
017052  104455                  TRAP    C$ERDF
017054  000002                  .WORD   2
017056  012317                  .WORD   EM70
017060  000000                  .WORD   0
017062  104432                  TRAP    C$EXIT
017064  000212                  .WORD   L10032-.
017066                  4$:

                        ;START THE TIMER

017066  005037  002304          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
017072  012737  003720  002306  MOV     #2000.,WATCH    ;SET WATCH TO 2000. MS
017100  005737  002306  5$:     TST     WATCH           ;DID TIMER EXPIRE ?
017104  001375                  BNE     5$              ;IF NOT ZERO, NO
```

INITIALIZE SECTION

```
     42                                                 ;PRINT DRIVE SERIAL NUMBER
     43
     44 017106  012701  000004                         MOV     #4,R1           ;4 DIGITS
     45 017112  013777  002246  163262                  MOV     PORTA,@RPCS2    ;SELECT PORT A DRIVE
     46 017120  013746  002250                         MOV     PORTB,-(SP)
        017124  013746  002246                         MOV     PORTA,-(SP)
        017130  012746  002567                         MOV     #DSNMSG,-(SP)
        017134  012746  000003                         MOV     #3,-(SP)
        017140  010600                                 MOV     SP,R0
        017142  104417                                 TRAP    C$PNTF
        017144  062706  000010                         ADD     #10,SP
     47 017150  017746  163246                         MOV     @RPSN,-(SP)     ;FETCH S/N
     48 017154  005002                          6$:    CLR     R2              ;ZERO OUTPUT
     49 017156  006116                                 ROL     (SP)            ;PUT NEXT DIGIT INTO R2
     50 017160  006102                                 ROL     R2
     51 017162  006116                                 ROL     (SP)
     52 017164  006102                                 ROL     R2
     53 017166  006116                                 ROL     (SP)
     54 017170  006102                                 ROL     R2
     55 017172  006116                                 ROL     (SP)
     56 017174  006102                                 ROL     R2
     57 017176  062702  000060                         ADD     #'0,R2          ;MAKE RESULT ASCII
     58 017202  010237  002370                         MOV     R2,DRVSN        ;SAVE R2 FOR PRINT
     59 017206  012746  002370                         MOV     #DRVSN,-(SP)
        017212  012746  002623                         MOV     #SNDIGT,-(SP)
        017216  012746  000002                         MOV     #2,-(SP)
        017222  010600                                 MOV     SP,R0
        017224  104417                                 TRAP    C$PNTF
        017226  062706  000006                         ADD     #6,SP
     60 017232  005301                                 DEC     R1              ;COUNT DOWN DIGIT
     61 017234  003347                                 BGT     6$              ;NEXT DIGIT
     62 017236  005726                                 TST     (SP)+           ;RESTORE STACK
     63                                                                         ;CR-LF
     64 017240  012746  002564                         MOV     #CRLF,-(SP)
        017244  012746  000001                         MOV     #1,-(SP)
        017250  010600                                 MOV     SP,R0
        017252  104417                                 TRAP    C$PNTF
        017254  062706  000004                         ADD     #4,SP
     65 017260  004737  014714                         JSR     PC,DRVINI       ;INITIALIZE THE DRIVES
     66                                                                         ;SET PRIORITY TO 5
     67 017264  012700  000240                         MOV     #PRIO5,R0
        017270  104441                                 TRAP    C$SPRI
     68
     92
     93 017272  104432                                 TRAP    C$EXIT
        017274  000002                                 .WORD   L10032-.
     94
    106                                                 .EVEN
    107
    108 017276                                 L10032:
        017276  104411                                 TRAP    C$INIT
```

```
                                .SBTTL  AUTODROP SECTION

                                ;++
                                ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
                                ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
                                ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
                                ; DROPPED FROM TESTING.
                                ;--

017300                          L$AUTO::


017300                          L10033:
017300  104461                          TRAP    C$AUTO
```

```
                        .SBTTL  CLEANUP CODING SECTION

                        ;++
                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                        ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
                        ;--

017302                  L$CLEAN::
                                                        ;SET PRIORITY TO 7
017302  012700  000340          MOV     #PRI07,R0
017306  104441                  TRAP    C$SPRI
017310  012777  000040  163064  MOV     #CLR,@RPCS2     ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
017316  013777  002246  163056  MOV     PORTA,@RPCS2    ;GET PORT 'A' DRIVE NUMBER
017324  004737  014560          JSR     PC,STOPCK       ;STOP CLOCK
017330  005737  002244          TST     CLKSTA          ;RELEASE APPROPRIATE CLOCK VECTOR
017334  001410                  BEQ     2$              ;NO CLOCK, SKIP
017336  100404                  BMI     1$              ;L-CLK
                                                        ;P-CLK VECTOR RELEASE
017340  013700  014440          MOV     PKV,R0
017344  104436                  TRAP    C$CVEC
017346  000403                  BR      2$
                                                        ;L-CLK VECTOR RELEASE
017350                  1$:
017350  013700  014450          MOV     LKV,R0
017354  104436                  TRAP    C$CVEC
017356                  2$:


017356  104432                  TRAP    C$EXIT
017360  000002                  .WORD   L10034-.

                        .EVEN

017362                  L10034:
017362  104412                  TRAP    C$CLEAN
```

```
                                .SBTTL  DROP UNIT SECTION

                                ;++
                                ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ; TO NO LONGER BE TESTED.
                                ;--

017364                          L$DU::

017364  000167                          .WORD   J$JMP
017366  000000                          .WORD   L10035-2-.

                                        .EVEN

017370                          L10035:
017370  104453                          TRAP    C$DU
```

```
                                .SBTTL  ADD UNIT SECTION

                                ;++
                                ; THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
                                ;  TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
                                ;  TO THE TEST CYCLE.
                                ;--

017372                          L$AU::

017372  000167                          .WORD   J$JMP
017374  000000                          .WORD   L10036-2-.

                                        .EVEN

017376                          L10036:
017376  104452                          TRAP    C$AU
```

```
      2                                 .SBTTL  HARDWARE TESTS
```

```
                                .SBTTL  TEST 1 NEUTRAL ACCESS TEST
                                ;*
                                ;*VERIFY THAT THE DRIVE IS ACCESSIBLE TO BOTH PORTS
                                ;*
                                ;*  A.  SELECT DRIVE, VERIFY THAT THE DRIVE IS PRESENT, THAT THE
                                ;*      DRIVE IS A DUAL PORT RP07, THAT THE DRIVE IS ONLINE (RPDS HAS
                                ;*      'MOL', 'PGM', 'DPR', & 'DRY' BITS SET), AND THE THE DRIVE SERIAL
                                ;*      NUMBER READ THROUGH BOTH PORTS IS THE SAME.
                                ;*
                                ;*  B.  THE TEST IS REPEATED THROUGH BOTH PORTS.
                                ;*

017400                          T1::
017400  005737  002340                TST     DRVBAD          ;SYSTEM OK??
017404  001402                       BEQ     1$              ;IF ZERO, YES!
017406  104432                       TRAP    C$EXIT
017410  001544                       .WORD   L10037-.
017412  012777  000040  162762  1$:  MOV     #CLR,@RPCS2     ;INITIALIZE THE MASSBUS

                                ;;*************************************************************************
                                ;VERIFY THAT DRIVE IS PRESENT THROUGH PORTS A & B

017420  113777  002246  162754        MOVB    PORTA,@RPCS2      ;SELECT PORT A
017426  013737  002246  002266        MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
017434  005777  162744                TST     @RPDS           ;SEE IF DRIVE (PORT A) PRESENT
017440  005037  002276                CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
017444  017737  162732  002332        MOV     @RPCS2,BADDAT  ;GET CONTENTS OF RPCS2
017452  013737  002402  002334        MOV     RPCS2,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
017460  005037  002336                CLR     EXPTED          ;WHAT REGISTER SHOULD BE
017464  013737  002332  002342        MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
017472  042737  167777  002342        BIC     #^CNED,TMP0  ;SAVE SPECIFIED BITS
017500  023737  002336  002342        CMP     EXPTED,TMP0     ;COMPARE THE BITS
017506  001427                       BEQ     64$             ;BR IF OK
017510  013737  002332  002352        MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
017516  042737  010000  002352        BIC     #NED,TMP4       ;CLEAR THE MASKED BITS
017524  053737  002352  002336        BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
017532  104456                       TRAP    C$ERHRD
017534  000003                       .WORD   3
017536  010251                       .WORD   EM37
017540  013152                       .WORD   ERR8
017542  012746  003716                MOV     #FRMT17,-(SP)
017546  012746  000001                MOV     #1,-(SP)
017552  010600                       MOV     SP,R0
017554  104414                       TRAP    C$PNTB
017556  062706  000004                ADD     #4,SP
017562  005137  002276                COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
017566                          64$:
017566  005737  002276                TST     CKERR           ;WAS 'NED' SET ?
017572  001403                       BEQ     .+10            ;BR IF NOT
017574  012777  000040  162600        MOV     #CLR,@RPCS2     ;ISSUE MASSBUS INIT TO CLEAR 'NED'
017602  113777  002250  162572        MOVB    PORTB,@RPCS2      ;SELECT PORT B
017610  013737  002250  002266        MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
017616  005777  162562                TST     @RPDS           ;SEE IF DRIVE (PORT B) PRESENT
017622  005037  002276                CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
```

```
017626  017737  162550  002332          MOV     @RPCS2,BADDAT  ;GET CONTENTS OF RPCS2
017634  013737  002402  002334          MOV     RPCS2,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
017642  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
017646  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
017654  042737  167777  002342          BIC     #^CNED,TMP0  ;SAVE SPECIFIED BITS
017662  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
017670  001427                          BEQ     66$             ;BR IF OK
017672  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
017700  042737  010000  002352          BIC     #NED,TMP4       ;CLEAR THE MASKED BITS
017706  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
017714  104456                          TRAP    C$ERHRD
017716  000003                          .WORD   3
017720  010251                          .WORD   EM37
017722  013152                          .WORD   ERR8
017724  012746  003716                  MOV     #FRMT17,-(SP)
017730  012746  000001                  MOV     #1,-(SP)
017734  010600                          MOV     SP,R0
017736  104414                          TRAP    C$PNTB
017740  062706  000004                  ADD     #4,SP
017744  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
017750                          66$:
017750  005737  002276                  TST     CKERR           ;WAS 'NED' SET ?
017754  001403                          BEQ     .+10            ;BR IF NOT
017756  012777  000040  162416          MOV     #CLR,@RPCS2     ;ISSUE MASSBUS INIT TO CLEAR 'NED'
 94
 95                                     ;;*************************************************************************
 96                                     ;CONFIRM THAT DRIVE IS AN RP07 AND IS DUAL PORTED
 97
101 017764  113777  002246  162410          MOVB    PORTA,@RPCS2      ;SELECT PORT A
017772  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020000  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
020004  017737  162410  002332          MOV     @RPDT,BADDAT  ;GET CONTENTS OF RPDT
020012  013737  002420  002334          MOV     RPDT,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
020020  012737  024040  002336          MOV     #024040,EXPTED  ;;;WHAT REGISTER SHOULD BE
020026  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
020034  042737  000003  002342          BIC     #^C177774,TMP0  ;SAVE SPECIFIED BITS
020042  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
020050  001427                          BEQ     68$             ;BR IF OK
020052  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
020060  042737  177774  002352          BIC     #177774,TMP4    ;CLEAR THE MASKED BITS
020066  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
020074  104456                          TRAP    C$ERHRD
020076  000003                          .WORD   3
020100  005560                          .WORD   EM1
020102  012462                          .WORD   ERR0
020104  012746  003716                  MOV     #FRMT17,-(SP)
020110  012746  000001                  MOV     #1,-(SP)
020114  010600                          MOV     SP,R0
020116  104414                          TRAP    C$PNTB
020120  062706  000004                  ADD     #4,SP
020124  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
020130                          68$:
020130  113777  002250  162244          MOVB    PORTB,@RPCS2      ;SELECT PORT B
020136  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020144  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
020150  017737  162244  002332          MOV     @RPDT,BADDAT  ;GET CONTENTS OF RPDT
020156  013737  002420  002334          MOV     RPDT,BADADR  ;FORM REGISTER ADDRESS O' ERROR MESSAGE
```

```
020164  012737  024040  002336          MOV     #024040,EXPTED  ;;;WHAT REGISTER SHOULD BE
020172  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
020200  042737  000003  002342          BIC     #^C177774,TMP0  ;SAVE SPECIFIED BITS
020206  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
020214  001427                          BEQ     70$             ;BR IF OK
020216  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
020224  042737  177774  002352          BIC     #177774,TMP4    ;CLEAR THE MASKED BITS
020232  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
020240  104456                          TRAP    C$ERHRD
020242  000003                          .WORD   3
020244  00556U                          .WORD   EM1
020246  012462                          .WORD   ERR0
020250  012746  003716                  MOV     #FRMT17,-(SP)
020254  012746  000001                  MOV     #1,-(SP)
020260  010600                          MOV     SP,R0
020262  104414                          TRAP    C$PNTB
020264  062706  000004                  ADD     #4,SP
020270  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
020274                          70$:
    102
    103                         ;;**************************************************************************
    104                         ;VERIFY THROUGH BOTH PORTS THAT THE DRIVE IS ON LINE AND IN NEUTRAL
    105
    110 020274  113777  002246  162100          MOVB    PORTA,@RPCS2        ;SELECT PORT A
        020302  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        020310  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
        020314  017737  162064  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
        020322  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        020330  012737  001000  002336          MOV     #PGM,EXPTED     ;;;WHAT REGISTER SHOULD BE
        020336  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
        020344  042737  176777  002342          BIC     #^CPGM,TMP0  ;SAVE SPECIFIED BITS
        020352  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
        020360  001427                          BEQ     72$             ;BR IF OK
        020362  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
        020370  042737  001000  002352          BIC     #PGM,TMP4       ;CLEAR THE MASKED BITS
        020376  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
        020404  104456                          TRAP    C$ERHRD
        020406  000003                          .WORD   3
        020410  010672                          .WORD   EM45
        020412  012462                          .WORD   ERR0
        020414  012746  003716                  MOV     #FRMT17,-(SP)
        020420  012746  000001                  MOV     #1,-(SP)
        020424  010600                          MOV     SP,R0
        020426  104414                          TRAP    C$PNTB
        020430  062706  000004                  ADD     #4,SP
        020434  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        020440                          72$:
        020440  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
        020444  017737  161734  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
        020452  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        020460  012737  010600  002336          MOV     #MOL!DPR!DRY,EXPTED     ;;;WHAT REGISTER SHOULD BE
        020466  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
        020474  042737  167177  002342          BIC     #^C10600,TMP0  ;SAVE SPECIFIED BITS
        020502  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
        020510  001427                          BEQ     74$             ;BR IF OK
        020512  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
        020520  042737  010600  002352          BIC     #10600,TMP4     ;CLEAR THE MASKED BITS
```

```
020526  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
020534  104456                          TRAP    C$ERHRD
020536  000003                          .WORD   3
020540  005601                          .WORD   EM2
020542  012654                          .WORD   ERR3
020544  012746  003716                  MOV     #FRMT17,-(SP)
020550  012746  000001                  MOV     #1,-(SP)
020554  010600                          MOV     SP,R0
020556  104414                          TRAP    C$PNTB
020560  062706  000004                  ADD     #4,SP
020564  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
020570                          74$:
020570  113777  002250  161604          MOVB    PORTB,@RPCS2      ;SELECT PORT B
020576  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020604  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
020610  017737  161570  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
020616  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
020624  012737  001000  002336          MOV     #PGM,EXPTED     ;;;WHAT REGISTER SHOULD BE
020632  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
020640  042737  176777  002342          BIC     #^CPGM,TMP0  ;SAVE SPECIFIED BITS
020646  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
020654  001427                          BEQ     76$             ;BR IF OK
020656  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
020664  042737  001000  002352          BIC     #PGM,TMP4       ;CLEAR THE MASKED BITS
020672  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
020700  104456                          TRAP    C$ERHRD
020702  000003                          .WORD   3
020704  010672                          .WORD   EM45
020706  012462                          .WORD   ERR0
020710  012746  003716                  MOV     #FRMT17,-(SP)
020714  012746  000001                  MOV     #1,-(SP)
020720  010600                          MOV     SP,R0
020722  104414                          TRAP    C$PNTB
020724  062706  000004                  ADD     #4,SP
020730  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
020734                          76$:
020734  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
020740  017737  161440  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
020746  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
020754  012737  010600  002336          MOV     #MOL!DPR!DRY,EXPTED     ;;;WHAT REGISTER SHOULD BE
020762  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
020770  042737  167177  002342          BIC     #^C10600,TMP0  ;SAVE SPECIFIED BITS
020776  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
021004  001427                          BEQ     78$             ;BR IF OK
021006  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
021014  042737  010600  002352          BIC     #10600,TMP4     ;CLEAR THE MASKED BITS
021022  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
021030  104456                          TRAP    C$ERHRD
021032  000003                          .WORD   3
021034  005601                          .WORD   EM2
021036  012654                          .WORD   ERR3
021040  012746  003716                  MOV     #FRMT17,-(SP)
021044  012746  000001                  MOV     #1,-(SP)
021050  010600                          MOV     SP,R0
021052  104414                          TRAP    C$PNTB
021054  062706  000004                  ADD     #4,SP
021060  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
```

```
        021064                          78$:
    111
    112                                 ;;*************************************************************************
    113                                 ;VERIFY THAT DRIVE SERIAL NUMBER AS SEEN THROUGH BOTH PORTS IS THE SAME
    114
    115 021064  113777  002246  161310          MOVB    PORTA,@RPCS2    ;SELECT PORT A
    116 021072  017737  161324  002336          MOV     @RPSN,EXPTED    ;STORE THE PORT A SERIAL NUMBER
    117 021100  113777  002250  161274          MOVB    PORTB,@RPCS2    ;SELECT PORT B
    118 021106  017737  161310  002332          MOV     @RPSN,BADDAT    ;STORE THE PORT B SERIAL NUMBER
    119 021114  023737  002336  002332          CMP     EXPTED,BADDAT   ;ARE THEY THE SAME ?
    120 021122  001414                          BEQ     2$              ;BR IF THEY ARE
    124 021124  104456                          TRAP    C$ERHRD
        021126  000021                          .WORD   17
        021130  005623                          .WORD   EM3
        021132  012530                          .WORD   ERR1
    125 021134  012746  003553                  MOV     #FRMT16,-(SP)
        021140  012746  000001                  MOV     #1,-(SP)
        021144  010600                          MOV     SP,R0
        021146  104414                          TRAP    C$PNTB
        021150  062706  000004                  ADD     #4,SP
    126 021154                          2$:
    127 021154                          L10037:
        021154  104401                          TRAP    C$ETST
```

```
TEST 2 PORT 'A' SEIZE/TIMEOUT TEST

                                .SBTTL  TEST 2 PORT 'A' SEIZE/TIMEOUT TEST
                                ;
                                ;*VERIFY THAT THE DRIVE CAN BE SEIZED BY WRITING A REMOTE REGISTER AND THAT
                                ;*      IT CAN BE RELEASED BY THE ONE SECOND TIMER.
                                ;*
                                ;*  A.  WRITE 0'S INTO RPDA THROUGH PORT 'A'; VERIFY THAT THE DRIVE
                                ;*      HAS BEEN SEIZED.
                                ;*
                                ;*  B.  READ EACH DRIVE REGISTER, EXCEPT RPCS1, THROUGH PORT 'B';
                                ;*      VERIFY THAT 0'S ARE READ FROM EACH REGISTER.
                                ;*
                                ;*  C.  WAIT FOR THE PORT TIMEOUT TO RELEASE THE DRIVE.
                                ;*      MEASURE THE DURATION OF THE TIMEOUT ONE SHOT AND SAVE THE
                                ;*      VALUE FOR LATER USE.  VERIFY THAT TIMEOUT RETURNED THE DRIVE TO
                                ;*      NEUTRAL. ALSO VERIFY THAT THE DURATION OF THE ONE SHOT IS > 500 MS.
                                ;*
                                ;
    195 021156                  T2::
    199 021156  005737  002340          TST     DRVBAD          ;SYSTEM OK?
        021162  001402                  BEQ     64$             ;TAKE BRANCH IF SO...
        021164  104432                  TRAP    C$EXIT
        021166  001714                  .WORD   L10040-.
        021170                  64$:                            ;SET PRIORITY TO 5
        021170  012700  000240          MOV     #PRI05,R0
        021174  104441                  TRAP    C$SPRI

                                        ;START THE TIMER

        021176  005037  002304          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
        021202  012737  002342  002306  MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
                                ;;**************************************************************************

                                        ;SEIZE THE DRIVE THROUGH PORT A

        021210  113777  002246  161164  MOVB    PORTA,@RPCS2    ;SELECT PORT A
        021216  013737  002246  002270  MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
        021224  005077  161150          CLR     @RPDA           ;WRITE RPDA

        021230  113777  002250  161144  MOVB    PORTB,@RPCS2      ;SELECT PORT B
        021236  013737  002250  002266  MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        021244  013737  002250  002272  MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
        021252  017737  161126  002332  MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
        021260  013737  002404  002334  MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
        021266  005037  002336          CLR     EXPTED          ;REGISTER SHOULD BE ZERO
        021272  023737  002336  002332  CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
        021300  001406                  BEQ     65$             ;BR IF IT IS
        021302  104456                  TRAP    C$ERHRD
        021304  000001                  .WORD   1
        021306  005705                  .WORD   EM4
        021310  012576                  .WORD   ERR2
        021312  000137  023062          JMP     5$              ;BYPASS REST OF THE SUBTEST
        021316                  65$:
        021316  113777  002246  161056  MOVB    PORTA,@RPCS2      ;SELECT PORT A
        021324  013737  002246  002266  MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        021332  017737  161046  002332  MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
        021340  042737  020005  002332  BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
        021346  012737  011700  002336  MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
```

```
021354  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
021362  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
021366  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
021374  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
021402  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
021410  001404                          BEQ     66$             ;BR IF THEY ARE
021412  104456                          TRAP    C$ERHRD
021414  000002                          .WORD   2
021416  005736                          .WORD   EM5
021420  012654                          .WORD   ERR3
021422                          66$:
                        ;;*************************************************************************
                        ;READ THE DRIVE REGISTERS THROUGH PORT B AND STORE THEM ON THE STACK

021422  113777  002250  160752          MOVB    PORTB,@RPCS2      ;SELECT PORT B
021430  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
021436  017746  160776                  MOV     @RPEC2,-(SP)    ;STORE REGISTER RPEC2, PORT B, FOR CHECK
021442  017746  160770                  MOV     @RPEC1,-(SP)    ;STORE REGISTER RPEC1, PORT B, FOR CHECK
021446  017746  160750                  MOV     @RPSN,-(SP)     ;STORE REGISTER RPSN, PORT B, FOR CHECK
021452  017746  160750                  MOV     @RPDC,-(SP)     ;STORE REGISTER RPDC, PORT B, FOR CHECK
021456  017746  160742                  MOV     @RPOF,-(SP)     ;STORE REGISTER RPOF, PORT B, FOR CHECK
021462  017746  160746                  MOV     @RPER3,-(SP)    ;STORE REGISTER RPER3, PORT B, FOR CHECK
021466  017746  160720                  MOV     @RPLA,-(SP)     ;STORE REGISTER RPLA, PORT B, FOR CHECK
021472  017746  160702                  MOV     @RPDA,-(SP)     ;STORE REGISTER RPDA, PORT B, FOR CHECK
021476  017746  160714                  MOV     @RPMR1,-(SP)    ;STORE REGISTER RPMR1, PORT B, FOR CHECK
021502  017746  160700                  MOV     @RPER1,-(SP)    ;STORE REGISTER RPER1, PORT B, FOR CHECK

                        ;;*************************************************************************
                        ;WAIT FOR PORT A TO TIMEOUT

021506  005777  160672          1$:     TST     @RPDS           ;WAIT FOR THE DRIVE TO TIMEOUT
021512  001021                          BNE     2$              ;BR WHEN TIMEOUT OCCURS
021514  005737  002306                  TST     WATCH           ;CHECK WATCH
021520  001372                          BNE     1$              ;BR IF NOT ZERO
021522  104456                          TRAP    C$ERHRD
021524  000022                          .WORD   18
021526  010177                          .WORD   EM36
021530  013320                          .WORD   ERR11
021532  012746  003471                  MOV     #FRMT14,-(SP)
021536  012746  000001                  MOV     #1,-(SP)
021542  010600                          MOV     SP,R0
021544  104414                          TRAP    C$PNTB
021546  062706  000004                  ADD     #4,SP
021552  000137  022302                  JMP     4$              ;BYPASS TIMEOUT TIME CHECK
021556                          2$:                             ;SET PRIORITY TO 7
021556  012700  000340                  MOV     #PRI07,R0
021562  104441                          TRAP    C$SPRI

                        ;;*************************************************************************
                        ;VERIFY THAT THE TIMEOUT ONE-SHOT IS AT LEAST 750 MS

021564  023727  002304  001356          CMP     TIME,#750.      ;WAS MEASURED TIME AT LEAST 750 MS?
021572  103014                          BHIS    3$              ;BR IF IT  WAS
021574  104456                          TRAP    C$ERHRD
021576  000023                          .WORD   19
021600  011517                          .WORD   EM55
021602  013640                          .WORD   ERR17
```

```
021604  012746  003471                  MOV     #FRMT14,-(SP)
021610  012746  000001                  MOV     #1,-(SP)
021614  010600                          MOV     SP,R0
021616  104414                          TRAP    C$PNTB
021620  062706  000004                  ADD     #4,SP

                                ;;*******************************************************************************
                                ;VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AFTER PORT A TIMED OUT

021624                          3$:                             ;SET PRIORITY TO 5
021624  012700  000240                  MOV     #PRI05,R0
021630  104441                          TRAP    C$SPRI

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

021632  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
021636  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
021644  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
021652  113777  002246  160522          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
021660  017737  160520  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
021666  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
021674  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
021702  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
021710  113777  002250  160464          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
021716  017737  160462  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
021724  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
021732  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
021740  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
021746  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
021754  001021                          BNE     67$             ;BR IF NOT
021756  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
021762  001065                          BNE     69$             ;BR IF NOT
021764  104456                          TRAP    C$ERHRD
021766  000006                          .WORD   6
021770  010751                          .WORD   EM46
021772  013534                          .WORD   ERR15
021774  012746  003716                  MOV     #FRMT17,-(SP)
022000  012746  000001                  MOV     #1,-(SP)
022004  010600                          MOV     SP,R0
022006  104414                          TRAP    C$PNTB
022010  062706  000004                  ADD     #4,SP
022014  000137  022302                  JMP     71$             ;BYPASS THE REST OF THE CHECKS
022020  013737  002346  002332  67$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
022026  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
022034  113777  002250  160340          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
022042  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
022046  001414                          BEQ     68$             ;BR IF ZERO
022050  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
022056  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
022064  113777  002246  160310          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
022072  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
022076  001017                          BNE     69$             ;BR IF NOT
022100  012737  177777  002302  68$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
022106  104456                          TRAP    C$ERHRD
022110  000011                          .WORD   9
022112  007313                          .WORD   EM26
022114  013214                          .WORD   ERR9
```

```
022116  012746  003716                  MOV     #FRMT17,-(SP)
022122  012746  000001                  MOV     #1,-(SP)
022126  010600                          MOV     SP,R0
022130  104414                          TRAP    C$PNTB
022132  062706  000004                  ADD     #4,SP
022136  013737  002346  002332  69$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
022144  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
022152  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
022160  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
022166  001414                          BEQ     70$             ;BR IF OK FROM PORT A.
022170  104456                          TRAP    C$ERHRD
022172  000013                          .WORD   11
022174  006072                          .WORD   EM7
022176  013000                          .WORD   ERR5
022200  012746  003471                  MOV     #FRMT14,-(SP)
022204  012746  000001                  MOV     #1,-(SP)
022210  010600                          MOV     SP,R0
022212  104414                          TRAP    C$PNTB
022214  062706  000004                  ADD     #4,SP
022220  013737  002350  002332  70$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
022226  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
022234  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
022242  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
022250  001414                          BEQ     71$             ;BR IF OK
022252  104456                          TRAP    C$ERHRD
022254  000014                          .WORD   12
022256  006072                          .WORD   EM7
022260  013000                          .WORD   ERR5
022262  012746  003522                  MOV     #FRMT15,-(SP)
022266  012746  000001                  MOV     #1,-(SP)
022272  010600                          MOV     SP,R0
022274  104414                          TRAP    C$PNTB
022276  062706  000004                  ADD     #4,SP
022302                          71$:
                                ;;**************************************************************************
                                ;CHECK THE REGISTERS STORED THROUGH PORT B.  ALL REGISTERS SHOULD BE ZERO.
                                ;THE REGISTERS ARE STORED ON THE STACK.

022302  013737  002250  002266  4$:     MOV     PORTB,PTNBR     ;CHANGE 'PORT NUMBER' TO THE OPPOSITE PORT
022310  013737  002406  002334          MOV     RPER1,BADADR    ;ADDRESS OF RPER1 FOR TYPEOUT
022316  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPER1
022322  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022324  104456                          TRAP    C$ERHRD
022326  000024                          .WORD   20
022330  006004                          .WORD   EM6
022332  012726                          .WORD   ERR4
022334  012746  003471                  MOV     #FRMT14,-(SP)
022340  012746  000001                  MOV     #1,-(SP)
022344  010600                          MOV     SP,R0
022346  104414                          TRAP    C$PNTB
022350  062706  000004                  ADD     #4,SP
022354  013737  002416  002334          MOV     RPMR1,BADADR    ;ADDRESS OF RPMR1 FOR TYPEOUT
022362  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPMR1
022366  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022370  104456                          TRAP    C$ERHRD
022372  000024                          .WORD   20
022374  006004                          .WORD   EM6
```

TEST 2 PORT 'A' SEIZE/TIMEOUT TEST

```
022376  012726                          .WORD   ERR4
022400  012746  003471                  MOV     #FRMT14,-(SP)
022404  012746  000001                  MOV     #1,-(SP)
022410  010600                          MOV     SP,R0
022412  104414                          TRAP    C$PNTB
022414  062706  000004                  ADD     #4,SP
022420  013737  002400  002334          MOV     RPDA,BADADR     ;ADDRESS OF RPDA FOR TYPEOUT
022426  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPDA
022432  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022434  104456                          TRAP    C$ERHRD
022436  000024                          .WORD   20
022440  006004                          .WORD   EM6
022442  012726                          .WORD   ERR4
022444  012746  003471                  MOV     #FRMT14,-(SP)
022450  012746  000001                  MOV     #1,-(SP)
022454  010600                          MOV     SP,R0
022456  104414                          TRAP    C$PNTB
022460  062706  000004                  ADD     #4,SP
022464  013737  002412  002334          MOV     RPLA,BADADR     ;ADDRESS OF RPLA FOR TYPEOUT
022472  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPLA
022476  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022500  104456                          TRAP    C$ERHRD
022502  000024                          .WORD   20
022504  006004                          .WORD   EM6
022506  012726                          .WORD   ERR4
022510  012746  003471                  MOV     #FRMT14,-(SP)
022514  012746  000001                  MOV     #1,-(SP)
022520  010600                          MOV     SP,R0
022522  104414                          TRAP    C$PNTB
022524  062706  000004                  ADD     #4,SP
022530  013737  002434  002334          MOV     RPER3,BADADR    ;ADDRESS OF RPER3 FOR TYPEOUT
022536  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPER3
022542  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022544  104456                          TRAP    C$ERHRD
022546  000024                          .WORD   20
022550  006004                          .WORD   EM6
022552  012726                          .WORD   ERR4
022554  012746  003471                  MOV     #FRMT14,-(SP)
022560  012746  000001                  MOV     #1,-(SP)
022564  010600                          MOV     SP,R0
022566  104414                          TRAP    C$PNTB
022570  062706  000004                  ADD     #4,SP
022574  013737  002424  002334          MOV     RPOF,BADADR     ;ADDRESS OF RPOF FOR TYPEOUT
022602  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPOF
022606  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022610  104456                          TRAP    C$ERHRD
022612  000024                          .WORD   20
022614  006004                          .WORD   EM6
022616  012726                          .WORD   ERR4
022620  012746  003471                  MOV     #FRMT14,-(SP)
022624  012746  000001                  MOV     #1,-(SP)
022630  010600                          MOV     SP,R0
022632  104414                          TRAP    C$PNTB
022634  062706  000004                  ADD     #4,SP
022640  013737  002426  002334          MOV     RPDC,BADADR     ;ADDRESS OF RPDC FOR TYPEOUT
022646  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPDC
022652  001414                          BEQ     .+32            ;CONTENTS ZERO ?
```

```
022654  104456                          TRAP    C$ERHRD
022656  000025                          .WORD   21
022660  006004                          .WORD   EM6
022662  012726                          .WORD   ERR4
022664  012746  003471                  MOV     #FRMT14,-(SP)
022670  012746  000001                  MOV     #1,-(SP)
022674  010600                          MOV     SP,R0
022676  104414                          TRAP    C$PNTB
022700  062706  000004                  ADD     #4,SP
022704  013737  002422  002334          MOV     RPSN,BADADR     ;ADDRESS OF RPSN FOR TYPEOUT
022712  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPSN
022716  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022720  104456                          TRAP    C$ERHRD
022722  000025                          .WORD   21
022724  006004                          .WORD   EM6
022726  012726                          .WORD   ERR4
022730  012746  003471                  MOV     #FRMT14,-(SP)
022734  012746  000001                  MOV     #1,-(SP)
022740  010600                          MOV     SP,R0
022742  104414                          TRAP    C$PNTB
022744  062706  000004                  ADD     #4,SP
022750  013737  002436  002334          MOV     RPEC1,BADADR    ;ADDRESS OF RPEC1 FOR TYPEOUT
022756  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPEC1
022762  001414                          BEQ     .+32            ;CONTENTS ZERO ?
022764  104456                          TRAP    C$ERHRD
022766  000025                          .WORD   21
022770  006004                          .WORD   EM6
022772  012726                          .WORD   ERR4
022774  012746  003471                  MOV     #FRMT14,-(SP)
023000  012746  000001                  MOV     #1,-(SP)
023004  010600                          MOV     SP,R0
023006  104414                          TRAP    C$PNTB
023010  062706  000004                  ADD     #4,SP
023014  013737  002440  002334          MOV     RPEC2,BADADR    ;ADDRESS OF RPEC2 FOR TYPEOUT
023022  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPEC2
023026  001414                          BEQ     .+32            ;CONTENTS ZERO ?
023030  104456                          TRAP    C$ERHRD
023032  000025                          .WORD   21
023034  006004                          .WORD   EM6
023036  012726                          .WORD   ERR4
023040  012746  003471                  MOV     #FRMT14,-(SP)
023044  012746  000001                  MOV     #1,-(SP)
023050  010600                          MOV     SP,R0
023052  104414                          TRAP    C$PNTB
023054  062706  000004                  ADD     #4,SP
023060  000410                          BR      6$              ;EXIT NOW
023062                          5$:
023062  012746  003471                  MOV     #FRMT14,-(SP)
023066  012746  000001                  MOV     #1,-(SP)
023072  010600                          MOV     SP,R0
023074  104414                          TRAP    C$PNTB
023076  062706  000004                  ADD     #4,SP
203 023102                      L10040:
023102  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 3 SEIZE/TIMEOUT TEST

                                ;*VERIFY THAT THE DRIVE CAN BE SEIZED BY WRITING A REMOTE REGISTER AND THAT
                                ;*      IT CAN BE RELEASED BY THE ONE SECOND TIMER.
                                ;*
                                ;*  A.  WRITE 0'S INTO RPDA THROUGH PORT 'B';  VERIFY THAT THE DRIVE
                                ;*      HAS BEEN SEIZED.
                                ;*
                                ;*  B.  READ EACH DRIVE REGISTER, EXCEPT RPCS1, THROUGH PORT 'A';
                                ;*      VERIFY THAT 0'S ARE READ FROM EACH REGISTER.
                                ;*
                                ;*  C.  WAIT FOR THE PORT TIMEOUT TO RELEASE THE DRIVE.
                                ;*      MEASURE THE DURATION OF THE TIMEOUT ONE SHOT AND SAVE THE
                                ;*      VALUE FOR LATER USE.  VERIFY THAT TIMEOUT RETURNED THE DRIVE TO
                                ;*      NEUTRAL. ALSO VERIFY THAT THE DURATION OF THE ONE SHOT IS >500 MS.
                                ;*

023104                          T3::
023104  005737  002340                  TST     DRVBAD          ;SYSTEM OK?
023110  001402                          BEQ     64$             ;TAKE BRANCH IF SO...
023112  104432                          TRAP    C$EXIT
023114  001714                          .WORD   L10041-.
023116                          64$:                            ;SET PRIORITY TO 5
023116  012700  000240                  MOV     #PRI05,R0
023122  104441                          TRAP    C$SPRI

                                        ;START THE TIMER

023124  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
023130  012737  002342  002306          MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
                                ;;**************************************************************************

                                        ;SEIZE THE DRIVE THROUGH PORT B

023136  113777  002250  157236          MOVB    PORTB,@RPCS2    ;SELECT PORT B
023144  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
023152  005077  157222                  CLR     @RPDA           ;WRITE RPDA

023156  113777  002246  157216          MOVB    PORTA,@RPCS2      ;SELECT PORT A
023164  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
023172  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
023200  017737  157200  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
023206  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
023214  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
023220  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
023226  001406                          BEQ     65$             ;BR IF IT IS
023230  104456                          TRAP    C$ERHRD
023232  000001                          .WORD   1
023234  005705                          .WORD   EM4
023236  012576                          .WORD   ERR2
023240  000137  025010                  JMP     5$              ;BYPASS REST OF THE SUBTEST
023244                          65$:
023244  113777  002250  157130          MOVB    PORTB,@RPCS2      ;SELECT PORT B
023252  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
023260  017737  157120  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
023266  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
023274  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
```

```
023302  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
023310  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
023314  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
023322  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
023330  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
023336  001404                          BEQ     66$             ;BR IF THEY ARE
023340  104456                          TRAP    C$ERHRD
023342  000002                          .WORD   2
023344  005736                          .WORD   EM5
023346  012654                          .WORD   ERR3
023350                          66$:
                        ;;*************************************************************************
                        ;READ THE DRIVE REGISTERS THROUGH PORT A AND STORF THEM ON THE STACK

023350  113777  002246  157024          MOVB    PORTA,@RPCS2        ;SELECT PORT A
023356  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
023364  017746  157050                  MOV     @RPEC2,-(SP)    ;STORE REGISTER RPEC2, PORT A, FOR CHECK
023370  017746  157042                  MOV     @RPEC1,-(SP)    ;STORE REGISTER RPEC1, PORT A, FOR CHECK
023374  017746  157022                  MOV     @RPSN,-(SF)     ;STORE REGISTER RPSN, PORT A, FOR CHECK
023400  017746  157022                  MOV     @RPDC,-(SP)     ;STORE REGISTER RPDC, PORT A, FOR CHECK
023404  017746  157014                  MOV     @RPOF,-(SP)     ;STORE REGISTER RPOF, PORT A, FOR CHECK
023410  017746  157020                  MOV     @RPER3,-(SP)    ;STORE REGISTER RPER3, PORT A, FOR CHECK
023414  017746  156772                  MOV     @RPLA,-(SP)     ;STORE REGISTER RPLA, PORT A, FOR CHECK
023420  017746  156754                  MOV     @RPDA,-(SP)     ;STORE REGISTER RPDA, PORT A, FOR CHECK
023424  017746  156766                  MOV     @RPMR1,-(SP)    ;STORE REGISTER RPMR1, PORT A, FOR CHECK
023430  017746  156752                  MOV     @RPER1,-(SP)    ;STORE REGISTER RPER1, PORT A, FOR CHECK

                        ;;*************************************************************************
                        ;WAIT FOR PORT B TO TIMEOUT

023434  005777  156744          1$:     TST     @RPDS           ;WAIT FOR THE DRIVE TO TIMEOUT
023440  001021                          BNE     2$              ;BR WHEN TIMEOUT OCCURS
023442  005737  002306                  TST     WATCH           ;CHECK WATCH
023446  001372                          BNE     1$              ;BR IF NOT ZERO
023450  104456                          TRAP    C$ERHRD
023452  000022                          .WORD   18
023454  010177                          .WORD   EM36
023456  013320                          .WORD   ERR11
023460  012746  003522                  MOV     #FRMT15,-(SP)
023464  012746  000001                  MOV     #1,-(SP)
023470  010600                          MOV     SP,R0
023472  104414                          TRAP    C$PNTB
023474  062706  000004                  ADD     #4,SP
023500  000137  024230                  JMP     4$              ;BYPASS TIMEOUT TIME CHECK
023504                          2$:                             ;SET PRIORITY TO 7
023504  012700  000340                  MOV     #PRI07,R0
023510  104441                          TRAP    C$SPRI

                        ;;*************************************************************************
                        ;VERIFY THAT THE TIMEOUT ONE-SHOT IS AT LEAST 750 MS

023512  023727  002304  001356          CMP     TIME,#750.      ;WAS MEASURED TIME AT LEAST 750 MS?
023520  103014                          BHIS    3$              ;BR IF IT  WAS
023522  104456                          TRAP    C$ERHRD
023524  000023                          .WORD   19
023526  011517                          .WORD   EM55
023530  013640                          .WORD   ERR17
```

```
023532  012746  003522                  MOV     #FRMT15,-(SP)
023536  012746  000001                  MOV     #1,-(SP)
023542  010600                          MOV     SP,R0
023544  104414                          TRAP    C$PNTB
023546  062706  000004                  ADD     #4,SP

                                ;;*****************************************************************************
                                ;VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AFTER PORT B TIMED OUT

023552                          3$:                             ;SET PRIORITY TO 5
023552  012700  000240                  MOV     #PRI05,R0
023556  104441                          TRAP    C$SPRI

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

023560  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
023564  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
023572  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
023600  113777  002246  156574          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
023606  017737  156572  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
023614  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
023622  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
023630  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
023636  113777  002250  156536          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
023644  017737  156534  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
023652  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
023660  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
023666  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
023674  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
023702  001021                          BNE     67$             ;BR IF NOT
023704  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
023710  001065                          BNE     69$             ;BR IF NOT
023712  104456                          TRAP    C$ERHRD
023714  000006                          .WORD   6
023716  010751                          .WORD   EM46
023720  013534                          .WORD   ERR15
023722  012746  003716                  MOV     #FRMT17,-(SP)
023726  012746  000001                  MOV     #1,-(SP)
023732  010600                          MOV     SP,R0
023734  104414                          TRAP    C$PNTB
023736  062706  000004                  ADD     #4,SP
023742  000137  024230                  JMP     71$             ;BYPASS THE REST OF THE CHECKS
023746  013737  002346  002332  67$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
023754  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
023762  113777  002250  156412          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
023770  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
023774  001414                          BEQ     68$             ;BR IF ZERO
023776  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
024004  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
024012  113777  002246  156362          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
024020  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
024024  001017                          BNE     69$             ;BR IF NOT
024026  012737  177777  002302  68$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
024034  104456                          TRAP    C$ERHRD
024036  000011                          .WORD   9
024040  007313                          .WORD   EM26
024042  013214                          .WORD   ERR9
```

```
024044  012746  003716                  MOV     #FRMT17,-(SP)
024050  012746  000001                  MOV     #1,-(SP)
024054  010600                          MOV     SP,R0
024056  104414                          TRAP    C$PNTB
024060  062706  000004                  ADD     #4,SP
024064  013737  002346  002332  69$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
024072  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
024100  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
024106  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
024114  001414                          BEQ     70$             ;BR IF OK FROM PORT A.
024116  104456                          TRAP    C$ERHRD
024120  000013                          .WORD   11
024122  006072                          .WORD   EM7
024124  013000                          .WORD   ERR5
024126  012746  003471                  MOV     #FRMT14,-(SP)
024132  012746  000001                  MOV     #1,-(SP)
024136  010600                          MOV     SP,R0
024140  104414                          TRAP    C$PNTB
024142  062706  000004                  ADD     #4,SP
024146  013737  002350  002332  70$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
024154  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
024162  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
024170  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
024176  001414                          BEQ     71$             ;BR IF OK
024200  104456                          TRAP    C$ERHRD
024202  000014                          .WORD   12
024204  006072                          .WORD   EM7
024206  013000                          .WORD   ERR5
024210  012746  003522                  MOV     #FRMT15,-(SP)
024214  012746  000001                  MOV     #1,-(SP)
024220  010600                          MOV     SP,R0
024222  104414                          TRAP    C$PNTB
024224  062706  000004                  ADD     #4,SP
024230                          71$:
                        ;;**************************************************************************************
                        ;CHECK THE REGISTERS STORED THROUGH PORT A.  ALL REGISTERS SHOULD BE ZERO.
                        ;THE REGISTERS ARE STORED ON THE STACK.

024230  013737  002246  002266  4$:     MOV     PORTA,PTNBR     ;CHANGE 'PORT NUMBER' TO THE OPPOSITE PORT
024236  013737  002406  002334          MOV     RPER1,BADADR    ;ADDRESS OF RPER1 FOR TYPEOUT
024244  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPER1
024250  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024252  104456                          TRAP    C$ERHRD
024254  000024                          .WORD   20
024256  006004                          .WORD   EM6
024260  012726                          .WORD   ERR4
024262  012746  003522                  MOV     #FRMT15,-(SP)
024266  012746  000001                  MOV     #1,-(SP)
024272  010600                          MOV     SP,R0
024274  104414                          TRAP    C$PNTB
024276  062706  000004                  ADD     #4,SP
024302  013737  002416  002334          MOV     RPMR1,BADADR    ;ADDRESS OF RPMR1 FOR TYPEOUT
024310  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPMR1
024314  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024316  104456                          TRAP    C$ERHRD
024320  000024                          .WORD   20
024322  006004                          .WORD   EM6
```

```
024324  012726                          .WORD   ERR4
024326  012746  003522                  MOV     #FRMT15,-(SP)
024332  012746  000001                  MOV     #1,-(SP)
024336  010600                          MOV     SP,R0
024340  104414                          TRAP    C$PNTB
024342  062706  000004                  ADD     #4,SP
024346  013737  002400  002334          MOV     RPDA,BADADR     ;ADDRESS OF RPDA FOR TYPEOUT
024354  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPDA
024360  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024362  104456                          TRAP    C$ERHRD
024364  000024                          .WORD   20
024366  006004                          .WORD   EM6
024370  012726                          .WORD   ERR4
024372  012746  003522                  MOV     #FRMT15,-(SP)
024376  012746  000001                  MOV     #1,-(SP)
024402  010600                          MOV     SP,R0
024404  104414                          TRAP    C$PNTB
024406  062706  000004                  ADD     #4,SP
024412  013737  002412  002334          MOV     RPLA,BADADR     ;ADDRESS OF RPLA FOR TYPEOUT
024420  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPLA
024424  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024426  104456                          TRAP    C$ERHRD
024430  000024                          .WORD   20
024432  006004                          .WORD   EM6
024434  012726                          .WORD   ERR4
024436  012746  003522                  MOV     #FRMT15,-(SP)
024442  012746  000001                  MOV     #1,-(SP)
024446  010600                          MOV     SP,R0
024450  104414                          TRAP    C$PNTB
024452  062706  000004                  ADD     #4,SP
024456  013737  002434  002334          MOV     RPER3,BADADR    ;ADDRESS OF RPER3 FOR TYPEOUT
024464  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPER3
024470  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024472  104456                          TRAP    C$ERHRD
024474  000024                          .WORD   20
024476  006004                          .WORD   EM6
024500  012726                          .WORD   ERR4
024502  012746  003522                  MOV     #FRMT15,-(SP)
024506  012746  000001                  MOV     #1,-(SP)
024512  010600                          MOV     SP,R0
024514  104414                          TRAP    C$PNTB
024516  062706  000004                  ADD     #4,SP
024522  013737  002424  002334          MOV     RPOF,BADADR     ;ADDRESS OF RPOF FOR TYPEOUT
024530  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPOF
024534  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024536  104456                          TRAP    C$ERHRD
024540  000024                          .WORD   20
024542  006004                          .WORD   EM6
024544  012726                          .WORD   ERR4
024546  012746  003522                  MOV     #FRMT15,-(SP)
024552  012746  000001                  MOV     #1,-(SP)
024556  010600                          MOV     SP,R0
024560  104414                          TRAP    C$PNTB
024562  062706  000004                  ADD     #4,SP
024566  013737  002426  002334          MOV     RPDC,BADADR     ;ADDRESS OF RPDC FOR TYPEOUT
024574  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPDC
024600  001414                          BEQ     .+32            ;CONTENTS ZERO ?
```

```
024602  104456                          TRAP    C$ERHRD
024604  000025                          .WORD   21
024606  006004                          .WORD   EM6
024610  012726                          .WORD   ERR4
024612  012746  003522                  MOV     #FRMT15,-(SP)
024616  012746  000001                  MOV     #1,-(SP)
024622  010600                          MOV     SP,R0
024624  104414                          TRAP    C$PNTB
024626  062706  000004                  ADD     #4,SP
024632  013737  002422  002334          MOV     RPSN,BADADR     ;ADDRESS OF RPSN FOR TYPEOUT
024640  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPSN
024644  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024646  104456                          TRAP    C$ERHRD
024650  000025                          .WORD   21
024652  006004                          .WORD   EM6
024654  012726                          .WORD   ERR4
024656  012746  003522                  MOV     #FRMT15,-(SP)
024662  012746  000001                  MOV     #1,-(SP)
024666  010600                          MOV     SP,R0
024670  104414                          TRAP    C$PNTB
024672  062706  000004                  ADD     #4,SP
024676  013737  002436  002334          MOV     RPEC1,BADADR    ;ADDRESS OF RPEC1 FOR TYPEOUT
024704  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPEC1
024710  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024712  104456                          TRAP    C$ERHRD
024714  000025                          .WORD   21
024716  006004                          .WORD   EM6
024720  012726                          .WORD   ERR4
024722  012746  003522                  MOV     #FRMT15,-(SP)
024726  012746  000001                  MOV     #1,-(SP)
024732  010600                          MOV     SP,R0
024734  104414                          TRAP    C$PNTB
024736  062706  000004                  ADD     #4,SP
024742  013737  002440  002334          MOV     RPEC2,BADADR    ;ADDRESS OF RPEC2 FOR TYPEOUT
024750  012637  002332                  MOV     (SP)+,BADDAT    ;CHECK THE STORED CONTENTS OF RPEC2
024754  001414                          BEQ     .+32            ;CONTENTS ZERO ?
024756  104456                          TRAP    C$ERHRD
024760  000025                          .WORD   21
024762  006004                          .WORD   EM6
024764  012726                          .WORD   ERR4
024766  012746  003522                  MOV     #FRMT15,-(SP)
024772  012746  000001                  MOV     #1,-(SP)
024776  010600                          MOV     SP,R0
025000  104414                          TRAP    C$PNTB
025002  062706  000004                  ADD     #4,SP
025006  000410                          BR      6$              ;EXIT NOW
025010                          5$:
025010  012746  003522                  MOV     #FRMT15,-(SP)
025014  012746  000001                  MOV     #1,-(SP)
025020  010600                          MOV     SP,R0
025022  104414                          TRAP    C$PNTB
025024  062706  000004                  ADD     #4,SP
025030                          6$:
   26 025030                    L10041:
025030  104401                          TRAP    C$ETST
```

```
      1                                 .SBTTL  TEST 4 SEIZE/RELEASE TEST
      2
      3                                 ;*TEST THE OPERATION OF THE RELEASE COMMAND, DRIVE SEIZED
      4                                 ;*
      5                                 ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
      6                                 ;*
      7                                 ;*  B.  CHECK VOLUME VALID AND CLEAR ANY ERROR
      8                                 ;*
      9                                 ;*  C.  ISSUE A RELEASE COMMAND THROUGH PORT'A'.  VERIFY THAT THE DRIVE
     10                                 ;*      RETURNED TO NEUTRAL, AND THAT NO ERRORS ARE INDICATED BY THE
     11                                 ;*      DRIVE.
     12                                 ;*
     13
    112 025032                          T4::
    116 025032  005737  002340                  TST     DRVBAD          ;SYSTEM OK?
        025036  001402                          BEQ     64$             ;TAKE BRANCH IF SO
        025040  104432                          TRAP    C$EXIT
        025042  001314                          .WORD   L10042-.
        025044                          64$:
                                                ;START THE TIMER
        025044  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
        025050  012737  002342  002306          MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
                                        ;;*******************************************************************************
                                        ;SEIZE THE DRIVE AND CHECK VOLUME VALID
                                                ;SEIZE THE DRIVE THROUGH PORT A
        025056  113777  002246  155316          MOVB    PORTA,@RPCS2    ;SELECT PORT A
        025064  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
        025072  005077  155306                  CLR     @RPDS           ;WRITE RPDS

        025076  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
        025104  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
        025110  017737  155270  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
        025116  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        025124  012737  000100  002336          MOV     #VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
        025132  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
        025140  042737  177677  002342          BIC     #^CVV,TMP0  ;SAVE SPECIFIED BITS
        025146  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
        025154  001427                          BEQ     67$             ;BR IF OK
        025156  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
        025164  042737  000100  002352          BIC     #VV,TMP4        ;CLEAR THE MASKED BITS
        025172  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
        025200  104456                          TRAP    C$ERHRD
        025202  000003                          .WORD   3
        025204  006342                          .WORD   EM13
        025206  012726                          .WORD   ERR4
        025210  012746  003716                  MOV     #FRMT17,-(SP)
        025214  012746  000001                  MOV     #1,-(SP)
        025220  010600                          MOV     SP,R0
        025222  104414                          TRAP    C$PNTB
        025224  062706  000004                  ADD     #4,SP
        025230  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        025234                          67$:
        025234  012777  000040  155140          MOV     #CLR,@RPCS2             ;CLEAR DRIVE
```

```
                        ;;*************************************************************************************

                                ;RELEASE THE DRIVE FROM PORT A

025242  113777  002246  155132        MOVB    PORTA,@RPCS2        ;SELECT PORT A
025250  013737  002246  002266        MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
025256  012777  000013  155106        MOV     #13,@RPCS1          ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

025264  005037  002304                CLR     TIME                ;CLEAR THE ELAPSED TIME COUNTER
025270  012737  000050  002306        MOV     #40.,WATCH          ;SET WATCH TO 40. MS
025276  005737  002306        69$:    TST     WATCH
025302  001375                        BNE     69$


                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

025304  005037  002302                CLR     RELERR              ;CLEAR THE 'RELEASE ERROR ' INDICATOR
025310  013737  002404  002334        MOV     RPDS,BADADR         ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
025316  012737  011700  002336        MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
025324  113777  002246  155050        MOVB    PORTA,@RPCS2        ;SELECT PORT A.
025332  017737  155046  002346        MOV     @RPDS,TMP2          ;GET THE DRIVE STATUS REGISTER FROM PORT A.
025340  042737  024005  002346        BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
025346  013737  002346  002342        MOV     TMP2,TMP0           ;COPY IT INTO 'TMP0'
025354  042737  100100  002342        BIC     #ATA!VV,TMP0        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
025362  113777  002250  155012        MOVB    PORTB,@RPCS2        ;SELECT PORT B.
025370  017737  155010  002350        MOV     @RPDS,TMP3          ;GET THE DRIVE STATUS REGISTER FROM PORT B.
025376  042737  024005  002350        BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
025404  013737  002350  002344        MOV     TMP3,TMP1           ;COPY IT INTO 'TMP1'
025412  042737  100100  002344        BIC     #ATA!VV,TMP1        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
025420  023737  002342  002344        CMP     TMP0,TMP1           ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
025426  001021                        BNE     70$                 ;BR IF NOT
025430  005737  002342                TST     TMP0                ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
025434  001065                        BNE     72$                 ;BR IF NOT
025436  104456                        TRAP    C$ERHRD
025440  000006                        .WORD   6
025442  010751                        .WORD   EM46
025444  013534                        .WORD   ERR15
025446  012746  003716                MOV     #FRMT17,-(SP)
025452  012746  000001                MOV     #1,-(SP)
025456  010600                        MOV     SP,R0
025460  104414                        TRAP    C$PNTB
025462  062706  000004                ADD     #4,SP
025466  000137  025754                JMP     74$                 ;BYPASS THE REST OF THE CHECKS
025472  013737  002346  002332  70$:  MOV     TMP2,BADDAT         ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
025500  013737  002250  002266        MOV     PORTB,PTNBR         ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
025506  113777  002250  154666        MOVB    PORTB,@RPCS2        ;SELECT PORT B.
025514  005737  002342                TST     TMP0                ;SEE IF STATUS EQ 0 FROM PORT A.
025520  001414                        BEQ     71$                 ;BR IF ZERO
025522  013737  002246  002266        MOV     PORTA,PTNBR         ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
025530  013737  002350  002332        MOV     TMP3,BADDAT         ;'BAD DATA' FOR ERROR TYPE OUT
025536  113777  002246  154636        MOVB    PORTA,@RPCS2        ;SELECT PORT A.
025544  005737  002344                TST     TMP1                ;SEE IF STATUS EQ ZERO FROM PORT B.
025550  001017                        BNE     72$                 ;BR IF NOT
025552  012737  177777  002302  71$:  MOV     #-1,RELERR          ;SET 'RELEASE ERROR' INDICATOR
```

```
025560  104456                          TRAP    C$ERHRD
025562  000011                          .WORD   9
025564  007313                          .WORD   EM26
025566  013214                          .WORD   ERR9
025570  012746  003716                  MOV     #FRMT17,-(SP)
025574  012746  000001                  MOV     #1,-(SP)
025600  010600                          MOV     SP, )
025602  104414                          TRAP    C$P.. B
025604  062706  000004                  ADD     #4,SP
025610  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
025616  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
025624  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
025632  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
025640  001414                          BEQ     73$             ;BR IF OK FROM PORT A.
025642  104456                          TRAP    C$ERHRD
025644  000013                          .WORD   11
025646  006072                          .WORD   EM7
025650  013000                          .WORD   ERR5
025652  012746  003471                  MOV     #FRMT14,-(SP)
025656  012746  000001                  MOV     #1,-(SP)
025662  010600                          MOV     SP,R0
025664  104414                          TRAP    C$PNTB
025666  062706  000004                  ADD     #4,SP
025672  013737  002350  002332  73$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
025700  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
025706  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
025714  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
025722  001414                          BEQ     74$             ;BR IF OK
025724  104456                          TRAP    C$ERHRD
025726  000014                          .WORD   12
025730  006072                          .WORD   EM7
025732  013000                          .WORD   ERR5
025734  012746  003522                  MOV     #FRMT15,-(SP)
025740  012746  000001                  MOV     #1,-(SP)
025744  010600                          MOV     SP,R0
025746  104414                          TRAP    C$PNTB
025750  062706  000004                  ADD     #4,SP
025754                          74$:
025754  005737  002302                  TST     RELERR          ;DID DRIVE RETURN TO NEUTRAL ?
025760  001402                          BEQ     .+6             ;BR IF IN NEUTRAL
025762  000137  026276                  JMP     1$              ;GO WAIT FOR DRIVE TO TIMEOUT
025766  113777  002246  154406          MOVB    PORTA,@RPCS2      ;SELECT PORT A
025774  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026002  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
026006  017737  154372  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
026014  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
026022  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
026026  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
026034  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
026042  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
026050  001427                          BEQ     75$             ;BR IF OK
026052  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
026060  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
026066  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
026074  104456                          TRAP    C$ERHRD
026076  000003                          .WORD   3
026100  006624                          .WORD   EM17
```

```
026102  013000                          .WORD   ERR5
026104  012746  003716                  MOV     #FRMT17,-(SP)
026110  012746  000001                  MOV     #1,-(SP)
026114  010600                          MOV     SP,R0
026116  104414                          TRAP    C$PNTB
026120  062706  000004                  ADD     #4,SP
026124  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
026130                          75$:
026130  113777  002250  154244          MOVB    PORTB,@RPCS2      ;SELECT PORT B
026136  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026144  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
026150  017737  154230  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
026156  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
026164  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
026170  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
026176  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
026204  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
026212  001427                          BEQ     77$             ;BR IF OK
026214  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
026222  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
026230  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
026236  104456                          TRAP    C$ERHRD
026240  000003                          .WORD   3
026242  006624                          .WORD   EM17
026244  013000                          .WORD   ERR5
026246  012746  003716                  MOV     #FRMT17,-(SP)
026252  012746  000001                  MOV     #1,-(SP)
026256  010600                          MOV     SP,R0
026260  104414                          TRAP    C$PNTB
026262  062706  000004                  ADD     #4,SP
026266  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
026272                          77$:
026272  000137  026356                  JMP     2$              ;GO CHECK FOR LOOP ON ERROR

                                ;;*************************************************************************
                                ;IF RELEASE COMMAND DIDN'T RELEASE THE DRIVE, WAIT FOR THE PORT TIMEOUT
                                ;TO RELEASE THE DRIVE

026276                          1$:
026276  113777  002250  154076          MOVB    PORTB,@RPCS2      ;SELECT PORT B
026304  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026312  005777  154066                  TST     @RPDS           ;WAIT FOR TIMEOUT TO RELEASE DRIVE
026316  001017                          BNE     2$              ;BR WHEN DRIVE RELEASED
026320  005737  002306                  TST     WATCH           ;CHECK THE WATCH
026324  001364                          BNE     1$              ;BR IF NOT ZERO
026326  104456                          TRAP    C$ERHRD
026330  000026                          .WORD   22
026332  010177                          .WORD   EM36
026334  013320                          .WORD   ERR11
026336  012746  003471                  MOV     #FRMT14,-(SP)
026342  012746  000001                  MOV     #1,-(SP)
026346  010600                          MOV     SP,R0
026350  104414                          TRAP    C$PNTB
026352  062706  000004                  ADD     #4,SP
026356                          2$:
120 026356                      L10042:
026356  104401                          TRAP    C$TST
```

```
                                .SBTTL  TEST 5 PORT 'B' SEIZE/RELEASE TEST
                                ;
                                ;*TEST THE OPERATION OF THE RELEASE COMMAND, DRIVE SEIZED
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  SET VOLUME VALID AND CLEAR ANY ERROR
                                ;*
                                ;*  C.  ISSUE A RELEASE COMMAND THROUGH PORT 'B'.  VERIFY THAT THE DRIVE
                                ;*      RETURNED TO NEUTRAL, AND THAT NO ERRORS ARE INDICATED BY THE
                                ;*      DRIVE.
                                ;*
                                ;
026360                          T5::
026360  005737  002340                  TST     DRVBAD          ;SYSTEM OK?
026364  001402                          BEQ     64$             ;TAKE BRANCH IF SO
026366  104432                          TRAP    C$EXIT
026370  001314                          .WORD   L10043-.
026372                          64$:
                                        ;START THE TIMER
026372  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
026376  012737  002342  002306          MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
                                ;;*******************************************************************************
                                ;SEIZE THE DRIVE AND CHECK VOLUME VALID
                                        ;SEIZE THE DRIVE THROUGH PORT B
026404  113777  002250  153770          MOVB    PORTB,@RPCS2    ;SELECT PORT B
026412  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
026420  005077  153760                  CLR     @RPDS           ;WRITE RPDS

026424  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
026432  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
026436  017737  153742  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
026444  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
026452  012737  000100  002336          MOV     #VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
026460  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
026466  042737  177677  002342          BIC     #^CVV,TMP0  ;SAVE SPECIFIED BITS
026474  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
026502  001427                          BEQ     67$             ;BR IF OK
026504  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
026512  042737  000100  002352          BIC     #VV,TMP4        ;CLEAR THE MASKED BITS
026520  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
026526  104456                          TRAP    C$ERHRD
026530  000003                          .WORD   3
026532  006342                          .WORD   EM13
026534  012726                          .WORD   ERR4
026536  012746  003716                  MOV     #FRMT17,-(SP)
026542  012746  000001                  MOV     #1,-(SP)
026546  010600                          MOV     SP,R0
026550  104414                          TRAP    C$PNTB
026552  062706  000004                  ADD     #4,SP
026556  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
026562                          67$:
026562  012777  000040  153612          MOV     #CLR,@RPCS2             ;CLEAR DRIVE
```

```
                        ;;*************************************************************************************

                                ;RELEASE THE DRIVE FROM PORT B

026570  113777  002250  153604        MOVB    PORTB,@RPCS2        ;SELECT PORT B
026576  013737  002250  002266        MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026604  012777  000013  153560        MOV     #13,@RPCS1          ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

026612  005037  002304              CLR     TIME                ;CLEAR THE ELAPSED TIME COUNTER
026616  012737  000050  002306      MOV     #40.,WATCH          ;SET WATCH TO 40. MS
026624  005737  002306        69$:  TST     WATCH
026630  001375                      BNE     69$


                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

026632  005037  002302              CLR     RELERR              ;CLEAR THE 'RELEASE ERROR ' INDICATOR
026636  013737  002404  002334      MOV     RPDS,BADADR         ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
026644  012737  011700  002336      MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
026652  113777  002246  153522      MOVB    PORTA,@RPCS2        ;SELECT PORT A.
026660  017737  153520  002346      MOV     @RPDS,TMP2          ;GET THE DRIVE STATUS REGISTER FROM PORT A.
026666  042737  024005  002346      BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
026674  013737  002346  002342      MOV     TMP2,TMP0           ;COPY IT INTO 'TMP0'
026702  042737  100100  002342      BIC     #ATA!VV,TMP0        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
026710  113777  002250  153464      MOVB    PORTB,@RPCS2        ;SELECT PORT B.
026716  017737  153462  002350      MOV     @RPDS,TMP3          ;GET THE DRIVE STATUS REGISTER FROM PORT B.
026724  042737  024005  002350      BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
026732  013737  002350  002344      MOV     TMP3,TMP1           ;COPY IT INTO 'TMP1'
026740  042737  100100  002344      BIC     #ATA!VV,TMP1        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
026746  023737  002342  002344      CMP     TMP0,TMP1           ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
026754  001021                      BNE     70$                 ;BR IF NOT
026756  005737  002342              TST     TMP0                ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
026762  001065                      BNE     72$                 ;BR IF NOT
026764  104456                      TRAP    C$ERHRD
026766  000006                      .WORD   6
026770  010751                      .WORD   EM46
026772  013534                      .WORD   ERR15
026774  012746  003716              MOV     #FRMT17,-(SP)
027000  012746  000001              MOV     #1,-(SP)
027004  010600                      MOV     SP,R0
027006  104414                      TRAP    C$PNTB
027010  062706  000004              ADD     #4,SP
027014  000137  027302              JMP     74$                 ;BYPASS THE REST OF THE CHECKS
027020  013737  002346  002332  70$:  MOV   TMP2,BADDAT          ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
027026  013737  002250  002266      MOV     PORTB,PTNBR         ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
027034  113777  002250  153340      MOVB    PORTB,@RPCS2        ;SELECT PORT B.
027042  005737  002342              TST     TMP0                ;SEE IF STATUS EQ 0 FROM PORT A.
027046  001414                      BEQ     71$                 ;BR IF ZERO
027050  013737  002246  002266      MOV     PORTA,PTNBR         ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
027056  013737  002350  002332      MOV     TMP3,BADDAT         ;'BAD DATA' FOR ERROR TYPE OUT
027064  113777  002246  153310      MOVB    PORTA,@RPCS2        ;SELECT PORT A.
027072  005737  002344              TST     TMP1                ;SEE IF STATUS EQ ZERO FROM PORT B.
027076  001017                      BNE     72$                 ;BR IF NOT
027100  012737  177777  002302  71$:  MOV   #-1,RELERR          ;SET 'RELEASE ERROR' INDICATOR
```

```
027106  104456                          TRAP    C$ERHRD
027110  000011                          .WORD   9
027112  007313                          .WORD   EM26
027114  013214                          .WORD   ERR9
027116  012746  003716                  MOV     #FRMT17,-(SP)
027122  012746  000001                  MOV     #1,-(SP)
027126  010600                          MOV     SP,R0
027130  104414                          TRAP    C$PNTB
027132  062706  000004                  ADD     #4,SP
027136  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
027144  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
027152  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
027160  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
027166  001414                          BEQ     73$             ;BR IF OK FROM PORT A.
027170  104456                          TRAP    C$ERHRD
027172  000013                          .WORD   11
027174  006072                          .WORD   EM7
027176  013000                          .WORD   ERR5
027200  012746  003471                  MOV     #FRMT14,-(SP)
027204  012746  000001                  MOV     #1,-(SP)
027210  010600                          MOV     SP,R0
027212  104414                          TRAP    C$PNTB
027214  062706  000004                  ADD     #4,SP
027220  013737  002350  002332  73$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
027226  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
027234  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
027242  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
027250  001414                          BEQ     74$             ;BR IF OK
027252  104456                          TRAP    C$ERHRD
027254  000014                          .WORD   12
027256  006072                          .WORD   EM7
027260  013000                          .WORD   ERR5
027262  012746  003522                  MOV     #FRMT15,-(SP)
027266  012746  000001                  MOV     #1,-(SP)
027272  010600                          MOV     SP,R0
027274  104414                          TRAP    C$PNTB
027276  062706  000004                  ADD     #4,SP
027302                          74$:
027302  005737  002302                  TST     RELERR          ;DID DRIVE RETURN TO NEUTRAL ?
027306  001402                          BEQ     .+6             ;BR IF IN NEUTRAL
027310  000137  027624                  JMP     1$              ;GO WAIT FOR DRIVE TO TIMEOUT
027314  113777  002250  153060          MOVB    PORTB,@RPCS2      ;SELECT PORT B
027322  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027330  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
027334  017737  153044  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
027342  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
027350  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
027354  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
027362  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
027370  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
027376  001427                          BEQ     75$             ;BR IF OK
027400  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
027406  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
027414  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
027422  104456                          TRAP    C$ERHRD
027424  000003                          .WORD   3
027426  006624                          .WORD   EM17
```

```
027430  013000                          .WORD   ERR5
027432  012746  003716                  MOV     #FRMT17,-(SP)
027436  012746  000001                  MOV     #1,-(SP)
027442  010600                          MOV     SP,R0
027444  104414                          TRAP    C$PNTB
027446  062706  000004                  ADD     #4,SP
027452  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
027456                          75$:
027456  113777  002246  152716          MOVB    PORTA,@RPCS2      ;SELECT PORT A
027464  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027472  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
027476  017737  152702  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
027504  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
027512  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
027516  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
027524  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
027532  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
027540  001427                          BEQ     77$             ;BR IF OK
027542  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
027550  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
027556  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
027564  104456                          TRAP    C$ERHRD
027566  000003                          .WORD   3
027570  006624                          .WORD   EM17
027572  013000                          .WORD   ERR5
027574  012746  003716                  MOV     #FRMT17,-(SP)
027600  012746  000001                  MOV     #1,-(SP)
027604  010600                          MOV     SP,R0
027606  104414                          TRAP    C$PNTB
027610  062706  000004                  ADD     #4,SP
027614  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
027620                          77$:
027620  000137  027704                  JMP     2$              ;GO CHECK FOR LOOP ON ERROR

                                ;;*************************************************************************
                                ;IF RELEASE COMMAND DIDN'T RELEASE THE DRIVE, WAIT FOR THE PORT TIMEOUT
                                ;TO RELEASE THE DRIVE

027624                          1$:
027624  113777  002246  152550          MOVB    PORTA,@RPCS2      ;SELECT PORT A
027632  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027640  005777  152540                  TST     @RPDS           ;WAIT FOR TIMEOUT TO RELEASE DRIVE
027644  001017                          BNE     2$              ;BR WHEN DRIVE RELEASED
027646  005737  002306                  TST     WATCH           ;CHECK THE WATCH
027652  001364                          BNE     1$              ;BR IF NOT ZERO
027654  104456                          TRAP    C$ERHRD
027656  000026                          .WORD   22
027660  010177                          .WORD   EM36
027662  013320                          .WORD   ERR11
027664  012746  003522                  MOV     #FRMT15,-(SP)
027670  012746  000001                  MOV     #1,-(SP)
027674  010600                          MOV     SP,R0
027676  104414                          TRAP    C$PNTB
027700  062706  000004                  ADD     #4,SP
027704                          2$:
 22 027704                      L10043:
027704  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 6 PORT 'A' SEIZE THROUGH ALL MECHANISMS TEST

                                ;*TEST OPERATION OF SEIZE OPERATION, DRIVE IN NEUTRAL
                                ;*
                                ;*  A.  VERIFY THAT SEIZE OPERATION DID OCCUR.
                                ;*

027706                          T6::
027706  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
027712  001402                          BEQ     64$             ;TAKE BRANCH IF SO
027714  104432                          TRAP    C$EXIT
027716  001012                          .WORD   L10044-.
027720                          64$:

                                        ;SEIZE THE DRIVE THROUGH PORT A

027720  113777  002246  152454          MOVB    PORTA,@RPCS2    ;SELECT PORT A
027726  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
027734  005777  152432                  TST     @RPCS1          ;READ THE CONTROL REGISTER
027740  113777  002250  152434          MOVB    PORTB,@RPCS2      ;SELECT PORT B
027746  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027754  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
027762  017737  152416  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
027770  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
027776  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
030002  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
030010  001406                          BEQ     65$             ;BR IF IT IS
030012  104456                          TRAP    C$ERHRD
030014  000001                          .WORD   1
030016  005705                          .WORD   EM4
030020  012576                          .WORD   ERR2
030022  000137  030730                  JMP     1$              ;BYPASS REST OF THE SUBTEST
030026                          65$:
030026  113777  002246  152346          MOVB    PORTA,@RPCS2      ;SELECT PORT A
030034  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030042  017737  152336  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
030050  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
030056  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
030064  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
030072  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
030076  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
030104  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
030112  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
030120  001404                          BEQ     66$             ;BR IF THEY ARE
030122  104456                          TRAP    C$ERHRD
030124  000002                          .WORD   2
030126  005736                          .WORD   EM5
030130  012654                          .WORD   ERR3
030132                          66$:
030132  113777  002246  152242          MOVB    PORTA,@RPCS2      ;SELECT PORT A
030140  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030146  012777  000013  152216          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                        ;START THE TIMER

030154  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
030160  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
```

```
030166  005737  002306          67$:    TST     WATCH
030172  001375                          BNE     67$


                                        ;SEIZE THE DRIVE THROUGH PORT A

030174  113777  002246  152200          MOVB    PORTA,@RPCS2    ;SELECT PORT A
030202  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
030210  013777  002262  152172          MOV     ASRA,@RPAS              ;WRITE THE DRIVE'S ATTENTION BIT
030216  113777  002250  152156          MOVB    PORTB,@RPCS2      ;SELECT PORT B
030224  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030232  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
030240  017737  152140  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
030246  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
030254  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
030260  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
030266  001406                          BEQ     68$             ;BR IF IT IS
030270  104456                          TRAP    C$ERHRD
030272  000001                          .WORD   1
030274  005705                          .WORD   EM4
030276  012576                          .WORD   ERR2
030300  000137  030730                  JMP     1$              ;BYPASS REST OF THE SUBTEST
030304                          68$:
030304  113777  002246  152070          MOVB    PORTA,@RPCS2      ;SELECT PORT A
030312  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030320  017737  152060  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
030326  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
030334  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
030342  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
030350  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
030354  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
030362  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
030370  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
030376  001404                          BEQ     69$             ;BR IF THEY ARE
030400  104456                          TRAP    C$ERHRD
030402  000002                          .WORD   2
030404  005736                          .WORD   EM5
030406  012654                          .WORD   ERR3
030410                          69$:
030410  113777  002246  151764          MOVB    PORTA,@RPCS2      ;SELECT PORT A
030416  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030424  012777  000013  151740          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                        ;START THE TIMER

030432  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
030436  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
030444  005737  002306          70$:    TST     WATCH
030450  001375                          BNE     70$


                                        ;SEIZE THE DRIVE THROUGH PORT A

030452  113777  002246  151722          MOVB    PORTA,@RPCS2    ;SELECT PORT A
030460  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
030466  012777  177777  151712          MOV     #177777,@RPER1          ;WRITE 177777 INTO RPER1
030474  113777  002250  151700          MOVB    PORTB,@RPCS2      ;SELECT PORT B
```

```
030502  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030510  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
030516  017737  151662  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
030524  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
030532  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
030536  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
030544  001406                          BEQ     71$             ;BR IF IT IS
030546  104456                          TRAP    C$ERHRD
030550  000001                          .WORD   1
030552  005705                          .WORD   EM4
030554  012576                          .WORD   ERR2
030556  000137  030730                  JMP     1$              ;BYPASS REST OF THE SUBTEST
030562                          71$:
030562  113777  002246  151612          MOVB    PORTA,@RPCS2      ;SELECT PORT A
030570  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030576  017737  151602  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
030604  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
030612  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
030620  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
030626  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
030632  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
030640  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
030646  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
030654  001404                          BEQ     72$             ;BR IF THEY ARE
030656  104456                          TRAP    C$ERHRD
030660  000002                          .WORD   2
030662  005736                          .WORD   EM5
030664  012654                          .WORD   ERR3
030666                          72$:
030666  113777  002246  151506          MOVB    PORTA,@RPCS2      ;SELECT PORT A
030674  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030702  012777  000013  151462          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                        ;START THE TIMER

030710  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
030714  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
030722  005737  002306          73$:    TST     WATCH
030726  001375                          BNE     73$

030730                          1$:
   51 030730                    L10044:
030730  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 7 PORT 'B' SEIZE THROUGH ALL MECHANISMS TEST

                                ;*TEST OPERATION OF SEIZE OPERATION, DRIVE IN NEUTRAL
                                ;*
                                ;*  A.  VERIFY THAT SEIZE OPERATION DID OCCUR.
                                ;*

030732                          T7::
030732  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
030736  001402                          BEQ     64$             ;TAKE BRANCH IF SO
030740  104432                          TRAP    C$EXIT
030742  001012                          .WORD   L10045-.
030744                          64$:

                                        ;SEIZE THE DRIVE THROUGH PORT B

030744  113777  002250  151430          MOVB    PORTB,@RPCS2    ;SELECT PORT B
030752  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
030760  005777  151406                  TST     @RPCS1          ;READ THE CONTROL REGISTER
030764  113777  002246  151410          MOVB    PORTA,@RPCS2    ;SELECT PORT A
030772  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031000  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
031006  017737  151372  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
031014  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
031022  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
031026  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
031034  001406                          BEQ     65$             ;BR IF IT IS
031036  104456                          TRAP    C$ERHRD
031040  000001                          .WORD   1
031042  005705                          .WORD   EM4
031044  012576                          .WORD   ERR2
031046  000137  031754                  JMP     1$              ;BYPASS REST OF THE SUBTEST
031052                          65$:
031052  113777  002250  151322          MOVB    PORTB,@RPCS2    ;SELECT PORT B
031060  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031066  017737  151312  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
031074  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
031102  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
031110  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
031116  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
031122  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
031130  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
031136  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
031144  001404                          BEQ     66$             ;BR IF THEY ARE
031146  104456                          TRAP    C$ERHRD
031150  000002                          .WORD   2
031152  005736                          .WORD   EM5
031154  012654                          .WORD   ERR3
031156                          66$:
031156  113777  002250  151216          MOVB    PORTB,@RPCS2    ;SELECT PORT B
031164  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031172  012777  000013  151172          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                        ;START THE TIMER

031200  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
031204  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
```

```
031212  005737  002306          67$:    TST     WATCH
031216  001375                          BNE     67$


                                        ;SEIZE THE DRIVE THROUGH PORT B

031220  113777  002250  151154          MOVB    PORTB,@RPCS2    ;SELECT PORT B
031226  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
031234  013777  002264  151146          MOV     ASRB,@RPAS              ;WRITE THE DRIVE'S ATTENTION BIT
031242  113777  002246  151132          MOVB    PORTA,@RPCS2      ;SELECT PORT A
031250  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031256  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
031264  017737  151114  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
031272  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
031300  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
031304  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
031312  001406                          BEQ     68$             ;BR IF IT IS
031314  104456                          TRAP    C$ERHRD
031316  000001                          .WORD   1
031320  005705                          .WORD   EM4
031322  012576                          .WORD   ERR2
031324  000137  031754                  JMP     1$              ;BYPASS REST OF THE SUBTEST
031330                          68$:
031330  113777  002250  151044          MOVB    PORTB,@RPCS2      ;SELECT PORT B
031336  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031344  017737  151034  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
031352  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
031360  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
031366  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
031374  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
031400  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
031406  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
031414  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
031422  001404                          BEQ     69$             ;BR IF THEY ARE
031424  104456                          TRAP    C$ERHRD
031426  000002                          .WORD   2
031430  005736                          .WORD   EM5
031432  012654                          .WORD   ERR3
031434                          69$:
031434  113777  002250  150740          MOVB    PORTB,@RPCS2      ;SELECT PORT B
031442  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031450  012777  000013  150714          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                        ;START THE TIMER

031456  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
031462  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
031470  005737  002306          70$:    TST     WATCH
031474  001375                          BNE     70$


                                        ;SEIZE THE DRIVE THROUGH PORT B

031476  113777  002250  150676          MOVB    PORTB,@RPCS2    ;SELECT PORT B
031504  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
031512  012777  177777  150666          MOV     #177777,@RPER1          ;WRITE 177777 INTO RPER1
031520  113777  002246  150654          MOVB    PORTA,@RPCS2      ;SELECT PORT A
```

```
031526  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031534  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
031542  017737  150636  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
031550  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
031556  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
031562  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
031570  001406                          BEQ     71$             ;BR IF IT IS
031572  104456                          TRAP    C$ERHRD
031574  000001                          .WORD   1
031576  005705                          .WORD   EM4
031600  012576                          .WORD   ERR2
031602  000137  031754                  JMP     1$              ;BYPASS REST OF THE SUBTEST
031606                          71$:
031606  113777  002250  150566          MOVB    PORTB,@RPCS2       ;SELECT PORT B
031614  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031622  017737  150556  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
031630  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
031636  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
031644  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
031652  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
031656  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
031664  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
031672  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
031700  001404                          BEQ     72$             ;BR IF THEY ARE
031702  104456                          TRAP    C$ERHRD
031704  000002                          .WORD   2
031706  005736                          .WORD   EM5
031710  012654                          .WORD   ERR3
031712                          72$:
031712  113777  002250  150462          MOVB    PORTB,@RPCS2       ;SELECT PORT B
031720  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031726  012777  000013  150436          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                        ;START THE TIMER

031734  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
031740  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
031746  005737  002306          73$:    TST     WATCH
031752  001375                          BNE     73$

031754                          1$:
 16 031754                      L10045:
031754  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 8 PORT 'A' RELEASE/INTERFERENCE TEST
                                ;
                                ;*VERIFY THAT A COMMAND ISSUED BY ONE PORT IS NOT RECOGNIZED IF THE DRIVE
                                ;*      IS SEIZED BY THE OTHER PORT.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  ISSUE A RELEASE COMMAND THROUGH PORT 'A'.
                                ;*
                                ;*  C.  VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT 'B'.
                                ;*
                                ;*  D.  RELEASE THE DRIVE THROUGH PORT 'B'.  VERIFY THAT THE DRIVE SWITCHED
                                ;*      TO PORT 'A'.
                                ;*
                                ;*  E.  RELEASE THE DRIVE THROUGH PORT 'A'.  VERIFY THAT THE DRIVE RETURNED
                                ;*      TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*

 82 031756                      T8::
 86 031756  005737  002340              TST     DRVBAD          ;SYSTEM OK?
    031762  001402                      BEQ     64$             ;MAKE BRANCH IF SO
    031764  104432                      TRAP    C$EXIT
    031766  001542                      .WORD   L10046-.
    031770                      64$:

                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS

    031770  113777  002246  150404      MOVB    PORTA,@RPCS2    ;SELECT PORT #A
    031776  005077  150402              CLR     @RPDS           ;SEIZE THE DRIVE
    032002  012777  000011  150362      MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
    032010  012777  000013  150354      MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                        ;START THE TIMER

    032016  005037  002304              CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
    032022  012737  000050  002306      MOV     #40.,WATCH      ;SET WATCH TO 40. MS
    032030  005737  002306      65$:    TST     WATCH
    032034  001375                      BNE     65$
    032036  113777  002250  150336      MOVB    PORTB,@RPCS2    ;SELECT PORT #B
    032044  005077  150334              CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
    032050  012777  000011  150314      MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
    032056  012777  000013  150306      MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                        ;START THE TIMER

    032064  005037  002304              CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
    032070  012737  000050  002306      MOV     #40.,WATCH      ;SET WATCH TO 40. MS
    032076  005737  002306      66$:    TST     WATCH
    032102  001375                      BNE     66$
                                ;;**************************************************************************

                                        ;SEIZE THE DRIVE THROUGH PORT B

    032104  113777  002250  150270      MOVB    PORTB,@RPCS2    ;SELECT PORT B
    032112  013737  002250  002270      MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
    032120  005077  150260              CLR     @RPDS           ;WRITE RPDS
```

```
032124  113777  002246  150250          MOVB    PORTA,@RPCS2        ;SELECT PORT A
032132  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032140  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
032146  017737  150232  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
032154  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
032162  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
032166  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
032174  001406                          BEQ     67$             ;BR IF IT IS
032176  104456                          TRAP    C$ERHRD
032200  000001                          .WORD   1
032202  005705                          .WORD   EM4
032204  012576                          .WORD   ERR2
032206  000137  033530                  JMP     1$              ;BYPASS REST OF THE SUBTEST
032212                          67$:
032212  113777  002250  150162          MOVB    PORTB,@RPCS2        ;SELECT PORT B
032220  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032226  017737  150152  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
032234  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
032242  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
032250  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
032256  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
032262  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
032270  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
032276  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
032304  001404                          BEQ     68$             ;BR IF THEY ARE
032306  104456                          TRAP    C$ERHRD
032310  000002                          .WORD   2
032312  005736                          .WORD   EM5
032314  012654                          .WORD   ERR3
032316                          68$:
                        ;;**************************************************************************
                        ;TRY TO EXECUTE A RELEASE COMMAND THROUGH PORT A

032316  113777  002246  150056          MOVB    PORTA,@RPCS2        ;SELECT PORT A
032324  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032332  012777  000013  150032          MOV     #13,@RPCS1      ;ISSUE A RELEASE COMMAND THROUGH PORT A

                        ;;**************************************************************************
                        ;VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT B

032340  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
032344  017737  150034  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
032352  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
032360  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
032364  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
032372  001416                          BEQ     69$             ;BR IF OK
032374  104456                          TRAP    C$ERHRD
032376  000004                          .WORD   4
032400  006146                          .WORD   EM10
032402  012654                          .WORD   ERR3
032404  012746  003716                  MOV     #FRMT17,-(SP)
032410  012746  000001                  MOV     #1,-(SP)
032414  010600                          MOV     SP,R0
032416  104414                          TRAP    C$PNTB
032420  062706  000004                  ADD     #4,SP
032424  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
032430  017737  147736  002332  69$:    MOV     @RPCS1,BADDAT   ;GET THE CONTENTS OF RHCS1
```

```
032436  013737  002372  002334          MOV     RPCS1,BADADR    ;FORM ADDRESS OF REGISTER
032444  032737  020000  002332          BIT     #MCPE,BADDAT    ;IS 'MCPE' SET ?
032452  001417                          BEQ     70$             ;BR IF NOT
032454  104456                          TRAP    C$ERHRD
032456  000005                          .WORD   5
032460  006171                          .WORD   EM11
032462  013046                          .WORD   ERR6
032464  012746  003716                  MOV     #FRMT17,-(SP)
032470  012746  000001                  MOV     #1,-(SP)
032474  010600                          MOV     SP,R0
032476  104414                          TRAP    C$PNTB
032500  062706  000004                  ADD     #4,SP
032504  012777  040000  147660          MOV     #TRE,@RPCS1     ;CLEAR 'MCPE'
032512                          70$:
032512  005737  002276                  TST     CKERR           ;WAS RPDS NON ZERO ?
032516  001402                          BEQ     .+6             ;CONTENTS OF RPDS SEEN BY PORT A
032520  000137  033530                  JMP     1$              ;DRIVE IN NEUTRAL, BYPASS REST OF TEST

                                ;;**********************************************************************************

                                        ;RELEASE THE DRIVE FROM PORT B

032524  113777  002250  147650          MOVB    PORTB,@RPCS2      ;SELECT PORT B
032532  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032540  012777  000013  147624          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

032546  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
032552  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
032560  005737  002306          71$:    TST     WATCH
032564  001375                          BNE     71$

                                        ;VERIFY THAT DRIVE IS SEIZED BY PORT A WHEN RELEASED BY PORT B

032566  005037  002302                  CLR     RELERR          ;CLEAR 'RELEASE ERROR' INDICATOR
032572  012737  111700  002336          MOV     #ATA!MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
032600  013737  002404  002334          MOV     RPDS,BADADR   ;REGISTER ADDRESS
032606  113777  002246  147566          MOVB    PORTA,@RPCS2      ;SELECT PORT A
032614  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032622  017737  147556  002342          MOV     @RPDS,TMP0      ;READ STATUS REGISTER FROM PORT A
032630  042737  000004  002342          BIC     #ILV,TMP0       ;CLEAR DON'T CARE BIT
032636  113777  002250  147536          MOVB    PORTB,@RPCS2      ;SELECT PORT B
032644  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032652  017737  147526  002332          MOV     @RPDS,BADDAT  ;DRIVE STATUS FROM PORT B
032660  042737  000004  002332          BIC     #ILV,BADDAT     ;CLEAR DON'T CARE BIT
032666  001417                          BEQ     72$             ;BR IF STATUS FROM PORT B ZERO
032670  005737  002342                  TST     TMP0            ;IS STATUS FROM PORT A ZERO ?
032674  001414                          BEQ     72$             ;BR IF ZERO
032676  104456                          TRAP    C$ERHRD
032700  000016                          .WORD   14
032702  007553                          .WORD   EM31
032704  013362                          .WORD   ERR12
032706  012746  003522                  MOV     #FRMT15,-(SP)
032712  012746  000001                  MOV     #1,-(SP)
032716  010600                          MOV     SP,R0
```

```
032720  104414                          TRAP    C$PNTB
032722  062706  000004                  ADD     #4,SP
032726  013737  002342  002332  72$:    MOV     TMP0,BADDAT     ;CHECK STATUS FROM PORT A
032734  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT ADDRESS FOR TYPEOUT
032742  023737  002336  002332          CMP     EXPTED,BADDAT   ;COMPARE WITH CONSTANT
032750  001414                          BEQ     73$             ;BR IF OK
032752  104456                          TRAP    C$ERHRD
032754  000017                          .WORD   15
032756  007400                          .WORD   EM27
032760  013000                          .WORD   ERR5
032762  012746  003522                  MOV     #FRMT15,-(SP)
032766  012746  000001                  MOV     #1,-(SP)
032772  010600                          MOV     SP,R0
032774  104414                          TRAP    C$PNTB
032776  062706  000004                  ADD     #4,SP
033002                          73$:

                                        ;RELEASE THE DRIVE FROM PORT A

033002  113777  002246  147372          MOVB    PORTA,@RPCS2        ;SELECT PORT A
033010  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
033016  012777  000013  147346          MOV     #13,@RPCS1          ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

033024  005037  002304                  CLR     TIME                ;CLEAR THE ELAPSED TIME COUNTER
033030  012737  000050  002306          MOV     #40.,WATCH          ;SET WATCH TO 40. MS
033036  005737  002306          74$:    TST     WATCH
033042  001375                          BNE     74$

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

033044  005037  002302                  CLR     RELERR              ;CLEAR THE 'RELEASE ERROR ' INDICATOR
033050  013737  002404  002334          MOV     RPDS,BADADR         ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
033056  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
033064  113777  002246  147310          MOVB    PORTA,@RPCS2        ;SELECT PORT A.
033072  017737  147306  002346          MOV     @RPDS,TMP2          ;GET THE DRIVE STATUS REGISTER FROM PORT A.
033100  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
033106  013737  002346  002342          MOV     TMP2,TMP0           ;COPY IT INTO 'TMP0'
033114  042737  100100  002342          BIC     #ATA!VV,TMP0        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
033122  113777  002250  147252          MOVB    PORTB,@RPCS2        ;SELECT PORT B.
033130  017737  147250  002350          MOV     @RPDS,TMP3          ;GET THE DRIVE STATUS REGISTER FROM PORT B.
033136  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
033144  013737  002350  002344          MOV     TMP3,TMP1           ;COPY IT INTO 'TMP1'
033152  042737  100100  002344          BIC     #ATA!VV,TMP1        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
033160  023737  002342  002344          CMP     TMP0,TMP1           ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
033166  001021                          BNE     75$                 ;BR IF NOT
033170  005737  002342                  TST     TMP0                ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
033174  001073                          BNE     77$                 ;BR IF NOT
033176  104456                          TRAP    C$ERHRD
033200  000006                          .WORD   6
033202  010751                          .WORD   EM46
033204  013534                          .WORD   ERR15
033206  012746  003716                  MOV     #FRMT17,-(SP)
033212  012746  000001                  MOV     #1,-(SP)
033216  010600                          MOV     SP,R0
```

```
033220  104414                          TRAP    C$PNTB
033222  062706  000004                  ADD     #4,SP
033226  000137  033530                  JMP     79$             ;BYPASS THE REST OF THE CHECKS
033232  013737  002346  002332  75$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
033240  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
033246  113777  002250  147126          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
033254  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
033260  001414                          BEQ     76$             ;BR IF ZERO
033262  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
033270  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
033276  113777  002246  147076          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
033304  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
033310  001025                          BNE     77$             ;BR IF NOT
033312  012737  177777  002302  76$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
033320  012777  000011  147044          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
033326  012777  000013  147036          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
033334  104456                          TRAP    C$ERHRD
033336  000011                          .WORD   9
033340  007313                          .WORD   EM26
033342  013214                          .WORD   ERR9
033344  012746  003716                  MOV     #FRMT17,-(SP)
033350  012746  000001                  MOV     #1,-(SP)
033354  010600                          MOV     SP,R0
033356  104414                          TRAP    C$PNTB
033360  062706  000004                  ADD     #4,SP
033364  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
033372  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
033400  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
033406  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
033414  001414                          BEQ     78$             ;BR IF OK FROM PORT A.
033416  104456                          TRAP    C$ERHRD
033420  000013                          .WORD   11
033422  006072                          .WORD   EM7
033424  013000                          .WORD   ERR5
033426  012746  003471                  MOV     #FRMT14,-(SP)
033432  012746  000001                  MOV     #1,-(SP)
033436  010600                          MOV     SP,R0
033440  104414                          TRAP    C$PNTB
033442  062706  000004                  ADD     #4,SP
033446  013737  002350  002332  78$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
033454  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
033462  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
033470  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
033476  001414                          BEQ     79$             ;BR IF OK
033500  104456                          TRAP    C$ERHRD
033502  000014                          .WORD   12
033504  006072                          .WORD   EM7
033506  013000                          .WORD   ERR5
033510  012746  003522                  MOV     #FRMT15,-(SP)
033514  012746  000001                  MOV     #1,-(SP)
033520  010600                          MOV     SP,R0
033522  104414                          TRAP    C$PNTB
033524  062706  000004                  ADD     #4,SP
033530                          79$:
033530                          1$:
033530                          L10046:
033530  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 9 PORT 'B' RELEASE INTERFERENCE TEST
                                ;
                                ;*VERIFY THAT A COMMAND ISSUED BY ONE PORT IS NOT RECOGNIZED IF THE DRIVE
                                ;*      IS SEIZED BY THE OTHER PORT.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  ISSUE A RELEASE COMMAND THROUGH PORT 'B'.
                                ;*
                                ;*  C.  VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT 'A'.
                                ;*
                                ;*  D.  RELEASE THE DRIVE THROUGH PORT 'A'.  VERIFY THAT THE DRIVE SWITCHED
                                ;*      TO PORT 'B'.
                                ;*
                                ;*  E.  RELEASE THE DRIVE THROUGH PORT 'B'.  VERIFY THAT THE DRIVE RETURNED
                                ;*      TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*
                                ;
 033532                         T9::
 033532  005737  002340                 TST     DRVBAD          ;SYSTEM OK?
 033536  001402                        BEQ     64$             ;TAKE BRANCH IF SO
 033540  104432                        TRAP    C$EXIT
 033542  001542                        .WORD   L10047-.
 033544                         64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
 033544  113777  002246  146630        MOVB    PORTA,@RPCS2    ;SELECT PORT #A
 033552  005077  146626                CLR     @RPDS           ;SEIZE THE DRIVE
 033556  012777  000011  146606        MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 033564  012777  000013  146600        MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
 033572  005037  002304                CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 033576  012737  000050  002306        MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 033604  005737  002306         65$:   TST     WATCH
 033610  001375                        BNE     65$
 033612  113777  002250  146562        MOVB    PORTB,@RPCS2    ;SELECT PORT #B
 033620  005077  146560                CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
 033624  012777  000011  146540        MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 033632  012777  000013  146532        MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
 033640  005037  002304                CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 033644  012737  000050  002306        MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 033652  005737  002306         66$:   TST     WATCH
 033656  001375                        BNE     66$
                                ;;**************************************************************************
                                        ;SEIZE THE DRIVE THROUGH PORT A
 033660  113777  002246  146514        MOVB    PORTA,@RPCS2    ;SELECT PORT A
 033666  013737  002246  002270        MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
 033674  005077  146504                CLR     @RPDS           ;WRITE RPDS
```

```
033700  113777  002250  146474          MOVB    PORTB,@RPCS2        ;SELECT PORT B
033706  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
033714  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
033722  017737  146456  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
033730  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
033736  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
033742  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
033750  001406                          BEQ     67$             ;BR IF IT IS
033752  104456                          TRAP    C$ERHRD
033754  000001                          .WORD   1
033756  005705                          .WORD   EM4
033760  012576                          .WORD   ERR2
033762  000137  035304                  JMP     1$              ;BYPASS REST OF THE SUBTEST
033766                          67$:
033766  113777  002246  146406          MOVB    PORTA,@RPCS2        ;SELECT PORT A
033774  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034002  017737  146376  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
034010  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
034016  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
034024  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
034032  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
034036  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
034044  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
034052  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
034060  001404                          BEQ     68$             ;BR IF THEY ARE
034062  104456                          TRAP    C$ERHRD
034064  000002                          .WORD   2
034066  005736                          .WORD   EM5
034070  012654                          .WORD   ERR3
034072                          68$:
                        ;;**************************************************************************
                        ;TRY TO EXECUTE A RELEASE COMMAND THROUGH PORT B

034072  113777  002250  146302          MOVB    PORTB,@RPCS2        ;SELECT PORT B
034100  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034106  012777  000013  146256          MOV     #13,@RPCS1      ;ISSUE A RELEASE COMMAND THROUGH PORT B

                        ;;**************************************************************************
                        ;VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT A

034114  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
034120  017737  146260  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
034126  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
034134  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
034140  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
034146  001416                          BEQ     69$             ;BR IF OK
034150  104456                          TRAP    C$ERHRD
034152  000004                          .WORD   4
034154  006146                          .WORD   EM10
034156  012654                          .WORD   ERR3
034160  012746  003716                  MOV     #FRMT17,-(SP)
034164  012746  000001                  MOV     #1,-(SP)
034170  010600                          MOV     SP,R0
034172  104414                          TRAP    C$PNTB
034174  062706  000004                  ADD     #4,SP
034200  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
034204  017737  146162  002332  69$:    MOV     @RPCS1,BADDAT   ;GET THE CONTENTS OF RHCS1
```

```
034212  013737  002372  002334          MOV     RPCS1,BADADR    ;FORM ADDRESS OF REGISTER
034220  032737  020000  002332          BIT     #MCPE,BADDAT    ;IS 'MCPE' SET ?
034226  001417                          BEQ     70$             ;BR IF NOT
034230  104456                          TRAP    C$ERHRD
034232  000005                          .WORD   5
034234  006171                          .WORD   EM11
034236  013046                          .WORD   ERR6
034240  012746  003716                  MOV     #FRMT17,-(SP)
034244  012746  000001                  MOV     #1,-(SP)
034250  010600                          MOV     SP,R0
034252  104414                          TRAP    C$PNTB
034254  062706  000004                  ADD     #4,SP
034260  012777  040000  146104          MOV     #TRE,@RPCS1     ;CLEAR 'MCPE'
034266                          70$:
034266  005737  002276                  TST     CKERR           ;WAS RPDS NON ZERO ?
034272  001402                          BEQ     .+6             ;CONTENTS OF RPDS SEEN BY PORT B
034274  000137  035304                  JMP     1$              ;DRIVE IN NEUTRAL, BYPASS REST OF TEST

                                ;;**********************************************************************

                                        ;RELEASE THE DRIVE FROM PORT A

034300  113777  002246  146074          MOVB    PORTA,@RPCS2      ;SELECT PORT A
034306  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034314  012777  000013  146050          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

034322  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
034326  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
034334  005737  002306          71$:    TST     WATCH
034340  001375                          BNE     71$

                                        ;VERIFY THAT DRIVE IS SEIZED BY PORT B WHEN RELEASED BY PORT A

034342  005037  002302                  CLR     RELERR          ;CLEAR 'RELEASE ERROR' INDICATOR
034346  012737  111700  002336          MOV     #ATA!MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
034354  013737  002404  002334          MOV     RPDS,BADADR   ;REGISTER ADDRESS
034362  113777  002250  146012          MOVB    PORTB,@RPCS2      ;SELECT PORT B
034370  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034376  017737  146002  002342          MOV     @RPDS,TMP0      ;READ STATUS REGISTER FROM PORT B
034404  042737  000004  002342          BIC     #ILV,TMP0       ;CLEAR DON'T CARE BIT
034412  113777  002246  145762          MOVB    PORTA,@RPCS2      ;SELECT PORT A
034420  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034426  017737  145752  002332          MOV     @RPDS,BADDAT  ;DRIVE STATUS FROM PORT A
034434  042737  000004  002332          BIC     #ILV,BADDAT     ;CLEAR DON'T CARE BIT
034442  001417                          BEQ     72$             ;BR IF STATUS FROM PORT A ZERO
034444  005737  002342                  TST     TMP0            ;IS STATUS FROM PORT B ZERO ?
034450  001414                          BEQ     72$             ;BR IF ZERO
034452  104456                          TRAP    C$ERHRD
034454  000016                          .WORD   14
034456  007553                          .WORD   EM31
034460  013362                          .WORD   ERR12
034462  012746  003522                  MOV     #FRMT15,-(SP)
034466  012746  000001                  MOV     #1,-(SP)
034472  010600                          MOV     SP,R0
```

```
034474  104414                          TRAP    C$PNTB
034476  062706  000004                  ADD     #4,SP
034502  013737  002342  002332  72$:     MOV     TMP0,BADDAT     ;CHECK STATUS FROM PORT B
034510  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT ADDRESS FOR TYPEOUT
034516  023737  002336  002332          CMP     EXPTED,BADDAT   ;COMPARE WITH CONSTANT
034524  001414                          BEQ     73$             ;BR IF OK
034526  104456                          TRAP    C$ERHRD
034530  000017                          .WORD   15
034532  007400                          .WORD   EM27
034534  013000                          .WORD   ERR5
034536  012746  003522                  MOV     #FRMT15,-(SP)
034542  012746  000001                  MOV     #1,-(SP)
034546  010600                          MOV     SP,R0
034550  104414                          TRAP    C$PNTB
034552  062706  000004                  ADD     #4,SP
034556                          73$:

                                        ;RELEASE THE DRIVE FROM PORT B

034556  113777  002250  145616          MOVB    PORTB,@RPCS2        ;SELECT PORT B
034564  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034572  012777  000013  145572          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

034600  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
034604  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
034612  005737  002306          74$:    TST     WATCH
034616  001375                          BNE     74$

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

034620  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
034624  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
034632  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
034640  113777  002246  145534          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
034646  017737  145532  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
034654  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
034662  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
034670  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
034676  113777  002250  145476          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
034704  017737  145474  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
034712  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
034720  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
034726  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
034734  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
034742  001021                          BNE     75$             ;BR IF NOT
034744  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
034750  001073                          BNE     77$             ;BR IF NOT
034752  104456                          TRAP    C$ERHRD
034754  000006                          .WORD   6
034756  010751                          .WORD   EM46
034760  013534                          .WORD   ERR15
034762  012746  003716                  MOV     #FRMT17,-(SP)
034766  012746  000001                  MOV     #1,-(SP)
034772  010600                          MOV     SP,R0
```

```
035774  104414                          TRAP    C$PNTB
035776  062706  000004                  ADD     #4,SP
035002  000137  035304                  JMP     79$                     ;BYPASS THE REST OF THE CHECKS
035006  013737  002346  002332  75$:    MOV     TMP2,BADDAT             ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
035014  013737  002250  002266          MOV     PORTB,PTNBR             ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
035022  113777  002250  145352          MOVB    PORTB,@RPCS2            ;SELECT PORT B.
035030  005737  002342                  TST     TMP0                    ;SEE IF STATUS EQ 0 FROM PORT A.
035034  001414                          BEQ     76$                     ;BR IF ZERO
035036  013737  002246  002266          MOV     PORTA,PTNBR             ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
035044  013737  002350  002332          MOV     TMP3,BADDAT             ;'BAD DATA' FOR ERROR TYPE OUT
035052  113777  002246  145322          MOVB    PORTA,@RPCS2            ;SELECT PORT A.
035060  005737  002344                  TST     TMP1                    ;SEE IF STATUS EQ ZERO FROM PORT B.
035064  001025                          BNE     77$                     ;BR IF NOT
035066  012737  177777  002302  76$:    MOV     #-1,RELERR              ;SET 'RELEASE ERROR' INDICATOR
035074  012777  000011  145270          MOV     #11,@RPCS1              ;CLEAR THE DRIVE
035102  012777  000013  145262          MOV     #13,@RPCS1              ;RELEASE THE DRIVE
035110  104456                          TRAP    C$ERHRD
035112  000011                          .WORD   9
035114  007313                          .WORD   EM26
035116  013214                          .WORD   ERR9
035120  012746  003716                  MOV     #FRMT17,-(SP)
035124  012746  000001                  MOV     #1,-(SP)
035130  010600                          MOV     SP,R0
035132  104414                          TRAP    C$PNTB
035134  062706  000004                  ADD     #4,SP
035140  013737  002346  002332  77$:    MOV     TMP2,BADDAT             ;LOOK FOR BIT FAILURES WHEN RPDS READ
035146  013737  002246  002266          MOV     PORTA,PTNBR             ;CHANGE PORT NUMBER
035154  042737  100000  002332          BIC     #ATA,BADDAT             ;DON'T CHECK THE ATTN BIT
035162  023737  002336  002332          CMP     EXPTED,BADDAT           ;ALL BITS OK ?
035170  001414                          BEQ     78$                     ;BR IF OK FROM PORT A.
035172  104456                          TRAP    C$ERHRD
035174  000013                          .WORD   11
035176  006072                          .WORD   EM7
035200  013000                          .WORD   ERR5
035202  012746  003471                  MOV     #FRMT14,-(SP)
035206  012746  000001                  MOV     #1,-(SP)
035212  010600                          MOV     SP,R0
035214  104414                          TRAP    C$PNTB
035216  062706  000004                  ADD     #4,SP
035222  013737  002350  002332  78$:    MOV     TMP3,BADDAT             ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
035230  013737  002250  002266          MOV     PORTB,PTNBR             ;CHANGE PORT NUMBER
035236  042737  100000  002332          BIC     #ATA,BADDAT             ;DON'T CHECK THE ATTN BIT
035244  023737  002336  002332          CMP     EXPTED,BADDAT           ;SEE IF READ OK FROM PORT B.
035252  001414                          BEQ     79$                     ;BR IF OK
035254  104456                          TRAP    C$ERHRD
035256  000014                          .WORD   12
035260  006072                          .WORD   EM7
035262  013000                          .WORD   ERR5
035264  012746  003522                  MOV     #FRMT15,-(SP)
035270  012746  000001                  MOV     #1,-(SP)
035274  010600                          MOV     SP,R0
035276  104414                          TRAP    C$PNTB
035300  062706  000004                  ADD     #4,SP
035304                          79$:
035304                          1$:
27 035304                       L10047:
035304  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 10 PORT 'A' RELEASE WITH ERRORS TEST
                                ;
                                ;*VERIFY THAT A RELEASE COMMAND PERFORMS NO ACTION IF ISSUED WHEN ERROR
                                ;*      BIT IS SET IN THE DRIVE.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  FORCE ILF ERROR BY ISSUING ILLEGAL COMMAND (03)
                                ;*
                                ;*  C.  ISSUE A RELEASE COMMAND THROUGH PORT 'A'.  VERIFY THAT THE 'GO'
                                ;*      BIT HAS RESET, THAT THE DRIVE HAS NOT RETURNED TO NEUTRAL, AND
                                ;*      THAT RPER1 HAS NOT BEEN CLEARED.
                                ;*
                                ;*  D.  CLEAR RPER1 BY ISSUING A DRIVE CLEAR COMMAND THROUGH PORT 'A'.
                                ;*
                                ;*  E.  ISSUE A RELEASE COMMAND THROUGH PORT 'A'.  VERIFY THAT THE DRIVE
                                ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*
                                ;
035306                          T10::
035306  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
035312  001402                          BEQ     64$             ;TAKE BRANCH IF SO
035314  104432                          TRAP    C$EXIT
035316  001436                          .WORD   L10050-.
035320                          64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
035320  113777  002246  145054          MOVB    PORTA,@RPCS2    ;SELECT PORT #A
035326  005077  145052                  CLR     @RPDS           ;SEIZE THE DRIVE
035332  012777  000011  145032          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
035340  012777  000013  145024          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
035346  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
035352  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
035360  005737  002306          65$:    TST     WATCH
035364  001375                          BNE     65$
035366  113777  002250  145006          MOVB    PORTB,@RPCS2    ;SELECT PORT #B
035374  005077  145004                  CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
035400  012777  000011  144764          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
035406  012777  000013  144756          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
035414  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
035420  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
035426  005737  002306          66$:    TST     WATCH
035432  001375                          BNE     66$
                                ;;**************************************************************************
                                        ;SEIZE THE DRIVE THROUGH PORT A
035434  113777  002246  144740          MOVB    PORTA,@RPCS2    ;SELECT PORT A
035442  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
035450  005077  144730                  CLR     @RPDS           ;WRITE RPDS
```

```
035454  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
                                ;;*****************************************************************************
                                ;FORCE AN ERROR

035462  012777  000003  144702          MOV     #3,@RPCS1       ;SET ILF BITS

                                        ;START THE TIMER

035470  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
035474  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
035502  005737  002306          69$:    TST     WATCH
035506  001375                          BNE     69$

                                ;VERIFY THAT ILF IS SET

035510  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
035514  017737  144666  002332          MOV     @RPER1,BADDAT   ;GET CONTENTS OF RPER1
035522  013737  002406  002334          MOV     RPER1,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
035530  012737  000001  002336          MOV     #1,EXPTED       ;;;WHAT REGISTER SHOULD BE
035536  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
035544  001416                          BEQ     70$             ;BR IF OK
035546  104456                          TRAP    C$ERHRD
035550  000003                          .WORD   3
035552  012106                          .WORD   EM64
035554  014016                          .WORD   ERR20
035556  012746  003716                  MOV     #FRMT17,-(SP)
035562  012746  000001                  MOV     #1,-(SP)
035566  010600                          MOV     SP,R0
035570  104414                          TRAP    C$PNTB
035572  062706  000004                  ADD     #4,SP
035576  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
035602                          70$:
035602  012777  000013  144562          MOV     #13,@RPCS1      ;ISSUE A RELEASE COMMAND
035610  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
035614  017737  144552  002332          MOV     @RPCS1,BADDAT   ;GET CONTENTS OF RPCS1
035622  013737  002372  002334          MOV     RPCS1,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
035630  012737  004012  002336          MOV     #4012,EXPTED    ;;;WHAT REGISTER SHOULD BE
035636  013737  002332  002342          MOV     @ADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
035644  042737  173765  002342          BIC     #^C4012,TMP0    ;SAVE SPECIFIED BITS
035652  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
035660  001427                          BEQ     72$             ;BR IF OK
035662  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
035670  042737  004012  002352          BIC     #4012,TMP4      ;CLEAR THE MASKED BITS
035676  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
035704  104456                          TRAP    C$ERHRD
035706  000003                          .WORD   3
035710  006255                          .WORD   EM12
035712  013114                          .WORD   ERR7
035714  012746  003716                  MOV     #FRMT17,-(SP)
035720  012746  000001                  MOV     #1,-(SP)
035724  010600                          MOV     SP,R0
035726  104414                          TRAP    C$PNTB
035730  062706  000004                  ADD     #4,SP
035734  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
035740                          72$:
035740  005737  002276                  TST     CKERR           ;DID 'GO' BIT RESET ?
```

```
035744  001002                          BNE     .+6             ;BR IF NOT
035746  000137  036006                  JMP     1$              ;'GO' BIT RESET
035752  012777  000040  144422          MOV     #CLR,@RPCS2     ;INIT THE RH11
035760  113777  002246  144414          MOVB    PORTA,@RPCS2      ;SELECT PORT A
035766  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
035774  012777  000013  144370          MOV     #13,@RPCS1      ;RELEASE THE DRIVE THROUGH PORT A
036002  000137  036754                  JMP     2$              ;BYPASS THE REST OF THE TEST

                        ;;**************************************************************************
036006  113777  002250  144366          MOVB    PORTB,@RPCS2      ;SELECT PORT B
036014  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
036022  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
036026  017737  144352  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
036034  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
036042  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
036046  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
036054  001416                          BEQ     74$             ;BR IF OK
036056  104456                          TRAP    C$ERHRD
036060  000003                          .WORD   3
036062  007171                          .WORD   EM24
036064  040000                          .WORD   ERR
036066  012746  003716                  MOV     #FRMT17,-(SP)
036072  012746  000001                  MOV     #1,-(SP)
036076  010600                          MOV     SP,R0
036100  104414                          TRAP    C$PNTB
036102  062706  000004                  ADD     #4,SP
036106  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
036112                          74$:
036112  113777  002246  144262          MOVB    PORTA,@RPCS2      ;SELECT PORT A
036120  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
036126  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
036132  017737  144250  002332          MOV     @RPER1,BADDAT  ;GET CONTENTS OF RPER1
036140  013737  002406  002334          MOV     RPER1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
036146  012737  000001  002336          MOV     #1,EXPTED       ;;;WHAT REGISTER SHOULD BE
036154  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
036162  001416                          BEQ     76$             ;BR IF OK
036164  104456                          TRAP    C$ERHRD
036166  000004                          .WORD   4
036170  006146                          .WORD   EM10
036172  012654                          .WORD   ERR3
036174  012746  003716                  MOV     #FRMT17,-(SP)
036200  012746  000001                  MOV     #1,-(SP)
036204  010600                          MOV     SP,R0
036206  104414                          TRAP    C$PNTB
036210  062706  000004                  ADD     #4,SP
036214  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
036220                          76$:
                        ;;**************************************************************************
                        ;CLEAR THE ERRORS THROUGH PORT A

036220  012777  000011  144144          MOV     #11,@RPCS1      ;ISSUE A DRIVE CLEAR

                        ;;**************************************************************************

                        ;RELEASE THE DRIVE FROM PORT A

036226  113777  002246  144146          MOVB    PORTA,@RPCS2      ;SELECT PORT A
```

```
036234  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
036242  012777  000013  144122          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

036250  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
036254  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
036262  005737  002306          78$:    TST     WATCH
036266  001375                          BNE     78$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

036270  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
036274  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
036302  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
036310  113777  002246  144064          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
036316  017737  144062  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
036324  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
036332  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
036340  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
036346  113777  002250  144026          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
036354  017737  144024  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
036362  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
036370  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
036376  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
036404  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
036412  001021                          BNE     79$             ;BR IF NOT
036414  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
036420  001073                          BNE     81$             ;BR IF NOT
036422  104456                          TRAP    C$ERHRD
036424  000006                          .WORD   6
036426  010751                          .WORD   EM46
036430  013534                          .WORD   ERR15
036432  012746  003716                  MOV     #FRMT17,-(SP)
036436  012746  000001                  MOV     #1,-(SP)
036442  010600                          MOV     SP,R0
036444  104414                          TRAP    C$PNTB
036446  062706  000004                  ADD     #4,SP
036452  000137  036754                  JMP     83$             ;BYPASS THE REST OF THE CHECKS
036456  013737  002346  002332  79$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
036464  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
036472  113777  002250  143702          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
036500  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
036504  001414                          BEQ     80$             ;BR IF ZERO
036506  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
036514  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
036522  113777  002246  143652          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
036530  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
036534  001025                          BNE     81$             ;BR IF NOT
036536  012737  177777  002302  80$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
036544  012777  000011  143620          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
036552  012777  000013  143612          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
036560  104456                          TRAP    C$ERHRD
036562  000011                          .WORD   9
036564  007313                          .WORD   EM26
036566  013214                          .WORD   ERR9
```

```
        036570  012746  003716                  MOV     #FRMT17,-(SP)
        036574  012746  000001                  MOV     #1,-(SP)
        036600  010600                          MOV     SP,R0
        036602  104414                          TRAP    C$PNTB
        036604  062706  000004                  ADD     #4,SP
        036610  013737  002346  002332  81$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
        036616  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
        036624  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
        036632  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
        036640  001414                          BEQ     82$             ;BR IF OK FROM PORT A.
        036642  104456                          TRAP    C$ERHRD
        036644  000013                          .WORD   11
        036646  006072                          .WORD   EM7
        036650  013000                          .WORD   ERR5
        036652  012746  003471                  MOV     #FRMT14,-(SP)
        036656  012746  000001                  MOV     #1,-(SP)
        036662  010600                          MOV     SP,R0
        036664  104414                          TRAP    C$PNTB
        036666  062706  000004                  ADD     #4,SP
        036672  013737  002350  002332  82$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
        036700  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
        036706  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
        036714  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
        036722  001414                          BEQ     83$             ;BR IF OK
        036724  104456                          TRAP    C$ERHRD
        036726  000014                          .WORD   12
        036730  006072                          .WORD   EM7
        036732  013000                          .WORD   ERR5
        036734  012746  003522                  MOV     #FRMT15,-(SP)
        036740  012746  000001                  MOV     #1,-(SP)
        036744  010600                          MOV     SP,R0
        036746  104414                          TRAP    C$PNTB
        036750  062706  000004                  ADD     #4,SP
        036754                          83$:
        036754                          2$:
    108 036754                          L10050:
        036754  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 11 PORT 'B' RELEASE WITH ERRORS TEST
                                ;
                                ;*VERIFY THAT A RELEASE COMMAND PERFORMS NO ACTION IF ISSUED WHEN ERROR
                                ;*      BIT IS SET IN THE DRIVE.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  FORCE ILF ERROR BY ISSUING ILLEGAL COMMAND (03)
                                ;*
                                ;*  C.  ISSUE A RELEASE COMMAND THROUGH PORT 'B'.  VERIFY THAT THE 'GO'
                                ;*      BIT HAS RESET, THAT THE DRIVE HAS NOT RETURNED TO NEUTRAL, AND
                                ;*      THAT RPER1 HAS NOT BEEN CLEARED.
                                ;*
                                ;*  D.  CLEAR RPER1 BY ISSUING A DRIVE CLEAR COMMAND THROUGH PORT 'B'.
                                ;*
                                ;*  E.  ISSUE A RELEASE COMMAND THROUGH PORT 'B'.  VERIFY THAT THE DRIVE
                                ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*
                                ;
036756                          T11::
036756  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
036762  001402                          BEQ     64$             ;TAKE BRANCH IF SO
036764  104432                          TRAP    C$EXIT
036766  001436                          .WORD   L10051-.
036770                          64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
036770  113777  002246  143404          MOVB    PORTA,@RPCS2    ;SELECT PORT #A
036776  005077  143402                  CLR     @RPDS           ;SEIZE THE DRIVE
037002  012777  000011  143362          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
037010  012777  000013  143354          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
037016  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
037022  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
037030  005737  002306          65$:    TST     WATCH
037034  001375                          BNE     65$
037036  113777  002250  143336          MOVB    PORTB,@RPCS2    ;SELECT PORT #B
037044  005077  143334                  CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
037050  012777  000011  143314          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
037056  012777  000013  143306          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
037064  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
037070  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
037076  005737  002306          66$:    TST     WATCH
037102  001375                          BNE     66$
                                ;;**************************************************************************
                                        ;SEIZE THE DRIVE THROUGH PORT B
037104  113777  002250  143270          MOVB    PORTB,@RPCS2    ;SELECT PORT B
037112  013737  002250  002270          MOV     PORTB,SEIZPT    ;STORE SEIZING PORT'S ADDRESS
037120  005077  143260                  CLR     @RPDS           ;WRITE RPDS
```

```
037124  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
                                        ;;*************************************************************************
                                        ;FORCE AN ERROR

037132  012777  000003  143232          MOV     #3,@RPCS1       ;SET ILF BITS

                                        ;START THE TIMER

037140  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
037144  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
037152  005737  002306          69$:    TST     WATCH
037156  001375                          BNE     69$

                                        ;VERIFY THAT ILF IS SET

037160  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
037164  017737  143216  002332          MOV     @RPER1,BADDAT   ;GET CONTENTS OF RPER1
037172  013737  002406  002334          MOV     RPER1,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037200  012737  000001  002336          MOV     #1,EXPTED       ;;;WHAT REGISTER SHOULD BE
037206  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
037214  001416                          BEQ     70$             ;BR IF OK
037216  104456                          TRAP    C$ERHRD
037220  000003                          .WORD   3
037222  012106                          .WORD   EM64
037224  014016                          .WORD   ERR20
037226  012746  003716                  MOV     #FRMT17,-(SP)
037232  012746  000001                  MOV     #1,-(SP)
037236  010600                          MOV     SP,R0
037240  104414                          TRAP    C$PNTB
037242  062706  000004                  ADD     #4,SP
037246  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
037252                          70$:
037252  012777  000013  143112          MOV     #13,@RPCS1      ;ISSUE A RELEASE COMMAND
037260  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
037264  017737  143102  002332          MOV     @RPCS1,BADDAT   ;GET CONTENTS OF RPCS1
037272  013737  002372  002334          MOV     RPCS1,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037300  012737  004012  002336          MOV     #4012,EXPTED    ;;;WHAT REGISTER SHOULD BE
037306  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
037314  042737  173765  002342          BIC     #^C4012,TMP0    ;SAVE SPECIFIED BITS
037322  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
037330  001427                          BEQ     72$             ;BR IF OK
037332  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
037340  042737  004012  002352          BIC     #4012,TMP4      ;CLEAR THE MASKED BITS
037346  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
037354  104456                          TRAP    C$ERHRD
037356  000003                          .WORD   3
037360  006255                          .WORD   EM12
037362  013114                          .WORD   ERR7
037364  012746  003716                  MOV     #FRMT17,-(SP)
037370  012746  000001                  MOV     #1,-(SP)
037374  010600                          MOV     SP,R0
037376  104414                          TRAP    C$PNTB
037400  062706  000004                  ADD     #4,SP
037404  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
037410                          72$:
037410  005737  002276                  TST     CKERR           ;DID 'GO' BIT RESET ?
```

```
037414  001002                          BNE     .+6             ;BR IF NOT
037416  000137  037456                  JMP     1$              ;'GO' BIT RESET
037422  012777  000040  142752          MOV     #CLR,@RPCS2     ;INIT THE RH11
037430  113777  002250  142744          MOVB    PORTB,@RPCS2      ;SELECT PORT B
037436  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037444  012777  000013  142720          MOV     #13,@RPCS1      ;RELEASE THE DRIVE THROUGH PORT B
037452  000137  040424                  JMP     2$              ;BYPASS THE REST OF THE TEST

                                ;;********************************************************* **********************
037456  113777  002246  142716          MOVB    PORTA,@RPCS2      ;SELECT PORT A
037464  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037472  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
037476  017737  142702  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
037504  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037512  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
037516  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
037524  001416                          BEQ     74$             ;BR IF OK
037526  104456                          TRAP    C$ERHRD
037530  000003                          .WORD   3
037532  007171                          .WORD   EM24
037534  040000                          .WORD   ERR
037536  012746  003716                  MOV     #FRMT17,-(SP)
037542  012746  000001                  MOV     #1,-(SP)
037546  010600                          MOV     SP,R0
037550  104414                          TRAP    C$PNTB
037552  062706  000004                  ADD     #4,SP
037556  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
037562                          74$:
037562  113777  002250  142612          MOVB    PORTB,@RPCS2      ;SELECT PORT B
037570  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037576  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
037602  017737  142600  002332          MOV     @RPER1,BADDAT  ;GET CONTENTS OF RPER1
037610  013737  002406  002334          MOV     RPER1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037616  012737  000001  002336          MOV     #1,EXPTED       ;;;WHAT REGISTER SHOULD BE
037624  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
037632  001416                          BEQ     76$             ;BR IF OK
037634  104456                          TRAP    C$ERHRD
037636  000004                          .WORD   4
037640  006146                          .WORD   EM10
037642  012654                          .WORD   ERR3
037644  012746  003716                  MOV     #FRMT17,-(SP)
037650  012746  000001                  MOV     #1,-(SP)
037654  010600                          MOV     SP,R0
037656  104414                          TRAP    C$PNTB
037660  062706  000004                  ADD     #4,SP
037664  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
037670                          76$:
                                ;;*********************************************************************************
                                ;CLEAR THE ERRORS THROUGH PORT B

037670  012777  000011  142474          MOV     #11,@RPCS1      ;ISSUE A DRIVE CLEAR

                                ;;*********************************************************************************

                                        ;RELEASE THE DRIVE FROM PORT B

037676  113777  002250  142476          MOVB    PORTB,@RPCS2      ;SELECT PORT B
```

```
037704  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037712  012777  000013  142452          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

037720  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
037724  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
037732  005737  002306          78$:    TST     WATCH
037736  001375                          BNE     78$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

037740  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
037744  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
037752  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
037760  113777  002246  142414          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
037766  017737  142412  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
037774  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
040002  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
040010  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
040016  113777  002250  142356          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
040024  017737  142354  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
040032  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
040040  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
040046  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
040054  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
040062  001021                          BNE     79$             ;BR IF NOT
040064  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
040070  001073                          BNE     81$             ;BR IF NOT
040072  104456                          TRAP    C$ERHRD
040074  000006                          .WORD   6
040076  010751                          .WORD   EM46
040100  013534                          .WORD   ERR15
040102  012746  003716                  MOV     #FRMT17,-(SP)
040106  012746  000001                  MOV     #1,-(SP)
040112  010600                          MOV     SP,R0
040114  104414                          TRAP    C$PNTB
040116  062706  000004                  ADD     #4,SP
040122  000137  040424                  JMP     83$             ;BYPASS THE REST OF THE CHECKS
040126  013737  002346  002332  79$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
040134  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
040142  113777  002250  142232          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
040150  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
040154  001414                          BEQ     80$             ;BR IF ZERO
040156  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
040164  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
040172  113777  002246  142202          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
040200  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
040204  001025                          BNE     81$             ;BR IF NOT
040206  012737  177777  002302  80$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
040214  012777  000011  142150          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
040222  012777  000013  142142          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
040230  104456                          TRAP    C$ERHRD
040232  000011                          .WORD   9
040234  007313                          .WORD   EM26
040236  013214                          .WORD   ERR9
```

```
040240  012746  003716                  MOV     #FRMT17,-(SP)
040244  012746  000001                  MOV     #1,-(SP)
040250  010600                          MOV     SP,R0
040252  104414                          TRAP    C$PNTB
040254  062706  000004                  ADD     #4,SP
040260  013737  002346  002332  81$:     MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
040266  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
040274  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
040302  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
040310  001414                          BEQ     82$             ;BR IF OK FROM PORT A.
040312  104456                          TRAP    C$ERHRD
040314  000013                          .WORD   11
040316  006072                          .WORD   EM7
040320  013000                          .WORD   ERR5
040322  012746  003471                  MOV     #FRMT14,-(SP)
040326  012746  000001                  MOV     #1,-(SP)
040332  010600                          MOV     SP,R0
040334  104414                          TRAP    C$PNTB
040336  062706  000004                  ADD     #4,SP
040342  013737  002350  002332  82$:     MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
040350  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
040356  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
040364  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
040372  001414                          BEQ     83$             ;BR IF OK
040374  104456                          TRAP    C$ERHRD
040376  000014                          .WORD   12
040400  006072                          .WORD   EM7
040402  013000                          .WORD   ERR5
040404  012746  003522                  MOV     #FRMT15,-(SP)
040410  012746  000001                  MOV     #1,-(SP)
040414  010600                          MOV     SP,R0
040416  104414                          TRAP    C$PNTB
040420  062706  000004                  ADD     #4,SP
040424                          83$:
040424                          2$:
 28 040424                      L10051:
040424  104401                          TRAP    C$ETST
```

```
                                                .SBTTL  TEST 12 PORT 'A' SEIZE AND CLEAR TEST

                                                ;*VERIFY THAT A MASSBUS CLEAR OR DRIVE CLEAR WILL NOT CAUSE THE SEIZING
                                                ;*      PORT TO RELEASE THE DRIVE.
                                                ;*
                                                ;*  A.  SEIZE THE DRIVE BY WRITING 0'S INTO RPDS THROUGH PORT 'A'.
                                                ;*      VERIFY THAT THE DRIVE HAS BEEN SEIZED.
                                                ;*
                                                ;*  B.  ISSUE A DRIVE CLEAR THROUGH PORT 'A' AND VERIFY THAT THE DRIVE
                                                ;*      DOES NOT RETURN TO NEUTRAL.
                                                ;*
                                                ;*  C.  ISSUE A MASSBUS CLEAR THROUGH THE RH70 AND VERIFY THAT THE DRIVE
                                                ;*      DOES NOT RETURN TO NEUTRAL.
                                                ;*
                                                ;*  D.  RELEASE THE DRIVE THROUGH PORT 'A'.  VERIFY THAT THE DRIVE
                                                ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                                ;*

040426                                          T12::
040426  005737  002340                                  TST     DRVBAD          ;SYSTEM OK?
040432  001402                                          BEQ     64$             ;TAKE BRANCH IF SO
040434  104432                                          TRAP    C$EXIT
040436  001572                                          .WORD   L10052-.
                                                ;;*****************************************************************
040440                                          64$:

                                                        ;SEIZE THE DRIVE THROUGH PORT A

040440  113777  002246  141734                          MOVB    PORTA,@RPCS2     ;SELECT PORT A
040446  013737  002246  002270                          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
040454  005077  141724                                  CLR     @RPDS           ;WRITE RPDS

040460  113777  002250  141714                          MOVB    PORTB,@RPCS2        ;SELECT PORT B
040466  013737  002250  002266                          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
040474  013737  002250  002272                          MOV     PORTB,OPPRT       ;'OPPOSITE' PORT ADDRESS
040502  017737  141676  002332                          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
040510  013737  002404  002334                          MOV     RPDS,BADADR     ;GENERATE BAD REGISTER ADDRESS
040516  005037  002336                                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
040522  023737  002336  002332                          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
040530  001406                                          BEQ     65$             ;BR IF IT IS
040532  104456                                          TRAP    C$ERHRD
040534  000001                                          .WORD   1
040536  005705                                          .WORD   EM4
040540  012576                                          .WORD   ERR2
040542  000137  042230                                  JMP     1$              ;BYPASS REST OF THE SUBTEST
040546                                          65$:
040546  113777  002246  141626                          MOVB    PORTA,@RPCS2        ;SELECT PORT A
040554  013737  002246  002266                          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
040562  017737  141616  002332                          MOV     @RPDS,BADDAT     ;SEE IF SEIZING PORT SEES CORRECT STATUS
040570  042737  020005  002332                          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
040576  012737  011700  002336                          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
040604  013737  002336  002344                          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
040612  005137  002344                                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
040616  013737  002332  002342                          MOV     BADDAT,TMPO     ;SAVE THE ACTUAL STATUS
040624  043737  002344  002342                          BIC     TMP1,TMPO       ;CLEAR UNWANTED BITS
040632  023737  002336  002342                          CMP     EXPTED,TMPO     ;ARE THE EXPECTED STATUS BITS SET ?
040640  001404                                          BEQ     66$             ;BR IF THEY ARE
```

```
040642  104456                          TRAP    C$ERHRD
040644  000002                          .WORD   2
040646  005736                          .WORD   EM5
040650  012654                          .WORD   ERR3
040652                          66$:
                                ;;**********************************************************************
                                ;DRIVE CLEAR THROUGH PORT A FIRST

040652  012777  000011  141512          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR THROUGH PORT A

                                ;;**********************************************************************
                                ;VERIFY THAT DRIVE STILL SEIZED BY PORT A

040660  113777  002250  141514          MOVB    PORTB,@RPCS2        ;SELECT PORT B
040666  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
040674  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
040700  017737  141500  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
040706  013737  002404  002334          MOV     RPCS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
040714  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
040720  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
040726  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
040734  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
040742  001427                          BEQ     67$             ;BR IF OK
040744  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
040752  042737  077773  002352          BIC     #77773,TMP4     ;CLEAR THE MASKED BITS
040760  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
040766  104456                          TRAP    C$ERHRD
040770  000003                          .WORD   3
040772  007701                          .WORD   EM33
040774  040000                          .WORD   ERR
040776  012746  003716                  MOV     #FRMT17,-(SP)
041002  012746  000001                  MOV     #1,-(SP)
041006  010600                          MOV     SP,R0
041010  104414                          TRAP    C$PNTB
041012  062706  000004                  ADD     #4,SP
041016  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
041022                          67$:
041022  113777  002246  141352          MOVB    PORTA,@RPCS2        ;SELECT PORT A
041030  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041036  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
041042  017737  141336  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
041050  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
041056  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
041064  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
041072  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
041100  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
041106  001427                          BEQ     69$             ;BR IF OK
041110  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
041116  042737  077773  002352          BIC     #77773,TMP4     ;CLEAR THE MASKED BITS
041124  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
041132  104456                          TRAP    C$ERHRD
041134  000003                          .WORD   3
041136  007701                          .WORD   EM33
041140  040000                          .WORD   ERR
041142  012746  003716                  MOV     #FRMT17,-(SP)
041146  012746  000001                  MOV     #1,-(SP)
041152  010600                          MOV     SP,R0
```

```
041154  104414                          TRAP    C$PNTB
041156  062706  000004                  ADD     #4,SP
041162  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
041166                          69$:
                                ;;*************************************************************************
                                ;NOW ISSUE MASSBUS INIT

041166  012777  000040  141206          MOV     #CLR,@RPCS2     ;ISSUE MASSBUS INIT

                                ;;*************************************************************************
                                ;CONFIRM THAT DRIVE STILL SEIZED BY PORT A

041174  113777  002250  141200          MOVB    PORTB,@RPCS2      ;SELECT PORT B
041202  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041210  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
041214  017737  141164  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
041222  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
041230  005037  002336                  CLR     EXPTED            ;WHAT REGISTER SHOULD BE
041234  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
041242  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
041250  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
041256  001427                          BEQ     71$               ;BR IF OK
041260  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
041266  042737  077773  002352          BIC     #77773,TMP4       ;CLEAR THE MASKED BITS
041274  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
041302  104456                          TRAP    C$ERHRD
041304  000003                          .WORD   3
041306  010003                          .WORD   EM34
041310  013320                          .WORD   ERR11
041312  012746  003716                  MOV     #FRMT17,-(SP)
041316  012746  000001                  MOV     #1,-(SP)
041322  010600                          MOV     SP,R0
041324  104414                          TRAP    C$PNTB
041326  062706  000004                  ADD     #4,SP
041332  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
041336                          71$:
041336  113777  002246  141036          MOVB    PORTA,@RPCS2      ;SELECT PORT A
041344  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041352  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
041356  017737  141022  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
041364  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
041372  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
041400  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
041406  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
041414  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
041422  001427                          BEQ     73$               ;BR IF OK
041424  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
041432  042737  077773  002352          BIC     #77773,TMP4       ;CLEAR THE MASKED BITS
041440  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
041446  104456                          TRAP    C$ERHRD
041450  000003                          .WORD   3
041452  010003                          .WORD   EM34
041454  040000                          .WORD   ERR
041456  012746  003716                  MOV     #FRMT17,-(SP)
041462  012746  000001                  MOV     #1,-(SP)
041466  010600                          MOV     SP,R0
041470  104414                          TRAP    C$PNTB
```

```
041472  062706  000004                  ADD     #4,SP
041476  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
041502                          73$:

                                        ;RELEASE THE DRIVE FROM PORT A

041502  113777  002246  140672          MOVB    PORTA,@RPCS2        ;SELECT PORT A
041510  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041516  012777  000013  140646          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

041524  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
041530  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
041536  005737  002306          75$:    TST     WATCH
041542  001375                  BNE     75$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

041544  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
041550  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
041556  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
041564  113777  002246  140610          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
041572  017737  140606  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
041600  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
041606  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
041614  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
041622  113777  002250  140552          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
041630  017737  140550  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
041636  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
041644  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
041652  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
041660  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
041666  001021                  BNE     76$             ;BR IF NOT
041670  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
041674  001073                  BNE     78$             ;BR IF NOT
041676  104456                  TRAP    C$ERHRD
041700  000006                  .WORD   6
041702  010751                  .WORD   EM46
041704  013534                  .WORD   ERR15
041706  012746  003716          MOV     #FRMT17,-(SP)
041712  012746  000001          MOV     #1,-(SP)
041716  010600                  MOV     SP,R0
041720  104414                  TRAP    C$PNTB
041722  062706  000004          ADD     #4,SP
041726  000137  042230          JMP     80$             ;BYPASS THE REST OF THE CHECKS
041732  013737  002346  002332  76$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
041740  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
041746  113777  002250  140426          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
041754  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
041760  001414                  BEQ     77$             ;BR IF ZERO
041762  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
041770  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
041776  113777  002246  140376          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
042004  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
042010  001025                  BNE     78$             ;BR IF NOT
```

```
042012  012737  177777  002302  77$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
042020  012777  000011  140344          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
042026  012777  000013  140336          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
042034  104456                          TRAP    C$ERHRD
042036  000011                          .WORD   9
042040  007313                          .WORD   EM26
042042  013214                          .WORD   ERR9
042044  012746  003716                  MOV     #FRMT17,-(SP)
042050  012746  000001                  MOV     #1,-(SP)
042054  010600                          MOV     SP,R0
042056  104414                          TRAP    C$PNTB
042060  062706  000004                  ADD     #4,SP
042064  013737  002346  002332  78$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
042072  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
042100  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
042106  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
042114  001414                          BEQ     79$             ;BR IF OK FROM PORT A.
042116  104456                          TRAP    C$ERHRD
042120  000013                          .WORD   11
042122  006072                          .WORD   EM7
042124  013000                          .WORD   ERR5
042126  012746  003471                  MOV     #FRMT14,-(SP)
042132  012746  000001                  MOV     #1,-(SP)
042136  010600                          MOV     SP,R0
042140  104414                          TRAP    C$PNTB
042142  062706  000004                  ADD     #4,SP
042146  013737  002350  002332  79$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
042154  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
042162  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
042170  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
042176  001414                          BEQ     80$             ;BR IF OK
042200  104456                          TRAP    C$ERHRD
042202  000014                          .WORD   12
042204  006072                          .WORD   EM7
042206  013000                          .WORD   ERR5
042210  012746  003522                  MOV     #FRMT15,-(SP)
042214  012746  000001                  MOV     #1,-(SP)
042220  010600                          MOV     SP,R0
042222  104414                          TRAP    C$PNTB
042224  062706  000004                  ADD     #4,SP
042230                          80$:
042230                          1$:
 93 042230                      L10052:
042230  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 13 PORT 'B' SEIZE AND CLEAR TEST

                                ;*VERIFY THAT A MASSBUS CLEAR OR DRIVE CLEAR WILL NOT CAUSE THE SEIZING
                                ;*      PORT TO RELEASE THE DRIVE.
                                ;*
                                ;*  A.  SEIZE THE DRIVE BY WRITING 0'S INTO RPDS THROUGH PORT 'B'.
                                ;*      VERIFY THAT THE DRIVE HAS BEEN SEIZED.
                                ;*
                                ;*  B.  ISSUE A DRIVE CLEAR THROUGH PORT 'B' AND VERIFY THAT THE DRIVE
                                ;*      DOES NOT RETURN TO NEUTRAL.
                                ;*
                                ;*  C.  ISSUE A MASSBUS CLEAR THROUGH THE RH70 AND VERIFY THAT THE DRIVE
                                ;*      DOES NOT RETURN TO NEUTRAL.
                                ;*
                                ;*  D.  RELEASE THE DRIVE THROUGH PORT 'B'.  VERIFY THAT THE DRIVE
                                ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*

042232                          T13::
042232  005737  002340                  TST     DRVBAD          ;SYSTEM OK?
042236  001402                          BEQ     64$             ;TAKE BRANCH IF SO
042240  104432                          TRAP    C$EXIT
042242  001572                          .WORD   L10053-.
                                ;;*****************************************************************************
042244                          64$:

                                        ;SEIZE THE DRIVE THROUGH PORT B

042244  113777  002250  140130          MOVB    PORTB,@RPCS2    ;SELECT PORT B
042252  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
042260  005077  140120                  CLR     @RPDS           ;WRITE RPDS

042264  113777  002246  140110          MOVB    PORTA,@RPCS2      ;SELECT PORT A
042272  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
042300  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
042306  017737  140072  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
042314  013737  002404  002334          MOV     RPDS,BADADR     ;GENERATE BAD PEGISTER ADDRESS
042322  005037  002336                  CLR     EXPTED          ;REGISTER SHOULD BE ZERO
042326  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER ZERO
042334  001406                          BEQ     65$             ;BR IF IT IS
042336  104456                          TRAP    C$ERHRD
042340  000001                          .WORD   1
042342  005705                          .WORD   EM4
042344  012576                          .WORD   ERR2
042346  000137  044034                  JMP     1$              ;BYPASS REST OF THE SUBTEST
042352                          65$:
042352  113777  002250  140022          MOVB    PORTB,@RPCS2      ;SELECT PORT B
042360  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
042366  017737  140012  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
042374  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
042402  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
042410  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
042416  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STA''S
042422  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
042430  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
042436  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
042444  001404                          BEQ     66$             ;BR IF THEY ARE
```

```
042446  104456                          TRAP    C$ERHRD
042450  000002                          .WORD   2
042452  005736                          .WORD   EM5
042454  012654                          .WORD   ERR3
042456                          66$:
                                ;;*****************************************************************************
                                ;DRIVE CLEAR THROUGH PORT B FIRST

042456  012777  000011  137706          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR THROUGH PORT B

                                ;;*****************************************************************************
                                ;VERIFY THAT DRIVE STILL SEIZED BY PORT B

042464  113777  002246  137710          MOVB    PORTA,@RPCS2        ;SELECT PORT A
042472  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
042500  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
042504  017737  137674  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
042512  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
042520  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
042524  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
042532  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
042540  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
042546  001427                          BEQ     67$             ;BR IF OK
042550  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
042556  042737  077773  002352          BIC     #77773,TMP4     ;CLEAR THE MASKED BITS
042564  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
042572  104456                          TRAP    C$ERHRD
042574  000003                          .WORD   3
042576  007701                          .WORD   EM33
042600  040000                          .WORD   ERR
042602  012746  003716                  MOV     #FRMT17,-(SP)
042606  012746  000001                  MOV     #1,-(SP)
042612  010600                          MOV     SP,R0
042614  104414                          TRAP    C$PNTB
042616  062706  000004                  ADD     #4,SP
042622  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
042626                          67$:
042626  113777  002250  137546          MOVB    PORTB,@RPCS2        ;SELECT PORT B
042634  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
042642  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
042646  017737  137532  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
042654  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
042662  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
042670  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
042676  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
042704  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
042712  001427                          BEQ     69$             ;BR IF OK
042714  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
042722  042737  077773  002352          BIC     #77773,TMP4     ;CLEAR THE MASKED BITS
042730  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
042736  104456                          TRAP    C$ERHRD
042740  000003                          .WORD   3
042742  007701                          .WORD   EM33
042744  040000                          .WORD   ERR
042746  012746  003716                  MOV     #FRMT17,-(SP)
042752  012746  000001                  MOV     #1,-(SP)
042756  010600                          MOV     SP,R0
```

```
042760  104414                          TRAP    C$PNTB
042762  062706  000004                  ADD     #4,SP
042766  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
042772                          69$:
                                ;;*************************************************************************
                                ;NOW ISSUE MASSBUS INIT

042772  012777  000040  137402          MOV     #CLR,@RPCS2     ;ISSUE MASSBUS INIT

                                ;;*************************************************************************
                                ;CONFIRM THAT DRIVE STILL SEIZED BY PORT B

043000  113777  002246  137374          MOVB    PORTA,@RPCS2      ;SELECT PORT A
043006  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
043014  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
043020  017737  137360  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
043026  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
043034  005037  002336                  CLR     EXPTED            ;WHAT REGISTER SHOULD BE
043040  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
043046  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
043054  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
043062  001427                          BEQ     71$               ;BR IF OK
043064  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
043072  042737  077773  002352          BIC     #77773,TMP4       ;CLEAR THE MASKED BITS
043100  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
043106  104456                          TRAP    C$ERHRD
043110  000003                          .WORD   3
043112  010003                          .WORD   EM34
043114  013320                          .WORD   ERR11
043116  012746  003716                  MOV     #FRMT17,-(SP)
043122  012746  000001                  MOV     #1,-(SP)
043126  010600                          MOV     SP,R0
043130  104414                          TRAP    C$PNTB
043132  062706  000004                  ADD     #4,SP
043136  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
043142                          71$:
043142  113777  002250  137232          MOVB    PORTB,@RPCS2      ;SELECT PORT B
043150  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
043156  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
043162  017737  137216  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
043170  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
043176  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
043204  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
043212  042737  100004  002342          BIC     #^C77773,TMP0  ;SAVE SPECIFIED BITS
043220  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
043226  001427                          BEQ     73$               ;BR IF OK
043230  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
043236  042737  077773  002352          BIC     #77773,TMP4       ;CLEAR THE MASKED BITS
043244  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
043252  104456                          TRAP    C$ERHRD
043254  000003                          .WORD   3
043256  010003                          .WORD   EM34
043260  040000                          .WORD   ERR
043262  012746  003716                  MOV     #FRMT17,-(SP)
043266  012746  000001                  MOV     #1,-(SP)
043272  010600                          MOV     SP,R0
043274  104414                          TRAP    C$PNTB
```

```
043276  062706  000004                  ADD     #4,SP
043302  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
043306                          73$:

                                        ;RELEASE THE DRIVE FROM PORT B

043306  113777  002250  137066          MOVB    PORTB,@RPCS2      ;SELECT PORT B
043314  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
043322  012777  000013  137042          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

043330  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
043334  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
043342  005737  002306          75$:    TST     WATCH
043346  001375                          BNE     75$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

043350  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
043354  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
043362  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
043370  113777  002246  137004          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
043376  017737  137002  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
043404  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
043412  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
043420  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
043426  113777  002250  136746          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
043434  017737  136744  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
043442  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
043450  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
043456  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
043464  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
043472  001021                          BNE     76$             ;BR IF NOT
043474  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
043500  001073                          BNE     78$             ;BR IF NOT
043502  104456                          TRAP    C$ERHRD
043504  000006                          .WORD   6
043506  010751                          .WORD   EM46
043510  013534                          .WORD   ERR15
043512  012746  003716                  MOV     #FRMT17,-(SP)
043516  012746  000001                  MOV     #1,-(SP)
043522  010600                          MOV     SP,R0
043524  104414                          TRAP    C$PNTB
043526  062706  000004                  ADD     #4,SP
043532  000137  044034                  JMP     80$             ;BYPASS THE REST OF THE CHECKS
043536  013737  002346  002332  76$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
043544  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
043552  113777  002250  136622          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
043560  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
043564  001414                          BEQ     77$             ;BR IF ZERO
043566  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
043574  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
043602  113777  002246  136572          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
043610  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
043614  001025                          BNE     78$             ;BR IF NOT
```

```
043616  012737  177777  002302  77$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
043624  012777  000011  136540          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
043632  012777  000013  136532          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
043640  104456                          TRAP    C$ERHRD
043642  000011                          .WORD   9
043644  007313                          .WORD   EM26
043646  013214                          .WORD   ERR9
043650  012746  003716                  MOV     #FRMT17,-(SP)
043654  012746  000001                  MOV     #1,-(SP)
043660  010600                          MOV     SP,R0
043662  104414                          TRAP    C$PNTB
043664  062706  000004                  ADD     #4,SP
043670  013737  002346  002332  78$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
043676  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
043704  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
043712  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
043720  001414                          BEQ     79$             ;BR IF OK FROM PORT A.
043722  104456                          TRAP    C$ERHRD
043724  000013                          .WORD   11
043726  006072                          .WORD   EM7
043730  013000                          .WORD   ERR5
043732  012746  003471                  MOV     #FRMT14,-(SP)
043736  012746  000001                  MOV     #1,-(SP)
043742  010600                          MOV     SP,R0
043744  104414                          TRAP    C$PNTB
043746  062706  000004                  ADD     #4,SP
043752  013737  002350  002332  79$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
043760  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
043766  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
043774  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
044002  001414                          BEQ     80$             ;BR IF OK
044006  104456                          TRAP    C$ERHRD
044010  000014                          .WORD   12
044012  006072                          .WORD   EM7
044014  013000                          .WORD   ERR5
044016  012746  003522                  MOV     #FRMT15,-(SP)
044022  012746  000001                  MOV     #1,-(SP)
044026  010600                          MOV     SP,R0
044030  104414                          TRAP    C$PNTB
044032  062706  000004                  ADD     #4,SP
044036                          80$:
044036                          1$:
044036                          L10053:
044036  104401                          TRAP    C$ETST
```

```
      1                                 .SBTTL  TEST 14 SEIZE BY RPAS TEST
      2
      3                                 ;*TEST THAT WRITING THE APPROPRIATE DRIVE BIT INTO THE ATTENTION REGISTER
      4                                 ;*      (RPAS) SEIZES THE DRIVE.  VERIFY THAT REQUEST IS SET FOR THE OTHER
      5                                 ;*      PORT.
      6                                 ;*
      7                                 ;*  A.  WRITE THE APPROPRIATE DRIVE BITS INTO RPAS; VERIFY THAT THE DRIVE
      8                                 ;*      IS SEIZED.
      9                                 ;*
     10                                 ;*  B.  ISSUE A RELEASE COMMAND THROUGH THE SEIZING PORT; VERIFY THAT THE
     11                                 ;*      DRIVE SWITCHES TO THE OPPOSITE PORT.  ISSUE A RELEASE THROUGH THE
     12                                 ;*      OPPOSITE PORT AND VERIFY THAT THE DRIVE IS IN NEUTRAL.
     13                                 ;*
     14
    138 044036                          T14::
    142 044036  005737  002340                  TST     DRVBAD          ;SYSTEM OK?
        044042  001402                          BEQ     64$             ;TAKE BRANCH IF SO
        044044  104432                          TRAP    C$EXIT
        044046  002662                          .WORD   L10054-.
        044050                          64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
        044050  113777  002246  136324          MOVB    PORTA,@RPCS2    ;SELECT PORT #A
        044056  005077  136322                  CLR     @RPDS           ;SEIZE THE DRIVE
        044062  012777  000011  136302          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
        044070  012777  000013  136274          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
        044076  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
        044102  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
        044110  005737  002306          65$:    TST     WATCH
        044114  001375                          BNE     65$
        044116  113777  002250  136256          MOVB    PORTB,@RPCS2    ;SELECT PORT #B
        044124  005077  136254                  CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
        044130  012777  000011  136234          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
        044136  012777  000013  136226          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
        044144  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
        044150  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
        044156  005737  002306          66$:    TST     WATCH
        044162  001375                          BNE     66$
                                        ;;*****************************************************************************
                                        ;SELECT DRIVE OTHER THAN THAT BEING TESTED
        044164  113777  002252  136210          MOVB    PORTC,@RPCS2    ;SELECT DRIVE NOT BEING TESTED
        044172  013737  002246  002270          MOV     PORTA,SEIZPT    ;'SEIZED' PORT ADDRESS
                                        ;;*****************************************************************************
                                        ;WRITE THE DRIVE'S ATTENTION BIT
        044200  013777  002260  136202          MOV     ASR1,@RPAS      ;WRITE THE ATTENTION BITS OF THE DRIVE BEING TESTED
        044206  113777  002246  136166          MOVB    PORTA,@RPCS2      ;SELECT PORT A
        044214  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
```

```
                        ;;*************************************************************************
                        ;VERIFY THAT EITHER PORT A OR PORT B HAS THE DRIVE

044222  005777  136156          TST     @RPDS           ;SEE THE REGISTER THROUGH PORT A ?
044226  001027                  BNE     1$              ;BR IF YES
044230  113777  002250  136144  MOVB    PORTB,@RPCS2      ;SELECT PORT B
044236  013737  002250  002266  MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044244  005777  136134          TST     @RPDS           ;SEE REGISTER THROUGH PORT B ?
044250  001047                  BNE     2$              ;BR IF YES
044252  104456                  TRAP    C$ERHRD
044254  000027                  .WORD   23
044256  010436                  .WORD   EM42
044260  000000                  .WORD   0
044262  012746  003716          MOV     #FRMT17,-(SP)
044266  012746  000001          MOV     #1,-(SP)
044272  010600                  MOV     SP,R0
044274  104414                  TRAP    C$PNTB
044276  062706  000004          ADD     #4,SP
044302  000137  046730          JMP     4$              ;BYPASS REST OF TEST
044306                  1$:
044306  113777  002250  136066  MOVB    PORTB,@RPCS2      ;SELECT PORT B
044314  013737  002250  002266  MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044322  005777  136056          TST     @RPDS           ;REGISTER SHOULD BE ZERO THROUGH PORT B
044326  001002                  BNE     .+6             ;BR IF STATUS REG IS NOT ZERO
044330  000137  045544          JMP     3$              ;STATUS REG IS ZERO
044334  104456                  TRAP    C$ERHRD
044336  000030                  .WORD   24
044340  010524                  .WORD   EM43
044342  000000                  .WORD   0
044344  012746  003522          MOV     #FRMT15,-(SP)
044350  012746  000001          MOV     #1,-(SP)
044354  010600                  MOV     SP,R0
044356  104414                  TRAP    C$PNTB
044360  062706  000004          ADD     #4,SP
044364  000137  046730          JMP     4$              ;BYPASS REST OF TEST

                        ;;*************************************************************************
                        ;PORT B HAS THE DRIVE.  VERIFY THAT PORT A HAS PORT REQUEST SET

044370                  2$:
044370  005037  002276          CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
044374  017737  136004  002332  MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
044402  013737  002404  002334  MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
044410  012737  011700  002336  MOV     #MOL!PGM!DPR!DRY!VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
044416  013737  002332  002342  MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
044424  042737  106077  002342  BIC     #^C71700,TMP0  ;SAVE SPECIFIED BITS
044432  023737  002336  002342  CMP     EXPTED,TMP0     ;COMPARE THE BITS
044440  001427                  BEQ     67$             ;BR IF OK
044442  013737  002332  002352  MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
044450  042737  071700  002352  BIC     #71700,TMP4     ;CLEAR THE MASKED BITS
044456  053737  002352  002336  BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
044464  104456                  TRAP    C$ERHRD
044466  000004                  .WORD   4
044470  006146                  .WORD   EM10
044472  012654                  .WORD   ERR3
044474  012746  003716          MOV     #FRMT17,-(SP)
044500  012746  000001          MOV     #1,-(SP)
```

```
044504  010600                          MOV     SP,R0
044506  104414                          TRAP    C$PNTB
044510  062706  000004                  ADD     #4,SP
044514  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
044520                          67$:
044520  013737  002250  002270          MOV     PORTB,SEIZPT    ;ADDRESS FOR ERROR MESSAGE
044526  013737  002246  002272          MOV     PORTA,OPPRT     ;SAME AS ABOVE

                                        ;RELEASE THE DRIVE FROM PORT B

044534  113777  002250  135640          MOVB    PORTB,@RPCS2      ;SELECT PORT B
044542  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044550  012777  000013  135614          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

044556  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
044562  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
044570  005737  002306          69$:    TST     WATCH
044574  001375                          BNE     69$


                                        ;VERIFY THAT DRIVE IS SEIZED BY PORT A WHEN RELEASED BY PORT B

044576  005037  002302                  CLR     RELERR          ;CLEAR 'RELEASE ERROR' INDICATOR
044602  012737  111700  002336          MOV     #ATA!MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
044610  013737  002404  002334          MOV     RPDS,BADADR   ;REGISTER ADDRESS
044616  113777  002246  135556          MOVB    PORTA,@RPCS2      ;SELECT PORT A
044624  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044632  017737  135546  002342          MOV     @RPDS,TMP0      ;READ STATUS REGISTER FROM PORT A
044640  042737  000004  002342          BIC     #ILV,TMP0       ;CLEAR DON'T CARE BIT
044646  113777  002250  135526          MOVB    PORTB,@RPCS2      ;SELECT PORT B
044654  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044662  017737  135516  002332          MOV     @RPDS,BADDAT  ;DRIVE STATUS FROM PORT B
044670  042737  000004  002332          BIC     #ILV,BADDAT     ;CLEAR DON'T CARE BIT
044676  001417                          BEQ     70$             ;BR IF STATUS FROM PORT B ZERO
044700  005737  002342                  TST     TMP0            ;IS STATUS FROM PORT A ZERO ?
044704  001414                          BEQ     70$             ;BR IF ZERO
044706  104456                          TRAP    C$ERHRD
044710  000015                          .WORD   13
044712  010601                          .WORD   EM44
044714  040000                          .WORD   ERR
044716  012746  003522                  MOV     #FRMT15,-(SP)
044722  012746  000001                  MOV     #1,-(SP)
044726  010600                          MOV     SP,R0
044730  104414                          TRAP    C$PNTB
044732  062706  000004                  ADD     #4,SP
044736  013737  002342  002332  70$:    MOV     TMP0,BADDAT     ;CHECK STATUS FROM PORT A
044744  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT ADDRESS FOR TYPEOUT
044752  023737  002336  002332          CMP     EXPTED,BADDAT   ;COMPARE WITH CONSTANT
044760  001414                          BEQ     71$             ;BR IF OK
044762  104456                          TRAP    C$ERHRD
044764  000017                          .WORD   15
044766  007400                          .WORD   EM27
044770  013000                          .WORD   ERR5
044772  012746  003522                  MOV     #FRMT15,-(SP)
044776  012746  000001                  MOV     #1,-(SP)
```

```
045002  010600                          MOV     SP,R0
045004  104414                          TRAP    C$PNTB
045006  062706  000004                  ADD     #4,SP
045012                          71$:

                                        ;RELEASE THE DRIVE FROM PORT A

045012  113777  002246  135362          MOVB    PORTA,@RPCS2        ;SELECT PORT A
045020  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
045026  012777  000013  135336          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

045034  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
045040  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
045046  005737  002306          72$:    TST     WATCH
045052  001375                          BNE     72$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

045054  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
045060  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
045066  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
045074  113777  002246  135300          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
045102  017737  135276  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
045110  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
045116  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
045124  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
045132  113777  002250  135242          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
045140  017737  135240  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
045146  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
045154  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
045162  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
045170  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
045176  001021                          BNE     73$             ;BR IF NOT
045200  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
045204  001073                          BNE     75$             ;BR IF NOT
045206  104456                          TRAP    C$ERHRD
045210  000006                          .WORD   6
045212  010751                          .WORD   EM46
045214  013534                          .WORD   ERR15
045216  012746  003716                  MOV     #FRMT17,-(SP)
045222  012746  000001                  MOV     #1,-(SP)
045226  010600                          MOV     SP,R0
045230  104414                          TRAP    C$PNTB
045232  062706  000004                  ADD     #4,SP
045236  000137  045540                  JMP     77$             ;BYPASS THE REST OF THE CHECKS
045242  013737  002346  002332  73$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
045250  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
045256  113777  002250  135116          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
045264  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
045270  001414                          BEQ     74$             ;BR IF ZERO
045272  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
045300  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
045306  113777  002246  135066          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
045314  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
```

```
045320  001025                          BNE     75$             ;BR IF NOT
045322  012737  177777  002302  74$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
045330  012777  000011  135034          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
045336  012777  000013  135026          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
045344  104456                          TRAP    C$ERHRD
045346  000011                          .WORD   9
045350  007313                          .WORD   EM26
045352  013214                          .WORD   ERR9
045354  012746  003716                  MOV     #FRMT17,-(SP)
045360  012746  000001                  MOV     #1,-(SP)
045364  010600                          MOV     SP,R0
045366  104414                          TRAP    C$PNTB
045370  062706  000004                  ADD     #4,SP
045374  013737  002346  002332  75$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
045402  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
045410  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
045416  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
045424  001414                          BEQ     76$             ;BR IF OK FROM PORT A.
045426  104456                          TRAP    C$ERHRD
045430  000013                          .WORD   11
045432  006072                          .WORD   EM7
045434  013000                          .WORD   ERR5
045436  012746  003471                  MOV     #FRMT14,-(SP)
045442  012746  000001                  MOV     #1,-(SP)
045446  010600                          MOV     SP,R0
045450  104414                          TRAP    C$PNTB
045452  062706  000004                  ADD     #4,SP
045456  013737  002350  002332  76$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
045464  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
045472  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
045500  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
045506  001414                          BEQ     77$             ;BR IF OK
045510  104456                          TRAP    C$ERHRD
045512  000014                          .WORD   12
045514  006072                          .WORD   EM7
045516  013000                          .WORD   ERR5
045520  012746  003522                  MOV     #FRMT15,-(SP)
045524  012746  000001                  MOV     #1,-(SP)
045530  010600                          MOV     SP,R0
045532  104414                          TRAP    C$PNTB
045534  062706  000004                  ADD     #4,SP
045540                          77$:
045540  000137  046730                  JMP     4$

                                ;;*******************************************************************************
                                ;THE DRIVE IS SEIZED BY PORT A.  VERIFY THAT PORT B HAS PORT REQUEST SET

045544                          3$:
045544  113777  002246  134630          MOVB    PORTA,@RPCS2        ;SELECT PORT A
045552  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
045560  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
045564  017737  134614  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
045572  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
045600  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED      ;;;WHAT REGISTER SHOULD BE
045606  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
045614  042737  106077  002342          BIC     #^C71700,TMP0  ;SAVE SPECIFIED BITS
045622  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
```

```
045630  001427                          BEQ     78$             ;BR IF OK
045632  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
045640  042737  071700  002352          BIC     #71700,TMP4     ;CLEAR THE MASKED BITS
045646  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
045654  104456                          TRAP    C$ERHRD
045656  000004                          .WORD   4
045660  006146                          .WORD   EM10
045662  012654                          .WORD   ERR3
045664  012746  003716                  MOV     #FRMT17,-(SP)
045670  012746  000001                  MOV     #1,-(SP)
045674  010600                          MOV     SP,R0
045676  104414                          TRAP    C$PNTB
045700  062706  000004                  ADD     #4,SP
045704  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
045710                          78$:
045710  013737  002246  002270          MOV     PORTA,SEIZPT    ;ADDRESS FOR ERROR MESSAGE
045716  013737  002250  002272          MOV     PORTB,OPPRT     ;SAME AS ABOVE

                                        ;RELEASE THE DRIVE FROM PORT A

045724  113777  002246  134450          MOVB    PORTA,@RPCS2      ;SELECT PORT A
045732  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
045740  012777  000013  134424          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

045746  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
045752  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
045760  005737  002306          80$:    TST     WATCH
045764  001375                          BNE     80$

                                        ;VERIFY THAT DRIVE IS SEIZED BY PORT B WHEN RELEASED BY PORT A

045766  005037  002302                  CLR     RELERR          ;CLEAR 'RELEASE ERROR' INDICATOR
045772  012737  111700  002336          MOV     #ATA!MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
046000  013737  002404  002334          MOV     RPDS,BADADR   ;REGISTER ADDRESS
046006  113777  002250  134366          MOVB    PORTB,@RPCS2      ;SELECT PORT B
046014  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
046022  017737  134356  002342          MOV     @RPDS,TMP0      ;READ STATUS REGISTER FROM PORT B
046030  042737  000004  002342          BIC     #ILV,TMP0       ;CLEAR DON'T CARE BIT
046036  113777  002246  134336          MOVB    PORTA,@RPCS2      ;SELECT PORT A
046044  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
046052  017737  134326  002332          MOV     @RPDS,BADDAT  ;DRIVE STATUS FROM PORT A
046060  042737  000004  002332          BIC     #ILV,BADDAT     ;CLEAR DON'T CARE BIT
046066  001417                          BEQ     81$             ;BR IF STATUS FROM PORT A ZERO
046070  005737  002342                  TST     TMP0            ;IS STATUS FROM PORT B ZERO ?
046074  001414                          BEQ     81$             ;BR IF ZERO
046076  104456                          TRAP    C$ERHRD
046100  000015                          .WORD   13
046102  010601                          .WORD   EM44
046104  013472                          .WORD   ERR14
046106  012746  003522                  MOV     #FRMT15,-(SP)
046112  012746  000001                  MOV     #1,-(SP)
046116  010600                          MOV     SP,R0
046120  104414                          TRAP    C$PNTB
046122  062706  000004                  ADD     #4,SP
```

```
046126  013737  002342  002332  81$:    MOV     TMP0,BADDAT     ;CHECK STATUS FROM PORT B
046134  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT ADDRESS FOR TYPEOUT
046142  023737  002336  002332          CMP     EXPTED,BADDAT   ;COMPARE WITH CONSTANT
046150  001414                          BEQ     82$             ;BR IF OK
046152  104456                          TRAP    C$ERHRD
046154  000017                          .WORD   15
046156  007400                          .WORD   EM27
046160  013000                          .WORD   ERR5
046162  012746  003522                  MOV     #FRMT15,-(SP)
046166  012746  000001                  MOV     #1,-(SP)
046172  010600                          MOV     SP,R0
046174  104414                          TRAP    C$PNTB
046176  062706  000004                  ADD     #4,SP
046202                          82$:

                                        ;RELEASE THE DRIVE FROM PORT B

046202  113777  002250  134172          MOVB    PORTB,@RPCS2      ;SELECT PORT B
046210  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
046216  012777  000013  134146          MOV     #13,@RPCS1        ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

046224  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
046230  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
046236  005737  002306          83$:    TST     WATCH
046242  001375                          BNE     83$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

046244  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
046250  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
046256  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
046264  113777  002246  134110          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
046272  017737  134106  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
046300  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
046306  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
046314  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
046322  113777  002250  134052          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
046330  017737  134050  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
046336  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
046344  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
046352  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
046360  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
046366  001021                          BNE     84$             ;BR IF NOT
046370  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
046374  001073                          BNE     86$             ;BR IF NOT
046376  104456                          TRAP    C$ERHRD
046400  000006                          .WORD   6
046402  010751                          .WORD   EM46
046404  013534                          .WORD   ERR15
046406  012746  003716                  MOV     #FRMT17,-(SP)
046412  012746  000001                  MOV     #1,-(SP)
046416  010600                          MOV     SP,R0
046420  104414                          TRAP    C$PNTB
046422  062706  000004                  ADD     #4,SP
```

```
046426  000137  046730                  JMP     88$             ;BYPASS THE REST OF THE CHECKS
046432  013737  002346  002332  84$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
046440  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
046446  113777  002250  133726          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
046454  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
046460  001414                          BEQ     85$             ;BR IF ZERO
046462  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
046470  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
046476  113777  002246  133676          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
046504  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
046510  001025                          BNE     86$             ;BR IF NOT
046512  012737  177777  002302  85$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
046520  012777  000011  133644          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
046526  012777  000013  133636          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
046534  104456                          TRAP    C$ERHRD
046536  000011                          .WORD   9
046540  007313                          .WORD   EM26
046542  013214                          .WORD   ERR9
046544  012746  003716                  MOV     #FRMT17,-(SP)
046550  012746  000001                  MOV     #1,-(SP)
046554  010600                          MOV     SP,R0
046556  104414                          TRAP    C$PNTB
046560  062706  000004                  ADD     #4,SP
046564  013737  002346  002332  86$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
046572  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
046600  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
046606  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
046614  001414                          BEQ     87$             ;BR IF OK FROM PORT A.
046616  104456                          TRAP    C$ERHRD
046620  000013                          .WORD   11
046622  006072                          .WORD   EM7
046624  013000                          .WORD   ERR5
046626  012746  003471                  MOV     #FRMT14,-(SP)
046632  012746  000001                  MOV     #1,-(SP)
046636  010600                          MOV     SP,R0
046640  104414                          TRAP    C$PNTB
046642  062706  000004                  ADD     #4,SP
046646  013737  002350  002332  87$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
046654  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
046662  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
046670  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
046676  001414                          BEQ     88$             ;BR IF OK
046700  104456                          TRAP    C$ERHRD
046702  000014                          .WORD   12
046704  006072                          .WORD   EM7
046706  013000                          .WORD   ERR5
046710  012746  003522                  MOV     #FRMT15,-(SP)
046714  012746  000001                  MOV     #1,-(SP)
046720  010600                          MOV     SP,R0
046722  104414                          TRAP    C$PNTB
046724  062706  000004                  ADD     #4,SP
046730                          88$:
046730                          4$:
146 046730                      L10054:
046730  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 15 INHIBIT SEIZE BY RPAS TEST
                                        ;
                                        ;*VERIFY THAT THE DRIVE IS NOT SEIZED WHEN A 'ZERO' IS WRITTEN INTO
                                        ;*      THE DRIVE'S ATTENTION BIT.
                                        ;*
                                        ;*  A.  SELECT A DRIVE NOT BEING TESTED AND WRITE ALL BITS, EXCEPT THE
                                        ;*      BIT OF THE DRIVE BEING TESTED, INTO THE ATTENTION REGISTER.
                                        ;*
                                        ;*  B.  VERIFY THAT THE DRIVE IS STILL IN NEUTRAL.
                                        ;*

046732                                  T15::
046732  005737  002340                          TST     DRVBAD          ;SYSTEM OK?
046736  001402                                  BEQ     64$             ;TAKE BRANCH IF SO
046740  104432                                  TRAP    C$EXIT
046742  000640                                  .WORD   L10055-.
046744                                  64$:

                                                ;CLEAR ATTENTION BITS FOR BOTH PORTS

046744  113777  002246  133430                  MOVB    PORTA,@RPCS2    ;SELECT PORT #A
046752  005077  133426                          CLR     @RPDS           ;SEIZE THE DRIVE
046756  012777  000011  133406                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
046764  012777  000013  133400                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

046772  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
046776  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
047004  005737  002306                  65$:    TST     WATCH
047010  001375                                  BNE     65$
047012  113777  002250  133362                  MOVB    PORTB,@RPCS2    ;SELECT PORT #B
047020  005077  133360                          CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
047024  012777  000011  133340                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
047032  012777  000013  133332                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

047040  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
047044  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
047052  005737  002306                  66$:    TST     WATCH
047056  001375                                  BNE     66$
047060  113777  002252  133314                  MOVB    PORTC,@RPCS2    ;SELECT DRIVE NOT BEING TESTED

                                        ;;*************************************************************************
                                        ;WRITE ALL ATTENTION BITS EXCEPT BIT FOR DRIVE UNDER TEST

047066  013737  002260  002342                  MOV     ASR1,TMP0       ;STORE ATTN BIT FOR PORT A
047074  005137  002342                          COM     TMP0            ;COMPLEMENT IT
047100  013777  002342  133302                  MOV     TMP0,@RPAS      ;WRITE THE ATTN REGISTER

                                        ;;*************************************************************************
                                        ;VERIFY THAT DRIVE REMAINDED IN NEUTRAL


                                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL
```

```
047106  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
047112  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
047120  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
047126  113777  002246  133246          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
047134  017737  133244  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
047142  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
047150  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
047156  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
047164  113777  002250  133210          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
047172  017737  133206  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
047200  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
047206  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
047214  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
047222  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
047230  001021                          BNE     67$             ;BR IF NOT
047232  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
047236  001077                          BNE     69$             ;BR IF NOT
047240  104456                          TRAP    C$ERHRD
047242  000006                          .WORD   6
047244  010751                          .WORD   EM46
047246  013534                          .WORD   ERR15
047250  012746  003716                  MOV     #FRMT17,-(SP)
047254  012746  000001                  MOV     #1,-(SP)
047260  010600                          MOV     SP,R0
047262  104414                          TRAP    C$PNTB
047264  062706  000004                  ADD     #4,SP
047270  000137  047602                  JMP     71$             ;BYPASS THE REST OF THE CHECKS
047274  013737  002346  002332  67$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
047302  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
047310  113777  002250  133064          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
047316  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
047322  001414                          BEQ     68$             ;BR IF ZERO
047324  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
047332  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
047340  113777  002246  133034          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
047346  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
047352  001031                          BNE     69$             ;BR IF NOT
047354  012737  177777  002302  68$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
047362  012777  000011  133002          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
047370  012777  000013  132774          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
047376  104456                          TRAP    C$ERHRD
047400  000007                          .WORD   7
047402  006763                          .WORD   EM21
047404  013152                          .WORD   ERR8
047406  104456                          TRAP    C$ERHRD
047410  000010                          .WORD   8
047412  006763                          .WORD   EM21
047414  000000                          .WORD   0
047416  012746  003716                  MOV     #FRMT17,-(SP)
047422  012746  000001                  MOV     #1,-(SP)
047426  010600                          MOV     SP,R0
047430  104414                          TRAP    C$PNTB
047432  062706  000004                  ADD     #4,SP
047436  013737  002346  002332  69$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
047444  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
047452  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
047460  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
```

```
        047466  001414                          BEQ     70$             ;BR IF OK FROM PORT A.
        047470  104456                          TRAP    C$ERHRD
        047472  000013                          .WORD   11
        047474  006072                          .WORD   EM7
        047476  013000                          .WORD   ERR5
        047500  012746  003471                  MOV     #FRMT14,-(SP)
        047504  012746  000001                  MOV     #1,-(SP)
        047510  010600                          MOV     SP,R0
        047512  104414                          TRAP    C$PNTB
        047514  062706  000004                  ADD     #4,SP
        047520  013737  002350  002332  70$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
        047526  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
        047534  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
        047542  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
        047550  001414                          BEQ     71$             ;BR IF OK
        047552  104456                          TRAP    C$ERHRD
        047554  000014                          .WORD   12
        047556  006072                          .WORD   EM7
        047560  013000                          .WORD   ERR5
        047562  012746  003522                  MOV     #FRMT15,-(SP)
        047566  012746  000001                  MOV     #1,-(SP)
        047572  010600                          MOV     SP,R0
        047574  104414                          TRAP    C$PNTB
        047576  062706  000004                  ADD     #4,SP
        047602                          71$:
     61 047602                          L10055:
        047602  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 16 SET PORT 'A' REQUEST TEST

                                ;*VERIFY THAT WRITING A DRIVE REGISTER SETS 'PORT REQUEST' WHEN THE
                                ;*      DRIVE IS SEIZED BY THE OTHER PORT.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  WRITE 0'S INTO RPDS FROM PORT 'A'; VERIFY THAT THE DRIVE IS STILL
                                ;*      SEIZED BY PORT 'B'.
                                ;*
                                ;*  C.  ISSUE A RELEASE COMMAND FROM PORT 'B' AND VERIFY THAT THE DRIVE
                                ;*      SWITCHED TO PORT 'A'.  VERIFY THAT THE ATTENTION BIT IS SET FOR
                                ;*      PORT 'A' AND IS NOT SET FOR PORT 'B'.
                                ;*
                                ;*  D.  ISSUE A RELEASE COMMAND THROUGH PORT 'A' AND VERIFY THAT THE DRIVE
                                ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*

 047604                         T16::
 047604  005737  002340                 TST     DRVBAD          ;SYSTEM OK???
 047610  001402                         BEQ     64$             ;TAKE BRANCH IF SO
 047612  104432                         TRAP    C$EXIT
 047614  001246                         .WORD   L10056-.
 047616                         64$:

                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS

 047616  113777  002246  132556         MOVB    PORTA,@RPCS2    ;SELECT PORT #A
 047624  005077  132554                 CLR     @RPDS           ;SEIZE THE DRIVE
 047630  012777  000011  132534         MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 047636  012777  000013  132526         MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                        ;START THE TIMER

 047644  005037  002304                 CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 047650  012737  000050  002306         MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 047656  005737  002306         65$:    TST     WATCH
 047662  001375                         BNE     65$
 047664  113777  002250  132510         MOVB    PORTB,@RPCS2    ;SELECT PORT #B
 047672  005077  132506                 CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
 047676  012777  000011  132466         MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 047704  012777  000013  132460         MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                        ;START THE TIMER

 047712  005037  002304                 CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 047716  012737  000050  002306         MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 047724  005737  002306         66$:    TST     WATCH
 047730  001375                         BNE     66$
                                ;;*******************************************************************************

                                        ;SEIZE THE DRIVE THROUGH PORT B

 047732  113777  002250  132442         MOVB    PORTB,@RPCS2    ;SELECT PORT B
 047740  013737  002250  002270         MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
 047746  005077  132432                 CLR     @RPDS           ;WRITE RPDS
```

```
047752  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
047760  113777  002246  132414          MOVB    PORTA,@RPCS2      ;SELECT PORT A
047766  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                ;;*************************************************************************
                                ;SET PORT REQUEST

047774  005077  132404                  CLR     @RPDS           ;SET PORT REQUEST FOR PORT A

                                ;;*************************************************************************
                                ;RELEASE THROUGH PORT B.  DRIVE SHOULD SWITCH TO PORT A.

050000  113777  002250  132374          MOVB    PORTB,@RPCS2      ;SELECT PORT B
050006  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050014  012777  000013  132350          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                ;START THE TIMER

050022  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
050026  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
050034  005737  002306          69$:    TST     WATCH
050040  001375                  BNE     69$

050042  113777  002250  132332          MOVB    PORTB,@RPCS2      ;SELECT PORT B
050050  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050056  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
050062  017737  132316  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
050070  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
050076  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
050102  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
050110  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
050116  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
050124  001427                  BEQ     70$             ;BR IF OK
050126  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
050134  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
050142  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
050150  104456                  TRAP    C$ERHRD
050152  000003                  .WORD   3
050154  006551                  .WORD   EM16
050156  013000                  .WORD   ERR5
050160  012746  003716          MOV     #FRMT17,-(SP)
050164  012746  000001          MOV     #1,-(SP)
050170  010600                  MOV     SP,R0
050172  104414                  TRAP    C$PNTB
050174  062706  000004          ADD     #4,SP
050200  005137  002276          COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
050204                  70$:
050204  113777  002246  132170          MOVB    PORTA,@RPCS2      ;SELECT PORT A
050212  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050220  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
050224  017737  132154  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
050232  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
050240  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
050246  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
050254  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
050262  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
050270  001427                  BEQ     72$             ;BR IF OK
050272  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
```

```
050300  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
050306  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
050314  104456                          TRAP    C$ERHRD
050316  000003                          .WORD   3
050320  006551                          .WORD   EM16
050322  013000                          .WORD   ERR5
050324  012746  003716                  MOV     #FRMT17,-(SP)
050330  012746  000001                  MOV     #1,-(SP)
050334  010600                          MOV     SP,R0
050336  104414                          TRAP    C$PNTB
050340  062706  000004                  ADD     #4,SP
050344  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
050350                          72$:
                                ;;**************************************************************************************

                                        ;RELEASE THE DRIVE FROM PORT A

050350  113777  002246  132024          MOVB    PORTA,@RPCS2        ;SELECT PORT A
050356  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050364  012777  00001   132000          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

050372  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
050376  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
050404  005737  002306          74$:    TST     WATCH
050410  001375                          BNE     74$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

050412  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
050416  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
050424  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
050432  113777  002246  131742          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
050440  017737  131740  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
050446  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
050454  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
050462  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
050470  113777  002250  131704          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
050476  017737  131702  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
050504  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
050512  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
050520  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
050526  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
050534  001021                          BNE     75$             ;BR IF NOT
050536  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
050542  001073                          BNE     77$             ;BR IF NOT
050544  104456                          TRAP    C$ERHRD
050546  000006                          .WORD   6
050550  010751                          .WORD   EM46
050552  013534                          .WORD   ERR15
050554  012746  003716                  MOV     #FRMT17,-(SP)
050560  012746  000001                  MOV     #1,-(SP)
050564  010600                          MOV     SP,R0
050566  104414                          TRAP    C$PNTB
050570  062706  000004                  ADD     #4,SP
```

```
050574  000137  051062                  JMP     79$             ;BYPASS THE REST OF THE CHECKS
050600  013737  002346  002332  75$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
050606  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
050614  113777  002250  131560          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
050622  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
050626  001414                          BEQ     76$             ;BR IF ZERO
050630  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
050636  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
050644  113777  002246  131530          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
050652  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
050656  001025                          BNE     77$             ;BR IF NOT
050660  012737  177777  002302  76$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
050666  012777  000011  131476          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
050674  012777  000013  131470          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
050702  104456                          TRAP    C$ERHRD
050704  000011                          .WORD   9
050706  007313                          .WORD   EM26
050710  013214                          .WORD   ERR9
050712  012746  003716                  MOV     #FRMT17,-(SP)
050716  012746  000001                  MOV     #1,-(SP)
050722  010600                          MOV     SP,R0
050724  104414                          TRAP    C$PNTB
050726  062706  000004                  ADD     #4,SP
050732  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
050740  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
050746  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
050754  001414                          BEQ     78$             ;BR IF OK FROM PORT A.
050756  104456                          TRAP    C$ERHRD
050760  000013                          .WORD   11
050762  006072                          .WORD   EM7
050764  013000                          .WORD   ERR5
050766  012746  003471                  MOV     #FRMT14,-(SP)
050772  012746  000001                  MOV     #1,-(SP)
050776  010600                          MOV     SP,R0
051000  104414                          TRAP    C$PNTB
051002  062706  000004                  ADD     #4,SP
051006  013737  002350  002332  78$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
051014  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
051022  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
051030  001414                          BEQ     79$             ;BR IF OK
051032  104456                          TRAP    C$ERHRD
051034  000014                          .WORD   12
051036  006072                          .WORD   EM7
051040  013000                          .WORD   ERR5
051042  012746  003522                  MOV     #FRMT15,-(SP)
051046  012746  000001                  MOV     #1,-(SP)
051052  010600                          MOV     SP,R0
051054  104414                          TRAP    C$PNTB
051056  062706  000004                  ADD     #4,SP
051062                          79$:
051062                          1$:
 86 051062                      L10056:
051062  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 17 SET PORT 'B'' REQUEST TEST
                                ;
                                ;*VERIFY THAT WRITING A DRIVE REGISTER SETS 'PORT REQUEST' WHEN THE
                                ;*      DRIVE IS SEIZED BY THE OTHER PORT.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  WRITE 0'S INTO RPDS FROM PORT 'B'; VERIFY THAT THE DRIVE IS STILL
                                ;*      SEIZED BY PORT 'A'.
                                ;*
                                ;*  C.  ISSUE A RELEASE COMMAND FROM PORT 'A' AND VERIFY THAT THE DRIVE
                                ;*      SWITCHED TO PORT 'B'.  VERIFY THAT THE ATTENTION BIT IS SET FOR
                                ;*      PORT 'B' AND IS NOT SET FOR PORT 'A'.
                                ;*
                                ;*  D.  ISSUE A RELEASE COMMAND THROUGH PORT 'B' AND VERIFY THAT THE DRIVE
                                ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                ;*
                                ;
051064                          T17::
051064  005737  002340                  TST     DRVBAD          ;SYSTEM OK???
051070  001402                          BEQ     64$             ;TAKE BRANCH IF SO
051072  104432                          TRAP    C$EXIT
051074  001246                          .WORD   L10057-.
051076                          64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
051076  113777  002246  131276          MOVB    PORTA,@RPCS2    ;SELECT PORT #A
051104  005077  131274                  CLR     @RPDS           ;SEIZE THE DRIVE
051110  012777  000011  131254          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
051116  012777  000013  131246          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
051124  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
051130  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
051136  005737  002306          65$:    TST     WATCH
051142  001375                          BNE     65$
051144  113777  002250  131230          MOVB    PORTB,@RPCS2    ;SELECT PORT #B
051152  005077  131226                  CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
051156  012777  000011  131206          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
051164  012777  000013  131200          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
051172  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
051176  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
051204  005737  002306          66$:    TST     WATCH
051210  001375                          BNE     66$
                                ;;**************************************************************************
                                        ;SEIZE THE DRIVE THROUGH PORT A
051212  113777  002246  131162          MOVB    PORTA,@RPCS2    ;SELECT PORT A
051220  013737  002246  002270          MOV     PORTA,SEIZPT    ;STORE SEIZING PORT'S ADDRESS
051226  005077  131152                  CLR     @RPDS           ;WRITE RPDS
```

```
051232  013737  002250  002272          MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
051240  113777  002250  131134          MOVB    PORTB,@RPCS2      ;SELECT PORT B
051246  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                ;;*************************************************************************
                                ;SET PORT REQUEST

051254  005077  131124                  CLR     @RPDS           ;SET PORT REQUEST FOR PORT B

                                ;;*************************************************************************
                                ;RELEASE THROUGH PORT A.  DRIVE SHOULD SWITCH TO PORT B.

051260  113777  002246  131114          MOVB    PORTA,@RPCS2      ;SELECT PORT A
051266  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051274  012777  000013  131070          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT ADDRESS

                                ;START THE TIMER

051302  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
051306  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
051314  005737  002306          69$:    TST     WATCH
051320  001375                  BNE     69$

051322  113777  002246  131052          MOVB    PORTA,@RPCS2      ;SELECT PORT A
051330  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051336  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
051342  017737  131036  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
051350  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
051356  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
051362  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
051370  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
051376  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
051404  001427                  BEQ     70$             ;BR IF OK
051406  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
051414  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
051422  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
051430  104456                  TRAP    C$ERHRD
051432  000003                  .WORD   3
051434  006551                  .WORD   EM16
051436  013000                  .WORD   ERR5
051440  012746  003716          MOV     #FRMT17,-(SP)
051444  012746  000001          MOV     #1,-(SP)
051450  010600                  MOV     SP,R0
051452  104414                  TRAP    C$PNTB
051454  062706  000004          ADD     #4,SP
051460  005137  002276          COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
051464                  70$:
051464  113777  002250  130710          MOVB    PORTB,@RPCS2      ;SELECT PORT B
051472  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051500  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
051504  017737  130674  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
051512  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
051520  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
051526  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
051534  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
051542  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
051550  001427                  BEQ     72$             ;BR IF OK
051552  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
```

```
051560  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
051566  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
051574  104456                          TRAP    C$ERHRD
051576  000003                          .WORD   3
051600  006551                          .WORD   EM16
051602  013000                          .WORD   ERR5
051604  012746  003716                  MOV     #FRMT17,-(SP)
051610  012746  000001                  MOV     #1,-(SP)
051614  010600                          MOV     SP,R0
051616  104414                          TRAP    C$PNTB
051620  062706  000004                  ADD     #4,SP
051624  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
051630                          72$:
                                ;;*****************************************************************************

                                ;RELEASE THE DRIVE FROM PORT B

051630  113777  002250  130544          MOVB    PORTB,@RPCS2        ;SELECT PORT B
051636  013737  002250  002266          MOV     PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051644  012777  000013  130520          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

051652  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
051656  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
051664  005737  002306          74$:    TST     WATCH
051670  001375                          BNE     74$


                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

051672  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
051676  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
051704  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
051712  113777  002246  130462          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
051720  017737  130460  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
051726  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
051734  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
051742  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
051750  113777  002250  130424          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
051756  017737  130422  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
051764  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
051772  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
052000  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
052006  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
052014  001021                          BNE     75$             ;BR IF NOT
052016  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
052022  001073                          BNE     77$             ;BR IF NOT
052024  104456                          TRAP    C$ERHRD
052026  000006                          .WORD   6
052030  010751                          .WORD   EM46
052032  013534                          .WORD   ERR15
052034  012746  003716                  MOV     #FRMT17,-(SP)
052040  012746  000001                  MOV     #1,-(SP)
052044  010600                          MOV     SP,R0
052046  104414                          TRAP    C$PNTB
052050  062706  000004                  ADD     #4,SP
```

```
052054  000137  052342                  JMP     79$             ;BYPASS THE REST OF THE CHECKS
052060  013737  002346  002332  75$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
052066  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
052074  113777  002250  130300          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
052102  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
052106  001414                          BEQ     76$             ;BR IF ZERO
052110  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
052116  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
052124  113777  002246  130250          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
052132  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
052136  001025                          BNE     77$             ;BR IF NOT
052140  012737  177777  002302  76$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
052146  012777  000011  130216          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
052154  012777  000013  130210          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
052162  104456                          TRAP    C$ERHRD
052164  000011                          .WORD   9
052166  007313                          .WORD   EM26
052170  013214                          .WORD   ERR9
052172  012746  003716                  MOV     #FRMT17,-(SP)
052176  012746  000001                  MOV     #1,-(SP)
052202  010600                          MOV     SP,R0
052204  104414                          TRAP    C$PNTB
052206  062706  000004                  ADD     #4,SP
052212  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
052220  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
052226  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
052234  001414                          BEQ     78$             ;BR IF OK FROM PORT A.
052236  104456                          TRAP    C$ERHRD
052240  000013                          .WORD   11
052242  006072                          .WORD   EM7
052244  013000                          .WORD   ERR5
052246  012746  003471                  MOV     #FRMT14,-(SP)
052252  012746  000001                  MOV     #1,-(SP)
052256  010600                          MOV     SP,R0
052260  104414                          TRAP    C$PNTB
052262  062706  000004                  ADD     #4,SP
052266  013737  002350  002332  78$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
052274  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
052302  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
052310  001414                          BEQ     79$             ;BR IF OK
052312  104456                          TRAP    C$ERHRD
052314  000014                          .WORD   12
052316  006072                          .WORD   EM7
052320  013000                          .WORD   ERR5
052322  012746  003522                  MOV     #FRMT15,-(SP)
052326  012746  000001                  MOV     #1,-(SP)
052332  010600                          MOV     SP,R0
052334  104414                          TRAP    C$PNTB
052336  062706  000004                  ADD     #4,SP
052342                          79$:
052342                          1$:
 27 052342                      L10057:
052342  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 18 RESET ATTENTION 'A' BY DRV CLR
                                ;
                                ;*VERIFY THAT A DRIVE CLEAR COMMAND CLEARS ONLY THE ATTENTION BIT OF THE
                                ;*      SEIZING PORT.
                                ;*
                                ;*  A.  SET EACH PORT 'S ATTENTION BIT.  VERIFY THAT BOTH ATTENTION BITS
                                ;*      SET.
                                ;*
                                ;*  B.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  C.  ISSUE A DRIVE CLEAR COMMAND.
                                ;*
                                ;*
                                ;*  D.  RELEASE THE DRIVE THROUGH PORT 'A'.  VERIFY THAT THE ATTENTION
                                ;*      BIT FOR PORT 'A' HAS BEEN CLEARED AND THE ATTENTION BIT FOR PORT
                                ;*      'B' IS STILL SET.
                                ;*
                                ;*

100 052344                      T18::
104 052344  005737  002340              TST     DRVBAD          ;SYSTEM OK?
    052350  001402                      BEQ     64$             ;IF SO, TAKE THE BRANCH
    052352  104432                      TRAP    C$EXIT
    052354  001666                      .WORD   L10060-.
                                ;;*************************************************************************
    052356                      64$:

                                        ;SET ATTENTION BITS FOR BOTH PORTS

    052356  113777  002246  130016      MOVB    PORTA,@RPCS2    ;SELECT PORT A
    052364  005777  130014      67$:    TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
    052370  001775                      BEQ     67$
    052372  052777  000020  130002      BIS     #20,@RPCS2
    052400  005077  130002              CLR     @RPER1          ;FORCE ATA BIT
    052404  013777  002250  127770      MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
    052412  005777  127766      65$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
    052416  001775                      BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
    052420  052777  000020  127754      BIS     #20,@RPCS2
    052426  005077  127754              CLR     @RPER1          ;FORCE ATA BIT
    052432  113777  002246  127742      MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
    052440  005777  127740      66$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
    052444  001775                      BEQ     66$             ;BR IF DRIVE HASN'T TIMED OUT
                                ;;*************************************************************************
                                ;CONFIRM THAT BOTH ATTENTION BITS ARE SET

    052446  113777  002246  127726      MOVB    PORTA,@RPCS2      ;SELECT PORT A
    052454  013737  002246  002266      MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    052462  005037  002276              CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
    052466  017737  127712  002332      MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
    052474  013737  002404  002334      MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
    052502  012737  100000  002336      MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
    052510  013737  002332  002342      MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
    052516  042737  077777  002342      BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
    052524  023737  002336  002342      CMP     EXPTED,TMP0     ;COMPARE THE BITS
    052532  001427                      BEQ     68$             ;BR IF OK
    052534  013737  002332  002352      MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
    052542  042737  100000  002352      BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
    052550  053737  002352  002336      BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
```

```
052556  104456                          TRAP    C$ERHRD
052560  000004                          .WORD   4
052562  006146                          .WORD   EM10
052564  012654                          .WORD   ERR3
052566  012746  003716                  MOV     #FRMT17,-(SP)
052572  012746  000001                  MOV     #1,-(SP)
052576  010600                          MOV     SP,R0
052600  104414                          TRAP    C$PNTB
052602  062706  000004                  ADD     #4,SP
052606  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
052612                          68$:
052612  005737  002276                  TST     CKERR           ;WAS ATTN BIT FOR PORT A SET ?
052616  001402                          BEQ     .+6             ;BR IF IT WAS
052620  000137  054242                  JMP     1$              ;BYPASS REST OF TEST IF NOT
052624  113777  002250  127550          MOVB    PORTB,@RPCS2      ;SELECT PORT B
052632  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
052640  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
052644  017737  127534  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
052652  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
052660  012737  100000  002336          MOV     #ATA,EXPTED       ;;;WHAT REGISTER SHOULD BE
052666  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
052674  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
052702  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
052710  001427                          BEQ     70$               ;BR IF OK
052712  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
052720  042737  100000  002352          BIC     #ATA,TMP4         ;CLEAR THE MASKED BITS
052726  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
052734  104456                          TRAP    C$ERHRD
052736  000004                          .WORD   4
052740  006146                          .WORD   EM10
052742  012654                          .WORD   ERR3
052744  012746  003716                  MOV     #FRMT17,-(SP)
052750  012746  000001                  MOV     #1,-(SP)
052754  010600                          MOV     SP,R0
052756  104414                          TRAP    C$PNTB
052760  062706  000004                  ADD     #4,SP
052764  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
052770                          70$:
052770  005737  002276                  TST     CKERR           ;WAS ATTN BIT FOR PORT B SET ?
052774  001402                          BEQ     .+6             ;BR IF IT WAS
052776  000137  054242                  JMP     1$              ;BYPASS REST OF TEST IF NOT

                        ;;**************************************************************************************

                                ;SEIZE THE DRIVE THROUGH PORT A

053002  113777  002246  127372          MOVB    PORTA,@RPCS2      ;SELECT PORT A
053010  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
053016  005077  127362                  CLR     @RPDS             ;WRITE RPDS

053022  113777  002250  127352          MOVB    PORTB,@RPCS2      ;SELECT PORT B
053030  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
053036  013737  002250  002272          MOV     PORTB,OPPRT       ;'OPPOSITE' PORT ADDRESS
053044  017737  127334  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
053052  013737  002404  002334          MOV     RPDS,BADADR       ;GENERATE BAD REGISTER ADDRESS
053060  005037  002336                  CLR     EXPTED            ;REGISTER SHOULD BE ZERO
053064  023737  002336  002332          CMP     EXPTED,BADDAT     ;IS THE REGISTER ZERO
```

```
053072  001406                          BEQ     72$             ;BR IF IT IS
053074  104456                          TRAP    C$ERHRD
053076  000001                          .WORD   1
053100  005705                          .WORD   EM4
053102  012576                          .WORD   ERR2
053104  000137  054242                  JMP     1$              ;BYPASS REST OF THE SUBTEST
053110                          72$:
053110  113777  002246  127264          MOVB    PORTA,@RPCS2      ;SELECT PORT A
053116  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
053124  017737  127254  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
053132  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
053140  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
053146  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
053154  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
053160  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
053166  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
053174  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
053202  001404                          BEQ     73$             ;BR IF THEY ARE
053204  104456                          TRAP    C$ERHRD
053206  000002                          .WORD   2
053210  005736                          .WORD   EM5
053212  012654                          .WORD   ERR3
053214                          73$:
                                ;;**********************************************************************
                                ;ISSUE DRIVE CLEAR COMMAND TO PORT A

053214  012777  000011  127150          MOV     #11,@RPCS1      ;DO A DRIVE CLEAR COMMAND

                                ;;**********************************************************************
                                ;VERIFY THAT ATTENTION BIT FOR PORT A CLEARED

053222  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
053226  017737  127152  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
053234  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
053242  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
053246  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
053254  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
053262  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
053270  001427                          BEQ     74$             ;BR IF OK
053272  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
053300  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
053306  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
053314  104456                          TRAP    C$ERHRD
053316  000003                          .WORD   3
053320  011020                          .WORD   EM47
053322  013262                          .WORD   ERR10
053324  012746  003716                  MOV     #FRMT17,-(SP)
053330  012746  000001                  MOV     #1,-(SP)
053334  010600                          MOV     SP,RC
053336  104414                          TRAP    C$PNTB
053340  062706  000004                  ADD     #4,SP
053344  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
053350                          74$:
                                ;;**********************************************************************

                                ;RELEASE THE DRIVE FROM PORT A
```

```
053350  113777  002246  127024          MOVB    PORTA,@RPCS2        ;SELECT PORT A
053356  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
053364  012777  000013  127000          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;STARi THE TIMER

053372  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
053376  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
053404  005737  002306          76$:    TST     WATCH
053410  001375                          BNE     76$

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

053412  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
053416  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
053424  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
053432  113777  002246  126742          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
053440  017737  126740  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
053446  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
053454  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
053462  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
053470  113777  002250  126704          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
053476  017737  126702  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
053504  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
053512  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
053520  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
053526  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
053534  001021                          BNE     77$             ;BR IF NOT
053536  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
053542  001073                          BNE     79$             ;BR IF NOT
053544  104456                          TRAP    C$ERHRD
053546  000006                          .WORD   6
053550  010751                          .WORD   EM46
053552  013534                          .WORD   ERR15
053554  012746  003716                  MOV     #FRMT17,-(SP)
053560  012746  000001                  MOV     #1,-(SP)
053564  010600                          MOV     SP,R0
053566  104414                          TRAP    C$PNTB
053570  062706  000004                  ADD     #4,SP
053574  000137  054076                  JMP     81$             ;BYPASS THE REST OF THE CHECKS
053600  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
053606  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
053614  113777  002250  126560          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
053622  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
053626  001414                          BEQ     78$             ;BR IF ZERO
053630  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
053636  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
053644  113777  002246  126530          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
053652  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
053656  001025                          BNE     79$             ;BR IF NOT
053660  012737  177777  002302  78$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
053666  012777  000011  126476          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
053674  012777  000013  126470          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
053702  104456                          TRAP    C$ERHRD
053704  000011                          .WORD   9
053706  007313                          .WORD   EM26
```

```
053710  013214                          .WORD   ERR9
053712  012746  003716                  MOV     #FRMT17,-(SP)
053716  012746  000001                  MOV     #1,-(SP)
053722  010600                          MOV     SP,R0
053724  104414                          TRAP    C$PNTB
053726  062706  000004                  ADD     #4,SP
053732  013737  002346  002332  79$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
053740  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
053746  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
053754  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
053762  001414                          BEQ     80$             ;BR IF OK FROM PORT A.
053764  104456                          TRAP    C$ERHRD
053766  000013                          .WORD   11
053770  006072                          .WORD   EM7
053772  013000                          .WORD   ERR5
053774  012746  003471                  MOV     #FRMT14,-(SP)
054000  012746  000001                  MOV     #1,-(SP)
054004  010600                          MOV     SP,R0
054006  104414                          TRAP    C$PNTB
054010  062706  000004                  ADD     #4,SP
054014  013737  002350  002332  80$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
054022  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
054030  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHEC. THE ATTN BIT
054036  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
054044  001414                          BEQ     81$             ;BR IF OK
054046  104456                          TRAP    C$ERHRD
054050  000014                          .WORD   12
054052  006072                          .WORD   EM7
054054  013000                          .WORD   ERR5
054056  012746  003522                  MOV     #FRMT15,-(SP)
054062  012746  000001                  MOV     #1,-(SP)
054066  010600                          MOV     SP,R0
054070  104414                          TRAP    C$PNTB
054072  062706  000004                  ADD     #4,SP
054076                          81$:
                                ;;*****************************************************************************
                                ;CHECK ATTENTION BIT ON THE OPPOSITE PORT (PORT B)

054076  113777  002250  126276          MOVB    PORTB,@RPCS2        ;SELECT PORT B
054104  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054112  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
054116  017737  126262  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
054124  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
054132  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
054140  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
054146  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
054154  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
054162  001427                          BEQ     82$             ;BR IF OK
054164  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
054172  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
054200  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
054206  104456                          TRAP    C$ERHRD
054210  000003                          .WORD   3
054212  011106                          .WORD   EM50
054214  012726                          .WORD   ERR4
054216  012746  003716                  MOV     #FRMT17,-(SP)
054222  012746  000001                  MOV     #1,-(SP)
```

TEST 18 RESET ATTENTION 'A' BY DRV CLR

```
        054226  010600                          MOV     SP,R0
        054230  104414                          TRAP    C$PNTB
        054232  062706  000004                  ADD     #4,SP
        054236  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        054242                          82$:
        054242                          1$:
    108 054242                          L10060:
        054242  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 19 RESET ATTENTION 'B" BY DRV CLR
                                ;
                                ;*VERIFY THAT A DRIVE CLEAR COMMAND CLEARS ONLY THE ATTENTION BIT OF THE
                                ;*      SEIZING PORT.
                                ;*
                                ;*  A.  SET EACH PORT'S ATTENTION BIT.  VERIFY THAT BOTH ATTENTION BITS
                                ;*      SET.
                                ;*
                                ;*  B.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  C.  ISSUE A DRIVE CLEAR COMMAND.
                                ;*
                                ;*  D.  RELEASE THE DRIVE THROUGH PORT 'B'.  VERIFY THAT THE ATTENTION
                                ;*      BIT FOR PORT 'B' HAS BEEN CLEARED AND THE ATTENTION BIT FOR PORT
                                ;*      'A' IS STILL SET.
                                ;*
                                ;
054244                          T19::
054244  005737  002340                TST     DRVBAD          ;SYSTEM OK?
054250  001402                        BEQ     64$             ;IF SO, TAKE THE BRANCH
054252  104432                        TRAP    C$EXIT
054254  001666                        .WORD   L10061-.
                                ;;*************************************************************************
054256                          64$:
                                        ;SET ATTENTION BITS FOR BOTH PORTS
054256  113777  002246  126116        MOVB    PORTA,@RPCS2    ;SELECT PORT A
054264  005777  126114          67$:  TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
054270  001775                        BEQ     67$
054272  052777  000020  126102        BIS     #20,@RPCS2
054300  005077  126102                CLR     @RPER1          ;FORCE ATA BIT
054304  013777  002250  126070        MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
054312  005777  126066          65$:  TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
054316  001775                        BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
054320  052777  000020  126054        BIS     #20,@RPCS2
054326  005077  126054                CLR     @RPER1          ;FORCE ATA BIT
054332  113777  002246  126042        MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
054340  005777  126040          66$:  TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
054344  001775                        BEQ     66$             ;BR IF DRIVE HASN'T TIMED OUT
                                ;;*************************************************************************
                                ;CONFIRM THAT BOTH ATTENTION BITS ARE SET

054346  113777  002250  126026        MOVB    PORTB,@RPCS2      ;SELECT PORT B
054354  013737  002250  002266        MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054362  005037  002276                CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
054366  017737  126012  002332        MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
054374  013737  002404  002334        MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
054402  012737  100000  002336        MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
054410  013737  002332  002342        MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
054416  042737  077777  002342        BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
054424  023737  002336  002342        CMP     EXPTED,TMP0     ;COMPARE THE BITS
054432  001427                        BEQ     68$             ;BR IF OK
054434  013737  002332  002352        MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
054442  042737  100000  002352        BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
054450  053737  002352  002336        BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
054456  104456                        TRAP    C$ERHRD
```

```
054460  000004                          .WORD   4
054462  006146                          .WORD   EM10
054464  012654                          .WORD   ERR3
054466  012746  003716                  MOV     #FRMT17,-(SP)
054472  012746  000001                  MOV     #1,-(SP)
054476  010600                          MOV     SP,R0
054500  104414                          TRAP    C$PNTB
054502  062706  000004                  ADD     #4,SP
054506  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
054512                          68$:
054512  005737  002276                  TST     CKERR           ;WAS ATTN BIT FOR PORT B SET ?
054516  001402                          BEQ     .+6             ;BR IF IT WAS
054520  000137  056142                  JMP     1$              ;BYPASS REST OF TEST IF NOT
054524  113777  002246  125650          MOVB    PORTA,@RPCS2      ;SELECT PORT A
054532  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054540  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
054544  017737  125634  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
054552  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
054560  012737  100000  002336          MOV     #ATA,EXPTED       ;;;WHAT REGISTER SHOULD BE
054566  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
054574  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
054602  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
054610  001427                          BEQ     70$               ;BR IF OK
054612  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
054620  042737  100000  002352          BIC     #ATA,TMP4         ;CLEAR THE MASKED BITS
054626  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
054634  104456                          TRAP    C$ERHRD
054636  000004                          .WORD   4
054640  006146                          .WORD   EM10
054642  012654                          .WORD   ERR3
054644  012746  003716                  MOV     #FRMT17,-(SP)
054650  012746  000001                  MOV     #1,-(SP)
054654  010600                          MOV     SP,R0
054656  104414                          TRAP    C$PNTB
054660  062706  000004                  ADD     #4,SP
054664  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
054670                          70$:
054670  005737  002276                  TST     CKERR           ;WAS ATTN BIT FOR PORT A SET ?
054674  001402                          BEQ     .+6             ;BR IF IT WAS
054676  000137  056142                  JMP     1$              ;BYPASS REST OF TEST IF NOT

                        ;;*************************************************************************************

                                ;SEIZE THE DRIVE THROUGH PORT B

054702  113777  002250  125472          MOVB    PORTB,@RPCS2      ;SELECT PORT B
054710  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
054716  005077  125462                  CLR     @RPDS             ;WRITE RPDS

054722  113777  002246  125452          MOVB    PORTA,@RPCS2      ;SELECT PORT A
054730  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054736  013737  002246  002272          MOV     PORTA,OPPRT       ;'OPPOSITE' PORT ADDRESS
054744  017737  125434  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
054752  013737  002404  002334          MOV     RPDS,BADADR       ;GENERATE BAD REGISTER ADDRESS
054760  005037  002336                  CLR     EXPTED            ;REGISTER SHOULD BE ZERO
054764  023737  002336  002332          CMP     EXPTED,BADDAT     ;IS THE REGISTER ZERO
054772  001406                          BEQ     72$               ;BR IF IT IS
```

TEST 19 RESET ATTENTION 'B' BY DRV CLR

```
054774  104456                          TRAP    C$ERHRD
054776  000001                          .WORD   1
055000  005705                          .WORD   EM4
055002  012576                          .WORD   ERR2
055004  000137  056142                  JMP     1$              ;BYPASS REST OF THE SUBTEST
055010                          72$:
055010  113777  002250  125364          MOVB    PORTB,@RPCS2      ;SELECT PORT B
055016  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
055024  017737  125354  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
055032  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
055040  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
055046  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
055054  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
055060  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
055066  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
055074  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
055102  001404                          BEQ     73$             ;BR IF THEY ARE
055104  104456                          TRAP    C$ERHRD
055106  000002                          .WORD   2
055110  005736                          .WORD   EM5
055112  012654                          .WORD   ERR3
055114                          73$:
                                ;;**********************************************************************
                                ;ISSUE DRIVE CLEAR COMMAND TO PORT B

055114  012777  000011  125250          MOV     #11,@RPCS1      ;DO A DRIVE CLEAR COMMAND

                                ;;**********************************************************************
                                ;VERIFY THAT ATTENTION BIT FOR PORT B CLEARED

055122  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
055126  017737  125252  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
055134  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
055142  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
055146  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
055154  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
055162  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
055170  001427                          BEQ     74$             ;BR IF OK
055172  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
055200  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
055206  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
055214  104456                          TRAP    C$ERHRD
055216  000003                          .WORD   3
055220  011020                          .WORD   EM47
055222  013262                          .WORD   ERR10
055224  012746  003716                  MOV     #FRMT17,-(SP)
055230  012746  000001                  MOV     #1,-(SP)
055234  010600                          MOV     SP,R0
055236  104414                          TRAP    C$PNTB
055240  062706  000004                  ADD     #4,SP
055244  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
055250                          74$:
                                ;;**********************************************************************

                                ;RELEASE THE DRIVE FROM PORT B

055250  113777  002250  125124          MOVB    PORTB,@RPCS2      ;SELECT PORT B
```

TEST 19 RESET ATTENTION 'B" BY DRV CLR

```
055256  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
055264  012777  000013  125100          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

055272  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
055276  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
055304  005737  002306          76$:    TST     WATCH
055310  001375                          BNE     76$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

055312  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
055316  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
055324  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
055332  113777  002246  125042          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
055340  017737  125040  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
055346  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
055354  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
055362  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
055370  113777  002250  125004          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
055376  017737  125002  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
055404  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
055412  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
055420  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
055426  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
055434  001021                          BNE     77$             ;BR IF NOT
055436  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
055442  001073                          BNE     79$             ;BR IF NOT
055444  104456                          TRAP    C$ERHRD
055446  000006                          .WORD   6
055450  010751                          .WORD   EM46
055452  013534                          .WORD   ERR15
055454  012746  003716                  MOV     #FRMT17,-(SP)
055460  012746  000001                  MOV     #1,-(SP)
055464  010600                          MOV     SP,R0
055466  104414                          TRAP    C$PNTB
055470  062706  000004                  ADD     #4,SP
055474  000137  055776                  JMP     81$             ;BYPASS THE REST OF THE CHECKS
055500  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
055506  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
055514  113777  002250  124660          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
055522  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
055526  001414                          BEQ     78$             ;BR IF ZERO
055530  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
055536  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
055544  113777  002246  124630          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
055552  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
055556  001025                          BNE     79$             ;BR IF NOT
055560  012737  177777  002302  78$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
055566  012777  000011  124576          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
055574  012777  000013  124570          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
055602  104456                          TRAP    C$ERHRD
055604  000011                          .WORD   9
055606  007313                          .WORD   EM26
055610  013214                          .WORD   ERR9
```

TEST 19 RESET ATTENTION 'B' BY DRV CLR

```
055612  012746  003716                  MOV     #FRMT17,-(SP)
055616  012746  000001                  MOV     #1,-(SP)
055622  010600                          MOV     SP,R0
055624  104414                          TRAP    C$PNTB
055626  062706  000004                  ADD     #4,SP
055632  013737  002346  002332  79$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
055640  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
055646  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
055654  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
055662  001414                          BEQ     80$             ;BR IF OK FROM PORT A.
055664  104456                          TRAP    C$ERHRD
055666  000013                          .WORD   11
055670  006072                          .WORD   EM7
055672  013000                          .WORD   ERR5
055674  012746  003471                  MOV     #FRMT14,-(SP)
055700  012746  000001                  MOV     #1,-(SP)
055704  010600                          MOV     SP,R0
055706  104414                          TRAP    C$PNTB
055710  062706  000004                  ADD     #4,SP
055714  013737  002350  002332  80$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
055722  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
055730  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
055736  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
055744  001414                          BEQ     81$             ;BR IF OK
055746  104456                          TRAP    C$ERHRD
055750  000014                          .WORD   12
055752  006072                          .WORD   EM7
055754  013000                          .WORD   ERR5
055756  012746  003522                  MOV     #FRMT15,-(SP)
055762  012746  000001                  MOV     #1,-(SP)
055766  010600                          MOV     SP,R0
055770  104414                          TRAP    C$PNTB
055772  062706  000004                  ADD     #4,SP
055776                          81$:
                        ;;**************************************************************************************
                        ;CHECK ATTENTION BIT ON THE OPPOSITE PORT (PORT A)

055776  113777  002246  124376          MOVB    PORTA,@RPCS2        ;SELECT PORT A
056004  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056012  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
056016  017737  124362  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
056024  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
056032  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
056040  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
056046  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
056054  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
056062  001427                          BEQ     82$             ;BR IF OK
056064  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
056072  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
056100  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
056106  104456                          TRAP    C$ERHRD
056110  000003                          .WORD   3
056112  011106                          .WORD   EM50
056114  012726                          .WORD   ERR4
056116  012746  003716                  MOV     #FRMT17,-(SP)
056122  012746  000001                  MOV     #1,-(SP)
056126  010600                          MOV     SP,R0
```

TEST 19 RESET ATTENTION 'B'' BY DRV CLR

```
        056130  104414                          TRAP    C$PNTB
        056132  062706  000004                  ADD     #4,SP
        056136  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        056142                          82$:
        056142                          1$:
     26 056142                          L10061:
        056142  104401                          TRAP    C$ETST
```

```
      1                                 .SBTTL  TEST 20 RESET ATTENTION 'A' BY 'GO'
      2
      3                                 ;* VERIFY THAT THE 'GO BIT CLEARS ONLY THE ATTENTION BIT OF THE
      4                                 ;*      SEIZING PORT.
      5                                 ;*
      6                                 ;* A.   SET EACH PORT'S ATTENTION BIT, AND VERIFY THAT BOTH
      7                                 ;*      ATTENTION BITS ARE SET.
      8                                 ;*
      9                                 ;* B.   SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S
     10                                 ;*      'NTO RMDS.
     11                                 ;*
     12                                 ;* C.   ISSUE A NOP COMMAND.
     13                                 ;*
     14                                 ;* D.   RELEASE THE FRIVE THROUGH PORT 'A'. VERIFY THAT THE
     15                                 ;*      ATTENTION BIT FOR PORT 'A' IS RESET, AND THE
     16                                 ;*      ATTENTION BIT FOR PORT 'B' IS STILL SET.
     17                                 ;*
     18
     96
     97 056144                          T20::
    101 056144  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
        056150  001402                          BEQ     64$             ;TAKE BRANCH IF SO
        056152  104432                          TRAP    C$EXIT
        056154  001656                          .WORD   L10062-.
                                        ;;**************************************************************************
        056156                          64$:

                                                ;SET ATTENTION BITS FOR BOTH PORTS

        056156  113777  002246  124216          MOVB    PORTA,@RPCS2    ;SELECT PORT A
        056164  005777  124214          67$:    TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
        056170  001775                          BEQ     67$
        056172  012777  000017  124172          MOV     #17,@RPCS1
        056200  013777  002250  124174          MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
        056206  005777  124172          65$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
        056212  001775                          BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
        056214  012777  000017  124150          MOV     #17,@RPCS1              ;FORCE ATA BIT
        056222  113777  002246  124152          MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
        056230  005777  124150          66$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
        056234  001775                          BEQ     66$             ;BR IF DRIVE HASN'T TIMED OUT
                                        ;;**************************************************************************
                                        ;CONFIRM THAT BOTH ATTENTION BITS ARE SET

        056236  113777  002246  124136          MOVB    PORTA,@RPCS2      ;SELECT PORT A
        056244  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        056252  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
        056256  017737  124122  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
        056264  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        056272  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
        056300  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
        056306  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
        056314  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
        056322  001427                          BEQ     68$             ;BR IF OK
        056324  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
        056332  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
        056340  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
        056346  104456                          TRAP    C$ERHRD
```

```
056350  000004                          .WORD   4
056352  006146                          .WORD   EM10
056354  012654                          .WORD   ERR3
056356  012746  003716                  MOV     #FRMT17,-(SP)
056362  012746  000001                  MOV     #1,-(SP)
056366  010600                          MOV     SP,R0
056370  104414                          TRAP    C$PNTB
056372  062706  000004                  ADD     #4,SP
056376  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
056402                          68$:
056402  005737  002276                  TST     CKERR           ;WAS ATTENTION SET FOR A??
056406  001402                          BEQ     .+6             ;YES!!
056410  000137  060032                  JMP     1$              ;NO - BYPASS REST OF TEST
056414  113777  002250  123760          MOVB    PORTB,@RPCS2      ;SELECT PORT B
056422  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056430  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
056434  017737  123744  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
056442  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
056450  012737  100000  002336          MOV     #ATA,EXPTED       ;;;WHAT REGISTER SHOULD BE
056456  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
056464  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
056472  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
056500  001427                          BEQ     70$               ;BR IF OK
056502  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
056510  042737  100000  002352          BIC     #ATA,TMP4         ;CLEAR THE MASKED BITS
056516  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
056524  104456                          TRAP    C$ERHRD
056526  000004                          .WORD   4
056530  006146                          .WORD   EM10
056532  012654                          .WORD   ERR3
056534  012746  003716                  MOV     #FRMT17,-(SP)
056540  012746  000001                  MOV     #1,-(SP)
056544  010600                          MOV     SP,R0
056546  104414                          TRAP    C$PNTB
056550  062706  000004                  ADD     #4,SP
056554  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
056560                          70$:
056560  005737  002276                  TST     CKERR           ;WAS ATTENTION SET FOR B??
056564  001402                          BEQ     .+6             ;YES!!
056566  000137  060032                  JMP     1$              ;NO - BYPASS REST OF TEST

                        ;;**************************************************************************************

                                ;SEIZE THE DRIVE THROUGH PORT A

056572  113777  002246  123602          MOVB    PORTA,@RPCS2      ;SELECT PORT A
056600  013737  002246  002270          MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
056606  005077  123572                  CLR     @RPDS             ;WRITE RPDS

056612  113777  002250  123562          MOVB    PORTB,@RPCS2      ;SELECT PORT B
056620  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056626  013737  002250  002272          MOV     PORTB,OPPRT       ;'OPPOSITE' PORT ADDRESS
056634  017737  123544  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT A
056642  013737  002404  002334          MOV     RPDS,BADADR       ;GENERATE BAD REGISTER ADDRESS
056650  005037  002336                  CLR     EXPTED            ;REGISTER SHOULD BE ZERO
056654  023737  002336  002332          CMP     EXPTED,BADDAT     ;IS THE REGISTER ZERO
056662  001406                          BEQ     72$               ;BR IF IT IS
```

TEST 20 RESET ATTENTION 'A' BY 'GO'

```
056664  104456                          TRAP    C$ERHRD
056666  000001                          .WORD   1
056670  005705                          .WORD   EM4
056672  012576                          .WORD   ERR2
056674  000137  060032                  JMP     1$              ;BYPASS REST OF THE SUBTEST
056700                          72$:
056700  113777  002246  123474          MOVB    PORTA,@RPCS2      ;SELECT PORT A
056706  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056714  017737  123464  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
056722  042737  020005  002332          BIC     #OM!PIP!:LV,BADDAT              ;CLEAR DONT CARE BITS
056730  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
056736  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
056744  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
056750  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
056756  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
056764  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
056772  001404                          BEQ     73$             ;BR IF THEY ARE
056774  104456                          TRAP    C$ERHRD
056776  000002                          .WORD   2
057000  005736                          .WORD   EM5
057002  012654                          .WORD   ERR3
057004                          73$:
                                ;;**************************************************************************
                                ;ISSUE NOP COMMAND TO PORT A

057004  012777  000001  123360          MOV     #1,@RPCS1

                                ;;**************************************************************************
                                ; VERIFY THAT ATTENTION FOR PORT A CLEARED

057012  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
057016  017737  123362  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
057024  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
057032  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
057036  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
057044  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
057052  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
057060  001427                          BEQ     74$             ;BR IF OK
057062  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
057070  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
057076  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
057104  104456                          TRAP    C$ERHRD
057106  000003                          .WORD   3
057110  011734                          .WORD   EM61
057112  013262                          .WORD   ERR10
057114  012746  003716                  MOV     #FRMT17,-(SP)
057120  012746  000001                  MOV     #1,-(SP)
057124  010600                          MOV     SP,R0
057126  104414                          TRAP    C$PNTB
057130  062706  000004                  ADD     #4,SP
057134  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
057140                          74$:
                                ;;**************************************************************************

                                ;RELEASE THE DRIVE FROM PORT A

057140  113777  002246  123234          MOVB    PORTA,@RPCS2      ;SELECT PORT A
```

TEST 20 RESET ATTENTION 'A' BY 'GO'

```
057146  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
057154  012777  000013  123210          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                        ;START THE TIMER

057162  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
057166  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
057174  005737  002306          76$:    TST     WATCH
057200  001375                          BNE     76$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

057202  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
057206  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
057214  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
057222  113777  002246  123152          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
057230  017737  123150  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
057236  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
057244  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
057252  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
057260  113777  002250  123114          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
057266  017737  123112  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
057274  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
057302  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
057310  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
057316  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
057324  001021                          BNE     77$             ;BR IF NOT
057326  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
057332  001073                          BNE     79$             ;BR IF NOT
057334  104456                          TRAP    C$ERHRD
057336  000006                          .WORD   6
057340  010751                          .WORD   EM46
057342  013534                          .WORD   ERR15
057344  012746  003716                  MOV     #FRMT17,-(SP)
057350  012746  000001                  MOV     #1,-(SP)
057354  010600                          MOV     SP,R0
057356  104414                          TRAP    C$PNTB
057360  062706  000004                  ADD     #4,SP
057364  000137  057666                  JMP     81$             ;BYPASS THE REST OF THE CHECKS
057370  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
057376  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
057404  113777  002250  122770          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
057412  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
057416  001414                          BEQ     78$             ;BR IF ZERO
057420  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
057426  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
057434  113777  002246  122740          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
057442  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
057446  001025                          BNE     79$             ;BR IF NOT
057450  012737  177777  002302  78$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
057456  012777  000011  122706          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
057464  012777  000013  122700          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
057472  104456                          TRAP    C$ERHRD
057474  000011                          .WORD   9
057476  007313                          .WORD   EM26
057500  013214                          .WORD   ERR9
```

```
057502  012746  003716                  MOV     #FRMT17,-(SP)
057506  012746  000001                  MOV     #1,-(SP)
057512  010600                          MOV     SP,R0
057514  104414                          TRAP    C$PNTB
057516  062706  000004                  ADD     #4,SP
057522  013737  002346  002332  79$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
057530  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
057536  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
057544  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
057552  001414                          BEQ     80$             ;BR IF OK FROM PORT A.
057554  104456                          TRAP    C$ERHRD
057556  000013                          .WORD   11
057560  006072                          .WORD   EM7
057562  013000                          .WORD   ERR5
057564  012746  003471                  MOV     #FRMT14,-(SP)
057570  012746  000001                  MOV     #1,-(SP)
057574  010600                          MOV     SP,R0
057576  104414                          TRAP    C$PNTB
057600  062706  000004                  ADD     #4,SP
057604  013737  002350  002332  80$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
057612  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
057620  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
057626  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
057634  001414                          BEQ     81$             ;BR IF OK
057636  104456                          TRAP    C$ERHRD
057640  000014                          .WORD   12
057642  006072                          .WORD   EM7
057644  013000                          .WORD   ERR5
057646  012746  003522                  MOV     #FRMT15,-(SP)
057652  012746  000001                  MOV     #1,-(SP)
057656  010600                          MOV     SP,R0
057660  104414                          TRAP    C$PNTB
057662  062706  000004                  ADD     #4,SP
057666                          81$:
                                ;;**********************************************************************************
                                ;VERIFY THAT ATTENTION FOR PORT B IS STILL SET

057666  113777  002250  122506          MOVB    PORTB,@RPCS2        ;SELECT PORT B
057674  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
057702  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
057706  017737  122472  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
057714  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
057722  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
057730  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
057736  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
057744  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
057752  001427                          BEQ     82$             ;BR IF OK
057754  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
057762  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
057770  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
057776  104456                          TRAP    C$ERHRD
060000  000003                          .WORD   3
060002  011766                          .WORD   EM62
060004  012726                          .WORD   ERR4
060006  012746  003716                  MOV     #FRMT17,-(SP)
060012  012746  000001                  MOV     #1,-(SP)
060016  010600                          MOV     SP,R0
```

TEST 20 RESET ATTENTION 'A' BY 'GO'

```
        060020  104414                          TRAP    C$PNTB
        060022  062706  000004                  ADD     #4,SP
        060026  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        060032                          82$:
        060032                          1$:
    105 060032                          L10062:
        060032  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 21 RESET ATTENTION 'B' BY 'GO' TEST

                                ;* VERIFY THAT THE 'GO BIT CLEARS ONLY THE ATTENTION BIT OF THE
                                ;*      SEIZING PORT.
                                ;*
                                ;* A.   SET EACH PORT'S ATTENTION BIT, AND VERIFY THAT BOTH
                                ;*      ATTENTION BITS ARE SET.
                                ;*
                                ;* B.   SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S
                                ;*      INTO RMDS.
                                ;*
                                ;* C.   ISSUE A NOP COMMAND.
                                ;*
                                ;* D.   RELEASE THE FRIVE THROUGH PORT 'B'. VERIFY THAT THE
                                ;*      ATTENTION BIT FOR PORT 'B' IS RESET, AND THE
                                ;*      ATTENTION BIT FOR PORT 'A' IS STIL SET.
                                ;*


060034                          T21::
060034  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
060040  001402                          BEQ     64$             ;TAKE BRANCH IF SO
060042  104432                          TRAP    C$EXIT
060044  001656                          .WORD   L10063-.
                                ;;*****************************************************************************
060046                          64$:

                                        ;SET ATTENTION BITS FOR BOTH PORTS

060046  113777  002246  122326          MOVB    PORTA,@RPCS2    ;SELECT PORT A
060054  005777  122324          67$:    TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
060060  001775                          BEQ     67$
060062  012777  000017  122302          MOV     #17,@RPCS1
060070  013777  002250  122304          MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
060076  005777  122302          65$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
060102  001775                          BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
060104  012777  000017  122260          MOV     #17,@RPCS1              ;FORCE ATA BIT
060112  113777  002246  122262          MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
060120  005777  122260          66$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
060124  001775                          BEQ     66$             ;BR IF DRIVE HASN'T TIMED OUT
                                ;;*****************************************************************************
                                ;CONFIRM THAT BOTH ATTENTION BITS ARE SET

060126  113777  002250  122246          MOVB    PORTB,@RPCS2      ;SELECT PORT B
060134  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060142  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
060146  017737  122232  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
060154  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
060162  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
060170  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
060176  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
060204  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
060212  001427                          BEQ     68$             ;BR IF OK
060214  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
060222  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
060230  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
060236  104456                          TRAP    C$ERHRD
```

```
060240  000004                          .WORD   4
060242  006146                          .WORD   EM10
060244  012654                          .WORD   ERR3
060246  012746  003716                  MOV     #FRMT17,-(SP)
060252  012746  000001                  MOV     #1,-(SP)
060256  010600                          MOV     SP,R0
060260  104414                          TRAP    C$PNTB
060262  062706  000004                  ADD     #4,SP
060266  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
060272                          68$:
060272  005737  002276                  TST     CKERR           ;WAS ATTENTION SET FOR B??
060276  001402                          BEQ     .+6             ;YES!!
060300  000137  061722                  JMP     1$              ;NO - BYPASS REST OF TEST
060304  113777  002246  122070          MOVB    PORTA,@RPCS2      ;SELECT PORT A
060312  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060320  005037  002276                  CLR     CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
060324  017737  122054  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
060332  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
060340  012737  100000  002336          MOV     #ATA,EXPTED       ;;;WHAT REGISTER SHOULD BE
060346  013737  002332  002342          MOV     BADDAT,TMP0       ;MOVE REGISTER CONTENTS TO 'TMP0'
060354  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
060362  023737  002336  002342          CMP     EXPTED,TMP0       ;COMPARE THE BITS
060370  001427                          BEQ     70$               ;BR IF OK
060372  013737  002332  002352          MOV     BADDAT,TMP4       ;COPY 'BAD DATA'
060400  042737  100000  002352          BIC     #ATA,TMP4         ;CLEAR THE MASKED BITS
060406  053737  002352  002336          BIS     TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
060414  104456                          TRAP    C$ERHRD
060416  000004                          .WORD   4
060420  006146                          .WORD   EM10
060422  012654                          .WORD   ERR3
060424  012746  003716                  MOV     #FRMT17,-(SP)
060430  012746  000001                  MOV     #1,-(SP)
060434  010600                          MOV     SP,R0
060436  104414                          TRAP    C$PNTB
060440  062706  000004                  ADD     #4,SP
060444  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
060450                          70$:
060450  005737  002276                  TST     CKERR           ;WAS ATTENTION SET FOR A??
060454  001402                          BEQ     .+6             ;YES!!
060456  000137  061722                  JMP     1$              ;NO - BYPASS REST OF TEST

                        ;;**************************************************************************

                                ;SEIZE THE DRIVE THROUGH PORT B

060462  113777  002250  121712          MOVB    PORTB,@RPCS2      ;SELECT PORT B
060470  013737  002250  002270          MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
060476  005077  121702                  CLR     @RPDS             ;WRITE RPDS

060502  113777  002246  121672          MOVB    PORTA,@RPCS2      ;SELECT PORT A
060510  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060516  013737  002246  002272          MOV     PORTA,OPPRT       ;'OPPOSITE' PORT ADDRESS
060524  017737  121654  002332          MOV     @RPDS,BADDAT  ;SEE IF DRIVE SEIZED BY PORT B
060532  013737  002404  002334          MOV     RPDS,BADADR       ;GENERATE BAD REGISTER ADDRESS
060540  005037  002336                  CLR     EXPTED            ;REGISTER SHOULD BE ZERO
060544  023737  002336  002332          CMP     EXPTED,BADDAT     ;IS THE REGISTER ZERO
060552  001406                          BEQ     72$               ;BR IF IT IS
```

```
060554  104456                          TRAP    C$ERHRD
060556  000001                          .WORD   1
060560  005705                          .WORD   EM4
060562  012576                          .WORD   ERR2
060564  000137  061722                  JMP     1$              ;BYPASS REST OF THE SUBTEST
060570                          72$:
060570  113777  002250  121604          MOVB    PORTB,@RPCS2        ;SELECT PORT B
060576  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060604  017737  121574  002332          MOV     @RPDS,BADDAT    ;SEE IF SEIZING PORT SEES CORRECT STATUS
060612  042737  020005  002332          BIC     #OM!PIP!ILV,BADDAT              ;CLEAR DONT CARE BITS
060620  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;EXPECTED STATUS
060626  013737  002336  002344          MOV     EXPTED,TMP1  ;USE GOOD DATA AS A MASK
060634  005137  002344                  COM     TMP1            ;COMPLEMENT THE EXPECTED STATUS
060640  013737  002332  002342          MOV     BADDAT,TMP0     ;SAVE THE ACTUAL STATUS
060646  043737  002344  002342          BIC     TMP1,TMP0       ;CLEAR UNWANTED BITS
060654  023737  002336  002342          CMP     EXPTED,TMP0     ;ARE THE EXPECTED STATUS BITS SET ?
060662  001404                          BEQ     73$             ;BR IF THEY ARE
060664  104456                          TRAP    C$ERHRD
060666  000002                          .WORD   2
060670  005736                          .WORD   EM5
060672  012654                          .WORD   ERR3
060674                          73$:
                                ;;**********************************************************************
                                ;ISSUE NOP COMMAND TO PORT B

060674  012777  000001  121470          MOV     #1,@RPCS1

                                ;;**********************************************************************
                                ; VERIFY THAT ATTENTION FOR PORT B CLEARED

060702  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
060706  017737  121472  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
060714  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
060722  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
060726  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
060734  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
060742  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
060750  001427                          BEQ     74$             ;BR IF OK
060752  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
060760  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
060766  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
060774  104456                          TRAP    C$ERHRD
060776  000003                          .WORD   3
061000  011734                          .WORD   EM61
061002  013262                          .WORD   ERR10
061004  012746  003716                  MOV     #FRMT17,-(SP)
061010  012746  000001                  MOV     #1,-(SP)
061014  010600                          MOV     SP,R0
061016  104414                          TRAP    C$PNTB
061020  062706  000004                  ADD     #4,SP
061024  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
061030                          74$:
                                ;;**********************************************************************

                                ;RELEASE THE DRIVE FROM PORT B

061030  113777  002250  121344          MOVB    PORTB,@RPCS2        ;SELECT PORT B
```

TEST 21 RESET ATTENTION 'B' BY "GO" TEST

```
061036  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
061044  012777  000013  121320          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                        ;START THE TIMER

061052  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
061056  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
061064  005737  002306          76$:    TST     WATCH
061070  001375                          BNE     76$


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

061072  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
061076  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
061104  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
061112  113777  002246  121262          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
061120  017737  121260  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
061126  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
061134  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
061142  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
061150  113777  002250  121224          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
061156  017737  121222  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
061164  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
061172  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
061200  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
061206  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
061214  001021                          BNE     77$             ;BR IF NOT
061216  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
061222  001073                          BNE     79$             ;BR IF NOT
061224  104456                          TRAP    C$ERHRD
061226  000006                          .WORD   6
061230  010751                          .WORD   EM46
061232  013534                          .WORD   ERR15
061234  012746  003716                  MOV     #FRMT17,-(SP)
061240  012746  000001                  MOV     #1,-(SP)
061244  010600                          MOV     SP,R0
061246  104414                          TRAP    C$PNTB
061250  062706  000004                  ADD     #4,SP
061254  000137  061556                  JMP     81$             ;BYPASS THE REST OF THE CHECKS
061260  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
061266  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
061274  113777  002250  121100          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
061302  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
061306  001414                          BEQ     78$             ;BR IF ZERO
061310  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
061316  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
061324  113777  002246  121050          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
061332  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
061336  001025                          BNE     79$             ;BR IF NOT
061340  012737  177777  002302  78$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
061346  012777  000011  121016          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
061354  012777  000013  121010          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
061362  104456                          TRAP    C$ERHRD
061364  000011                          .WORD   9
061366  007313                          .WORD   EM26
061370  013214                          .WORD   ERR9
```

```
061372  012746  003716                  MOV     #FRMT17,-(SP)
061376  012746  000001                  MOV     #1,-(SP)
061402  010600                          MOV     SP,R0
061404  104414                          TRAP    C$PNTB
061406  062706  000004                  ADD     #4,SP
061412  013737  002346  002332  79$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
061420  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
061426  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
061434  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
061442  001414                          BEQ     80$             ;BR IF OK FROM PORT A.
061444  104456                          TRAP    C$ERHRD
061446  000013                          .WORD   11
061450  006072                          .WORD   EM7
061452  013000                          .WORD   ERR5
061454  012746  003471                  MOV     #FRMT14,-(SP)
061460  012746  000001                  MOV     #1,-(SP)
061464  010600                          MOV     SP,R0
061466  104414                          TRAP    C$PNTB
061470  062706  000004                  ADD     #4,SP
061474  013737  002350  002332  80$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
061502  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
061510  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
061516  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
061524  001414                          BEQ     81$             ;BR IF OK
061526  104456                          TRAP    C$ERHRD
061530  000014                          .WORD   12
061532  006072                          .WORD   EM7
061534  013000                          .WORD   ERR5
061536  012746  003522                  MOV     #FRMT15,-(SP)
061542  012746  000001                  MOV     #1,-(SP)
061546  010600                          MOV     SP,R0
061550  104414                          TRAP    C$PNTB
061552  062706  000004                  ADD     #4,SP
061556                          81$:
                                ;;**************************************************************************************
                                ;VERIFY THAT ATTENTION FOR PORT A IS STILL SET

061556  113777  002246  120616          MOVB    PORTA,@RPCS2        ;SELECT PORT A
061564  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
061572  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
061576  017737  120602  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
061604  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
061612  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
061620  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
061626  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
061634  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
061642  001427                          BEQ     82$             ;BR IF OK
061644  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
061652  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
061660  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
061666  104456                          TRAP    C$ERHRD
061670  000003                          .WORD   3
061672  011766                          .WORD   EM62
061674  012726                          .WORD   ERR4
061676  012746  003716                  MOV     #FRMT17,-(SP)
061702  012746  000001                  MOV     #1,-(SP)
061706  010600                          MOV     SP,R0
```

TEST 21 RESET ATTENTION "B" BY "GO" TEST

```
        061710  104414                          TRAP    C$PNTB
        061712  062706  000004                  ADD     #4,SP
        061716  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        061722                          82$:
        061722                          1$:
     28 061722                          L10063:
        061722  104401                          TRAP    C$ETST
```

TEST 22 RESET ATTENTION 'A' & 'B' BY MASSBUS INIT

```
                                .SBTTL  TEST 22 RESET ATTENTION 'A' & 'B' BY MASSBUS INIT
                                ;
                                ;*VERIFY THAT MASSBUS CLEAR  RESETS BOTH PORT'S ATTENTION BITS WHEN THE
                                ;*      DRIVE IS IN NEUTRAL.
                                ;*
                                ;*  A.  SET THE ATTENTION BITS FOR BOTH PORTS.
                                ;*
                                ;*  B.  VERIFY THAT THE DRIVE IS IN NEUTRAL.
                                ;*
                                ;*  C.  ISSUE A MASSBUS INIT.  VERIFY THAT BOTH ATTENTION BITS HAVE
                                ;*      RESET.
                                ;*
                                ;
061724                          T22::
061724  005737  002340                  TST     DRVBAD          ;SYSTEM OK??
061730  001402                          BEQ     64$             ;TAKE BRANCH IF SO
061732  104432                          TRAP    C$EXIT
061734  001412                          .WORD   L10064-.
                                ;;*************************************************************************
061736                          64$:
                                        ;SET ATTENTION BITS FOR BOTH PORTS
061736  113777  002246  120436          MOVB    PORTA,@RPCS2    ;SELECT PORT A
061744  005777  120434          67$:    TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
061750  001775                          BEQ     67$
061752  012777  000017  120412          MOV     #17,@RPCS1
061760  013777  002250  120414          MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
061766  005777  120412          65$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
061772  001775                          BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
061774  012777  000017  120370          MOV     #17,@RPCS1              ;FORCE ATA BIT
062002  113777  002246  120372          MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
062010  005777  120370          66$:    TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
062014  001775                          BEQ     66$             ;BR IF DRIVE HASN'T TIMED OUT
                                ;;*************************************************************************
                                ;CONFIRM THAT BOTH ATTENTION BITS ARE SET

062016  113777  002246  120356          MOVB    PORTA,@RPCS2      ;SELECT PORT A
062024  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
062032  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
062036  017737  120342  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
062044  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
062052  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
062060  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
062066  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
062074  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
062102  001427                          BEQ     68$             ;BR IF OK
062104  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
062112  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
062120  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
062126  104456                          TRAP    C$ERHRD
062130  000004                          .WORD   4
062132  006146                          .WORD   EM10
062134  012654                          .WORD   ERR3
062136  012746  003716                  MOV     #FRMT17,-(SP)
062142  012746  000001                  MOV     #1,-(SP)
062146  010600                          MOV     SP,R0
```

TEST 22 RESET ATTENTION 'A' & 'B' BY MASSBUS INIT

```
062150  104414                          TRAP    C$PNTB
062152  062706  000004                  ADD     #4,SP
062156  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
062162                          68$:
062162  005737  002276                  TST     CKERR           ;WAS ATTN BIT FOR PORT A SET ?
062166  001402                          BEQ     .+6             ;BR IF IT WAS
062170  000137  063346                  JMP     1$              ;BYPASS REST OF TEST IF NOT
062174  113777  002250  120200          MOVB    PORTB,@RPCS2      ;SELECT PORT B
062202  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
062210  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
062214  017737  120164  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
062222  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
062230  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
062236  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
062244  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
062252  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
062260  001427                          BEQ     70$             ;BR IF OK
062262  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
062270  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
062276  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
062304  104456                          TRAP    C$ERHRD
062306  000004                          .WORD   4
062310  006146                          .WORD   EM10
062312  012654                          .WORD   ERR3
062314  012746  003716                  MOV     #FRMT17,-(SP)
062320  012746  000001                  MOV     #1,-(SP)
062324  010600                          MOV     SP,R0
062326  104414                          TRAP    C$PNTB
062330  062706  000004                  ADD     #4,SP
062334  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
062340                          70$:
062340  005737  002276                  TST     CKERR           ;WAS ATTN BIT FOR PORT B SET ?
062344  001402                          BEQ     .+6             ;BR IF IT WAS
062346  000137  063346                  JMP     1$              ;BYPASS REST OF TEST IF NOT

                        ;;*************************************************************************************

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

062352  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
062356  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
062364  012737  111700  002336          MOV     #111700,EXPTED  ;COMPARSION CONSTANT
062372  113777  002246  120002          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
062400  017737  120000  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
062406  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
062414  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
062422  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
062430  113777  002250  117744          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
062436  017737  117742  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
062444  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
062452  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
062460  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
062466  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
062474  001021                          BNE     72$             ;BR IF NOT
062476  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
062502  001073                          BNE     74$             ;BR IF NOT
062504  104456                          TRAP    C$ERHRD
```

```
062506  000006                          .WORD   6
062510  010751                          .WORD   EM46
062512  013534                          .WORD   ERR15
062514  012746  003716                  MOV     #FRMT17,-(SP)
062520  012746  000001                  MOV     #1,-(SP)
062524  010600                          MOV     SP,R0
062526  104414                          TRAP    C$PNTB
062530  062706  000004                  ADD     #4,SP
062534  000137  063022                  JMP     76$             ;BYPASS THE REST OF THE CHECKS
062540  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
062546  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
062554  113777  002250  117620          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
062562  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
062566  001414                          BEQ     73$             ;BR IF ZERO
062570  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
062576  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
062604  113777  002246  117570          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
062612  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
062616  001025                          BNE     74$             ;BR IF NOT
062620  012737  177777  002302  73$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
062626  012777  000011  117536          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
062634  012777  000013  117530          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
062642  104456                          TRAP    C$ERHRD
062644  000011                          .WORD   9
062646  007313                          .WORD   EM26
062650  013214                          .WORD   ERR9
062652  012746  003716                  MOV     #FRMT17,-(SP)
062656  012746  000001                  MOV     #1,-(SP)
062662  010600                          MOV     SP,R0
062664  104414                          TRAP    C$PNTB
062666  062706  000004                  ADD     #4,SP
062672  013737  002346  002332  74$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
062700  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
062706  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
062714  001414                          BEQ     75$             ;BR IF OK FROM PORT A.
062716  104456                          TRAP    C$ERHRD
062720  000013                          .WORD   11
062722  006072                          .WORD   EM7
062724  013000                          .WORD   ERR5
062726  012746  003471                  MOV     #FRMT14,-(SP)
062732  012746  000001                  MOV     #1,-(SP)
062736  010600                          MOV     SP,R0
062740  104414                          TRAP    C$PNTB
062742  062706  000004                  ADD     #4,SP
062746  013737  002350  002332  75$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
062754  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
062762  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
062770  001414                          BEQ     76$             ;BR IF OK
062772  104456                          TRAP    C$ERHRD
062774  000014                          .WORD   12
062776  006072                          .WORD   EM7
063000  013000                          .WORD   ERR5
063002  012746  003522                  MOV     #FRMT15,-(SP)
063006  012746  000001                  MOV     #1,-(SP)
063012  010600                          MOV     SP,R0
063014  104414                          TRAP    C$PNTB
063016  062706  000004                  ADD     #4,SP
```

```
063022                                  76$:
063022  005737  002302                          TST     RELERR          ;WAS DRIVE IN NEUTRAL ?
063026  001402                                  BEQ     .+6             ;BR IF IT WAS
063030  000137  063346                          JMP     1$              ;BYPASS RESET OF TEST
                                        ;;**************************************************************************
                                        ;ISSUE THE MASSBUS INIT

063034  012777  000040  117340                  MOV     #CLR,@RPCS2     ;ISSUE A MASSBUS INIT

                                        ;;**************************************************************************
                                        ;CHECK THE ATTENTION BITS OF BOTH PORTS

063042  113777  002246  117332                  MOVB    PORTA,@RPCS2        ;SELECT PORT A
063050  013737  002246  002266                  MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
063056  005037  002276                          CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
063062  017737  117316  002332                  MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
063070  013737  002404  002334                  MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
063076  005037  002336                          CLR     EXPTED          ;WHAT REGISTER SHOULD BE
063102  013737  002332  002342                  MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
063110  042737  077777  002342                  BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
063116  023737  002336  002342                  CMP     EXPTED,TMP0     ;COMPARE THE BITS
063124  001427                                  BEQ     77$             ;BR IF OK
063126  013737  002332  002352                  MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
063134  042737  100000  002352                  BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
063142  053737  002352  002336                  BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
063150  104456                                  TRAP    C$ERHRD
063152  000003                                  .WORD   3
063154  011170                                  .WORD   EM51
063156  012654                                  .WORD   ERR3
063160  012746  003716                          MOV     #FRMT17,-(SP)
063164  012746  000001                          MOV     #1,-(SP)
063170  010600                                  MOV     SP,R0
063172  104414                                  TRAP    C$PNTB
063174  062706  000004                          ADD     #4,SP
063200  005137  002276                          COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
063204                                  77$:
063204  113777  002250  117170                  MOVB    PORTB,@RPCS2        ;SELECT PORT B
063212  013737  002250  002266                  MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
063220  005037  002276                          CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
063224  017737  117154  002332                  MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
063232  013737  002404  002334                  MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
063240  005037  002336                          CLR     EXPTED          ;WHAT REGISTER SHOULD BE
063244  013737  002332  002342                  MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
063252  042737  077777  002342                  BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
063260  023737  002336  002342                  CMP     EXPTED,TMP0     ;COMPARE THE BITS
063266  001427                                  BEQ     79$             ;BR IF OK
063270  013737  002332  002352                  MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
063276  042737  100000  002352                  BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
063304  053737  002352  002336                  BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
063312  104456                                  TRAP    C$ERHRD
063314  000003                                  .WORD   3
063316  011170                                  .WORD   EM51
063320  012654                                  .WORD   ERR3
063322  012746  003716                          MOV     #FRMT17,-(SP)
063326  012746 .000001                          MOV     #1,-(SP)
063332  010600                                  MOV     SP,R0
063334  104414                                  TRAP    C$PNTB
```

TEST 22 RESET ATTENTION 'A' & 'B' BY MASSBUS INIT

```
        063336  062706  000004                  ADD     #4,SP
        063342  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
        063346                          79$:
        063346                          1$:
     96 063346                          L10064:
        063346  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 23 RESET ATTENTION 'A' BY WRITING RPAS
                                ;
                                ;*VERIFY THAT ATA BIT CAN BE RESET BY WRITING THE APPROPRIATE
                                ;*      BIT IN THE ATTENTION SUMMARY REGISTER (RPAS).
                                ;*
                                ;*  A.  SET ATTENTION BITS IN BOTH PORTS, VERIFY THAT BOTH
                                ;*      ARE SET.
                                ;*
                                ;*  B.  VERIFY THAT DRIVE IS IN NEUTRAL.
                                ;*
                                ;*  C.  WRITE PORT 'A' ATTENTION BIT IN RPAS, VERIFY
                                ;*      THAT ONLY PORT 'A' ATTENTION BIT IS RESET.
                                ;*
                                ;
 063350                         T23::
 063350  005737  002340                 TST     DRVBAD          ;SYSTEM OK??
 063354  001402                        BEQ     64$             ;TAKE BRANCH IF SO
 063356  104432                        TRAP    C$EXIT
 063360  001204                        .WORD   L10065-.
                                ;;*************************************************************************
 063362                         64$:
                                        ;SET ATTENTION BITS FOR BOTH PORTS
 063362  113777  002246  1170'2        MOVB    PORTA,@RPCS2    ;SELECT PORT A
 063370  005777  117010         67$:   TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
 063374  001775                        BEQ     67$
 063376  012777  000017  116766        MOV     #17,@RPCS1
 063404  013777  002250  116770        MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
 063412  005777  116766         65$:   TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
 063416  001775                        BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
 063420  012777  000017  116744        MOV     #17,@RPCS1              ;FORCE ATA BIT
 063426  113777  002246  116746        MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
 063434  005777  116744         66$:   TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
 063440  001775                        BEQ     66$             ;BR IF DRIVE HASN'T TIMED OUT
                                ;;************************************************************ **************
                                ;CONFIRM THAT BOTH ATTENTION BITS ARE SET.
 063442  113777  002246  116732        MOVB    PORTA,@RPCS2        ;SELECT PORT A
 063450  013737  002246  002266        MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 063456  005037  002276                CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
 063462  017737  116722  002332        MOV     @RPAS,BADDAT  ;GET CONTENTS OF RPAS
 063470  013737  002410  002334        MOV     RPAS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 063476  013737  002260  002336        MOV     ASR1,EXPTED     ;;;WHAT REGISTER SHOULD BE
 063504  023737  002336  002332        CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
 063512  001416                        BEQ     68$             ;BR IF OK
 063514  104456                        TRAP    C$ERHRD
 063516  000004                        .WORD   4
 063520  006146                        .WORD   EM10
 063522  012654                        .WORD   ERR3
 063524  012746  003716                MOV     #FRMT17,-(SP)
 063530  012746  000001                MOV     #1,-(SP)
 063534  010600                        MOV     SP,R0
 063536  104414                        TRAP    C$PNTB
 063540  062706  000004                ADD     #4,SP
 063544  005137  002276                COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
 063550                         68$:
 063550  005737  002276                TST     CKERR           ;ARE BOTH BITS SET?
```

```
063554  001402                          BEQ     .+6             ;BR YES
063556  000137  064450                  JMP     4$              ;BYPASS REST OF TEST
                            ;CHECK IF NEUTRAL


                            ;VERIFY THAT THE DRIVE IS IN NEUTRAL

063562  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
063566  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
063574  012737  111700  002336          MOV     #111700,EXPTED  ;COMPARSION CONSTANT
063602  113777  002246  116572          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
063610  017737  116570  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
063616  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
063624  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
063632  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
063640  113777  002250  116534          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
063646  017737  116532  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
063654  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
063662  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
063670  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
063676  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
063704  001021                          BNE     70$             ;BR IF NOT
063706  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
063712  001073                          BNE     72$             ;BR IF NOT
063714  104456                          TRAP    C$ERHRD
063716  000006                          .WORD   6
063720  010751                          .WORD   EM46
063722  013534                          .WORD   ERR15
063724  012746  003716                  MOV     #FRMT17,-(SP)
063730  012746  000001                  MOV     #1,-(SP)
063734  010600                          MOV     SP,R0
063736  104414                          TRAP    C$PNTB
063740  062706  000004                  ADD     #4,SP
063744  000137  064232                  JMP     74$             ;BYPASS THE REST OF THE CHECKS
063750  013737  002346  002332  70$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
063756  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
063764  113777  002250  116410          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
063772  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
063776  001414                          BEQ     71$             ;BR IF ZERO
064000  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
064006  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
064014  113777  002246  116360          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
064022  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
064026  001025                          BNE     72$             ;BR IF NOT
064030  012737  177777  002302  71$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
064036  012777  000011  116326          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
064044  012777  000013  116320          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
064052  104456                          TRAP    C$ERHRD
064054  000011                          .WORD   9
064056  007313                          .WORD   EM26
064060  013214                          .WORD   ERR9
064062  012746  003716                  MOV     #FRMT17,-(SP)
064066  012746  000001                  MOV     #1,-(SP)
064072  010600                          MOV     SP,R0
064074  104414                          TRAP    C$PNTB
064076  062706  000004                  ADD     #4,SP
064102  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
```

TEST 23 RESET ATTENTION 'A' BY WRITING RPAS

```
064110  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
064116  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
064124  001414                          BEQ     73$             ;BR IF OK FROM PORT A.
064126  104456                          TRAP    C$ERHRD
064130  000013                          .WORD   11
064132  006072                          .WORD   EM7
064134  013000                          .WORD   ERR5
064136  012746  003471                  MOV     #FRMT14,-(SP)
064142  012746  000001                  MOV     #1,-(SP)
064146  010600                          MOV     SP,R0
064150  104414                          TRAP    C$PNTB
064152  062706  000004                  ADD     #4,SP
064156  013737  002350  002332  73$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
064164  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
064172  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
064200  001414                          BEQ     74$             ;BR IF OK
064202  104456                          TRAP    C$ERHRD
064204  000014                          .WORD   12
064206  006072                          .WORD   EM7
064210  013000                          .WORD   ERR5
064212  012746  003522                  MOV     #FRMT15,-(SP)
064216  012746  000001                  MOV     #1,-(SP)
064222  010600                          MOV     SP,R0
064224  104414                          TRAP    C$PNTB
064226  062706  000004                  ADD     #4,SP
064232                          74$:
064232  005737  002302                  TST     RELERR          ;IS DRIVE NEUTRAL?
064236  001402                          BEQ     .+6             ;BR YES
064240  000137  064450                  JMP     4$              ;BYPASS REST OF TEST

                                ;WRITE PORT A ATTENTION BIT
064244  013777  002262  116136          MOV     ASRA,@RPAS

                                ;VERIFY THAT THE CORRECT ATA BIT IS hESET

064252  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
064256  017737  116126  002332          MOV     @RPAS,BADDAT  ;GET CONTENTS OF RPAS
064264  013737  002410  002334          MOV     RPAS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
064272  013737  002264  002336          MOV     ASRB,EXPTED     ;;;WHAT REGISTER SHOULD BE
064300  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
064306  001416                          BEQ     75$             ;BR IF OK
064310  104456                          TRAP    C$ERHRD
064312  000004                          .WORD   4
064314  006146                          .WORD   EM10
064316  012654                          .WORD   ERR3
064320  012746  003716                  MOV     #FRMT17,-(SP)
064324  012746  000001                  MOV     #1,-(SP)
064330  010600                          MOV     SP,R0
064332  104414                          TRAP    C$PNTB
064334  062706  000004                  ADD     #4,SP
064340  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
064344                          75$:
064344  005737  002276                  TST     CKERR
064350  001415                          BEQ     1$              ;BR YES
064352  104456                          TRAP    C$ERHRD
064354  000031                          .WORD   25
064356  011670                          .WORD   EM60
```

```
064360  012654                          .WOF.D   ERR3
064362  012746  003522                  MOV      #FRMT15,-(SP)
064366  012746  000001                  MOV      #1,-(SP)
064372  010600                          MOV      SP,R0
064374  104414                          TRAP     C$PNTB
064376  062706  000004                  ADD      #4,SP
064402  000422                          BR       4$                ;BYPASS REST OF TEST
                              ;WAIT FOR DRIVE TO RELEASE BY TIMEOUT

064404                        1$:
064404  113777  002246  115770          MOVB     PORTA,@RPCS2       ;SELECT PORT A
064412  013737  002246  002266          MOV      PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
064420  005777  115760        2$:       TST      @RPDS              ;MAKE SURE DRIVE IS AVAILABLE
064424  001775                          BEQ      2$
064426  113777  002250  115746          MOVB     PORTB,@RPCS2       ;SELECT PORT B
064434  013737  002250  002266          MOV      PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
064442  005777  115736        3$:       TST      @RPDS              ;MAKE SURE DRIVE IS AVAILABLE
064446  001775                          BEQ      3$
064450                        4$:

                              ;CLEAR ATTENTION BITS FOR BOTH PORTS

064450  113777  002246  115724          MOVB     PORTA,@RPCS2     ;SELECT PORT #A
064456  005077  115722                  CLR      @RPDS            ;SEIZE THE DRIVE
064462  012777  000011  115702          MOV      #11,@RPCS1       ;ISSUE DRIVE CLEAR
064470  012777  000013  115674          MOV      #13,@RPCS1       ;RELEASE THE DRIVE

                              ;START THE TIMER

064476  005037  002304                  CLR      TIME             ;CLEAR THE ELAPSED TIME COUNTER
064502  012737  000050  002306          MOV      #40.,WATCH       ;SET WATCH TO 40. MS
064510  005737  002306        77$:      TST      WATCH
064514  001375                          BNE      77$
064516  113777  002250  115656          MOVB     PORTB,@RPCS2     ;SELECT PORT #B
064524  005077  115654                  CLR      @RPDS            ;SEIZE THE DRIVE THROUGH PORT 'B'
064530  012777  000011  115634          MOV      #11,@RPCS1       ;ISSUE DRIVE CLEAR
064536  012777  000013  115626          MOV      #13,@RPCS1       ;RELEASE THE DRIVE

                              ;START THE TIMER

064544  005037  002304                  CLR      TIME             ;CLEAR THE ELAPSED TIME COUNTER
064550  012737  000050  002306          MOV      #40.,WATCH       ;SET WATCH TO 40. MS
064556  005737  002306        78$:      TST      WATCH
064562  001375                          BNE      78$
107 064564                    L10065:
064564  104401                          TRAP     C$ETST
```

TEST 24 RESET ATTENTION 'B' BY WRITING RPAS

```
                                        .SBTTL  TEST 24 RESET ATTENTION 'B' BY WRITING RPAS
                                        ;*VERIFY THAT ATA BIT CAN BE RESET BY WRITING THE APPROPRIATE BIT
                                        ;*      BIT IN THE ATTENTION SUMMARY REGISTER (RPAS)
                                        ;*
                                        ;*  A.  SET ATTENTION BITS IN BOTH PORTS, VERIFY THAT BOTH ARE SET
                                        ;*
                                        ;*  B.  VERIFY THAT DRIVE IS IN NEUTRAL
                                        ;*
                                        ;*  C.  WRITE PORT 'B' ATTENTION BIT IN RPAS, VERIFY THAT ONLY
                                        ;*      PORT 'B' ATTENTION BIT IS RESET.
                                        ;*
                                        T24::
064566  005737  002340                          TST     DRVBAD          ;SYSTEM OK??
064572  001402                                BEQ     64$             ;TAKE BRANCH IF SO
064574  104432                                TRAP    C$EXIT
064576  001204                                .WORD   L10066-.
                                        ;;*************************************************************************
064600                                  64$:
                                                ;SET ATTENTION BITS FOR BOTH PORTS
064600  113777  002246  115574                  MOVB    PORTA,@RPCS2    ;SELECT PORT A
064606  005777  115572                67$:     TST     @RPDS           ;MAKE SURE DRIVE  AVAILABLE
064612  001775                                BEQ     67$
064614  012777  000017  115550                MOV     #17,@RPCS1
064622  013777  002250  115552                MOV     PORTB,@RPCS2    ;SELECT THE OTHER PORT
064630  005777  115550                65$:     TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
064634  001775                                BEQ     65$             ;BR IF DRIVE HASN'T TIMED OUT
064636  012777  000017  115526                MOV     #17,@RPCS1              ;FORCE ATA BIT
064644  113777  002246  115530                MOVB    PORTA,@RPCS2    ;SELECT PORT A AGAIN
064652  005777  115526                66$:     TST     @RPDS           ;WAIT FOR DRIVE TO TIMEOUT
064656  001775                                BEQ     66$             ;BR IF DRIVE 'ASN'T TIMED OUT
                                        ;;*************************************************************************
                                        ;CONFIRM THAT BOTH ATTENTION BITS ARE SET.
064660  113777  002250  115514                MOVB    PORTB,@RPCS2      ;SELECT PORT B
064666  013737  002250  002266                MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
064674  005037  002276                        CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
064700  017737  115504  002332                MOV     @RPAS,BADDAT  ;GET CONTENTS OF RPAS
064706  013737  002410  002334                MOV     RPAS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
064714  013737  002260  002336                MOV     ASR1,EXPTED     ;;;WHAT REGISTER SHOULD BE
064722  023737  002336  002332                CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
064730  001416                                BEQ     68$             ;BR IF OK
064732  104456                                TRAP    C$ERHRD
064734  000004                                .WORD   4
064736  006146                                .WORD   EM10
064740  012654                                .WORD   ERR3
064742  012746  003716                        MOV     #FRMT17,-(SP)
064746  012746  000001                        MOV     #1,-(SP)
064752  010600                                MOV     SP,R0
064754  104414                                TRAP    C$PNTB
064756  062706  000004                        ADD     #4,SP
064762  005137  002276                        COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
064766                                  68$:
064766  005737  002276                        TST     CKERR           ;ARE BOTH BITS SET?
064772  001402                                BEQ     .+6             ;BR YES
```

TEST 24 RESET ATTENTION 'B' BY WRITING RPAS

```
064774  000137  065666                  JMP     4$              ;BYPASS REST OF TEST
                                ;CHECK IF NEUTRAL

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

065000  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
065004  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
065012  012737  111700  002336          MOV     #111700,EXPTED  ;COMPARSION CONSTANT
065020  113777  002246  115354          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
065026  017737  115352  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
065034  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
065042  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
065050  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
065056  113777  002250  115316          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
065064  017737  115314  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
065072  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
065100  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
065106  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
065114  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
065122  001021                          BNE     70$             ;BR IF NOT
065124  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
065130  001073                          BNE     72$             ;BR IF NOT
065132  104456                          TRAP    C$ERHRD
065134  000006                          .WORD   6
065136  010751                          .WORD   EM46
065140  013534                          .WORD   ERR15
065142  012746  003716                  MOV     #FRMT17,-(SP)
065146  012746  000001                  MOV     #1,-(SP)
065152  010600                          MOV     SP,R0
065154  104414                          TRAP    C$PNTB
065156  062706  000004                  ADD     #4,SP
065162  000137  065450                  JMP     74$             ;BYPASS THE REST OF THE CHECKS
065166  013737  002346  002332  70$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
065174  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
065202  113777  002250  115172          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
065210  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
065214  001414                          BEQ     71$             ;BR IF ZERO
065216  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
065224  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
065232  113777  002246  115142          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
065240  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
065244  001025                          BNE     72$             ;BR IF NOT
065246  012737  177777  002302  71$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
065254  012777  000011  115110          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
065262  012777  000013  115102          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
065270  104456                          TRAP    C$ERHRD
065272  000011                          .WORD   9
065274  007313                          .WORD   EM26
065276  013214                          .WORD   ERR9
065300  012746  003716                  MOV     #FRMT17,-(SP)
065304  012746  000001                  MOV     #1,-(SP)
065310  010600                          MOV     SP,R0
065312  104414                          TRAP    C$PNTB
065314  062706  000004                  ADD     #4,SP
065320  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
065326  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
```

```
065334  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
065342  001414                          BEQ     73$             ;BR IF OK FROM PORT A.
065344  104456                          TRAP    C$ERHRD
065346  000013                          .WORD   11
065350  006072                          .WORD   EM7
065352  013000                          .WORD   ERR5
065354  012746  003471                  MOV     #FRMT14,-(SP)
065360  012746  000001                  MOV     #1,-(SP)
065364  010600                          MOV     SP,R0
065366  104414                          TRAP    C$PNTB
065370  062706  000004                  ADD     #4,SP
065374  013737  002350  002332  73$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
065402  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
065410  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
065416  001414                          BEQ     74$             ;BR IF OK
065420  104456                          TRAP    C$ERHRD
065422  000014                          .WORD   12
065424  006072                          .WORD   EM7
065426  013000                          .WORD   ERR5
065430  012746  003522                  MOV     #FRMT15,-(SP)
065434  012746  000001                  MOV     #1,-(SP)
065440  010600                          MOV     SP,R0
065442  104414                          TRAP    C$PNTB
065444  062706  000004                  ADD     #4,SP
065450                          74$:
065450  005737  002302                  TST     RELERR          ;IS DRIVE NEUTRAL?
065454  001402                          BEQ     .+6             ;BR YES
065456  000137  065666                  JMP     4$              ;BYPASS REST OF TEST

                                ;WRITE PORT B ATTENTION BIT
065462  013777  002264  114720          MOV     ASRB,@RPAS

                                ;VERIFY THAT THE CORRECT ATA BIT IS RESET

065470  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
065474  017737  114710  002332          MOV     @RPAS,BADDAT  ;GET CONTENTS OF RPAS
065502  013737  002410  002334          MOV     RPAS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
065510  013737  002262  002336          MOV     ASRA,EXPTED     ;;;WHAT REGISTER SHOULD BE
065516  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
065524  001416                          BEQ     75$             ;BR IF OK
065526  104456                          TRAP    C$ERHRD
065530  000004                          .WORD   4
065532  006146                          .WORD   EM10
065534  012654                          .WORD   ERR3
065536  012746  003716                  MOV     #FRMT17,-(SP)
065542  012746  000001                  MOV     #1,-(SP)
065546  010600                          MOV     SP,R0
065550  104414                          TRAP    C$PNTB
065552  062706  000004                  ADD     #4,SP
065556  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
065562                          75$:
065562  005737  002276                  TST     CKERR
065566  001415                          BEQ     1$              ;BR YES
065570  !04456                          TRAP    C$ERHRD
065572  000031                          .WORD   25
065574  011670                          .WORD   EM60
065576  012654                          .WORD   ERR3
```

TEST 24 RESET ATTENTION 'B' BY WRITING RPAS

```
065600  012746  003471                  MOV     #FRMT14,-(SP)
065604  012746  000001                  MOV     #1,-(SP)
065610  010600                          MOV     SP,R0
065612  104414                          TRAP    C$PNTB
065614  062706  000004                  ADD     #4,SP
065620  000422                          BR      4$              ;BYPASS REST OF TEST
                              ;WAIT FOR DRIVE TO RELEASE BY TIMEOUT

065622                        1$:
065622  113777  002250  114552          MOVB    PORTB,@RPCS2        ;SELECT PORT B
065630  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
065636  005777  114542        2$:       TST     @RPDS           ;MAKE SURE DRIVE IS AVAILABLE
065642  001775                          BEQ     2$
065644  113777  002246  114530          MOVB    PORTA,@RPCS2        ;SELECT PORT A
065652  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
065660  005777  114520        3$:       TST     @RPDS           ;MAKE SURE DRIVE IS AVAILABLE
065664  001775                          BEQ     3$
065666                        4$:

                              ;CLEAR ATTENTION BITS FOR BOTH PORTS

065666  113777  002246  114506          MOVB    PORTA,@RPCS2    ;SELECT PORT #A
065674  005077  114504                  CLR     @RPDS           ;SEIZE THE DRIVE
065700  012777  000011  114464          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
065706  012777  000013  114456          MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                              ;START THE TIMER

065714  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
065720  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
065726  005737  002306        77$:      TST     WATCH
065732  001375                          BNE     77$
065734  113777  002250  114440          MOVB    PORTB,@RPCS2    ;SELECT PORT #B
065742  005077  114436                  CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
065746  012777  000011  114416          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
065754  012777  000013  114410          MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                              ;START THE TIMER

065762  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
065766  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
065774  005737  002306        78$:      TST     WATCH
066000  001375                          BNE     78$
 22 066002                    L10066:
066002  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 25 SET ATTENTION 'A' BY COMMAND
                                        ;
                                        ;*TEST THE OPERATION OF THE PORT A AND PORT B ATTENTION BITS AFTER A
                                        ;*      COMMAND.
                                        ;*
                                        ;*  A.  ISSUE A RECALIBRATE COMMAND THROUGH PORT 'A'.
                                        ;*
                                        ;*  B.  WAIT FOR THE RECALIBRATE COMMAND TO COMPLETE ('DRY' TO BECOME
                                        ;*      '1').  VERIFY THAT THE ATTENTION BIT FOR PORT 'A' IS SET AND
                                        ;*      THAT THE ATTENTION BIT FOR PORT 'B' IS NOT SET.
                                        ;*
                                        ;*  C.  RELEASE THE DRIVE THROUGH PORT 'A'.  VERIFY THAT THE DRIVE RETURNED
                                        ;*      TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                        ;*

066004                                  T25::
066004  005737  002340                          TST     DRVBAD          ;SYSTEM OK??
066010  001402                                  BEQ     64$             ;TAKE BRANCH IF SO
066012  104432                                  TRAP    C$EXIT
066014  001162                                  .WORD   L10067-.
066016                                  64$:

                                                ;CLEAR ATTENTION BITS FOR BOTH PORTS

066016  113777  002246  114356                  MOVB    PORTA,@RPCS2    ;SELECT PORT #A
066024  005077  114354                          CLR     @RPDS           ;SEIZE THE DRIVE
066030  012777  000011  114334                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
066036  012777  000013  114326                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

066044  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
066050  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
066056  005737  002306          65$:    TST     WATCH
066062  001375                                  BNE     65$
066064  113777  002250  114310                  MOVB    PORTB,@RPCS2    ;SELECT PORT #B
066072  005077  114306                          CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
066076  012777  000011  114266                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
066104  012777  000013  114260                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

066112  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
066116  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
066124  005737  002306          66$:    TST     WATCH
066130  001375                                  BNE     66$
066132  113777  002246  114242                  MOVB    PORTA,@RPCS2      ;SELECT PORT A
066140  013737  002246  002266                  MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
066146  013737  002246  002270                  MOV     PORTA,SEIZPT    ;'SEIZED' PORT ADDRESS

                                        ;;*************************************************************************
                                        ;DO A RECALIBRATE THROUGH PORT A

066154  012777  000007  114210                  MOV     #7,@RPCS1       ;ISSUE A RECALIBRATE COMMAND THROUGH PORT A

                                        ;;*************************************************************************
                                        ;WAIT FOR DRIVE TO FINISH
```

```
066162  032777  000200  114214          BIT     #DRY,@RPDS      ;WAIT FOR DRIVE TO FINISH
066170  001774                          BEQ     .-6             ;BR IF NOT FINISHED

                                ;;*************************************************************************
                                ;CONFIRM THAT ATTENTION IS SET FOR PORT A

066172  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
066176  017737  114202  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
066204  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
066212  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
066220  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
066226  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
066234  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
066242  001427                          BEQ     67$             ;BR IF OK
066244  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
066252  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
066260  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
066266  104456                          TRAP    C$ERHRD
066270  000003                          .WORD   3
066272  007630                          .WORD   EM32
066274  012654                          .WORD   ERR3
066276  012746  003716                  MOV     #FRMT17,-(SP)
066302  012746  000001                  MOV     #1,-(SP)
066306  010600                          MOV     SP,R0
066310  104414                          TRAP    C$PNTB
066312  062706  000004                  ADD     #4,SP
066316  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
066322                          67$:

                                ;RELEASE THE DRIVE FROM PORT A

066322  113777  002246  114052          MOVB    PORTA,@RPCS2      ;SELECT PORT A
066330  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
066336  012777  000013  114026          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

066344  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
066350  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
066356  005737  002306          69$:    TST     WATCH
066362  001375                          BNE     69$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

066364  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
066370  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
066376  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
066404  113777  002246  113770          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
066412  017737  113766  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
066420  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
066426  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
066434  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
066442  113777  002250  113732          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
066450  017737  113730  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
066456  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
```

```
066464  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
066472  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
066500  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
066506  001021                          BNE     70$             ;BR IF NOT
066510  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
066514  001073                          BNE     72$             ;BR IF NOT
066516  104456                          TRAP    C$ERHRD
066520  000006                          .WORD   6
066522  010751                          .WORD   EM46
066524  013534                          .WORD   ERR15
066526  012746  003716                  MOV     #FRMT17,-(SP)
066532  012746  000001                  MOV     #1,-(SP)
066536  010600                          MOV     SP,R0
066540  104414                          TRAP    C$PNTB
066542  062706  000004                  ADD     #4,SP
066546  000137  067034                  JMP     74$             ;BYPASS THE REST OF THE CHECKS
066552  013737  002346  002332  70$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
066560  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
066566  113777  002250  113606          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
066574  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
066600  001414                          BEQ     71$             ;BR IF ZERO
066602  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
066610  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
066616  113777  002246  113556          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
066624  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
066630  001025                          BNE     72$             ;BR IF NOT
066632  012737  177777  002302  71$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
066640  012777  000011  113524          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
066646  012777  000013  113516          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
066654  104456                          TRAP    C$ERHRD
066656  000011                          .WORD   9
066660  007313                          .WORD   EM26
066662  013214                          .WORD   ERR9
066664  012746  003716                  MOV     #FRMT17,-(SP)
066670  012746  000001                  MOV     #1,-(SP)
066674  010600                          MOV     SP,R0
066676  104414                          TRAP    C$PNTB
066700  062706  000004                  ADD     #4,SP
066704  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
066712  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
066720  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
066726  001414                          BEQ     73$             ;BR IF OK FROM PORT A.
066730  104456                          TRAP    C$ERHRD
066732  000013                          .WORD   11
066734  006072                          .WORD   EM7
066736  013000                          .WORD   ERR5
066740  012746  003471                  MOV     #FRMT14,-(SP)
066744  012746  000001                  MOV     #1,-(SP)
066750  010600                          MOV     SP,R0
066752  104414                          TRAP    C$PNTB
066754  062706  000004                  ADD     #4,SP
066760  013737  002350  002332  73$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
066766  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
066774  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
067002  001414                          BEQ     74$             ;BR IF OK
067004  104456                          TRAP    C$ERHRD
067006  000014                          .WORD   12
```

```
        067010  006072                          .WORD   EM7
        067012  013000                          .WORD   ERR5
        067014  012746  003522                  MOV     #FRMT15,-(SP)
        067020  012746  000001                  MOV     #1,-(SP)
        067024  010600                          MOV     SP,R0
        067026  104414                          TRAP    C$PNTB
        067030  062706  000004                  ADD     #4,SP
        067034                          74$:
        067034  113777  002250  113340          MOVB    PORTB,@RPCS2        ;SELECT PORT B
        067042  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                        ;;**************************************************************************
                                        ;CONFIRM THAT ATTENTION IS NOT SET FOR PORT B

        067050  005037  002276                  CLR     CKERR               ;CLEAR THE 'CHECK ERROR' INDICATOR
        067054  017737  113324  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
        067062  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        067070  005037  002336                  CLR     EXPTED              ;WHAT REGISTER SHOULD BE
        067074  013737  002332  002342          MOV     BADDAT,TMP0         ;MOVE REGISTER CONTENTS TO 'TMP0'
        067102  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
        067110  023737  002336  002342          CMP     EXPTED,TMP0         ;COMPARE THE BITS
        067116  001427                          BEQ     75$                 ;BR IF OK
        067120  013737  002332  002352          MOV     BADDAT,TMP4         ;COPY 'BAD DATA'
        067126  042737  100000  002352          BIC     #ATA,TMP4           ;CLEAR THE MASKED BITS
        067134  053737  002352  002336          BIS     TMP4,EXPTED         ;'OR' WITH GOOD DATA FOR TYPEOUT
        067142  104456                          TRAP    C$ERHRD
        067144  000003                          .WORD   3
        067146  007630                          .WORD   EM32
        067150  012654                          .WORD   ERR3
        067152  012746  003716                  MOV     #FRMT17,-(SP)
        067156  012746  000001                  MOV     #1,-(SP)
        067162  010600                          MOV     SP,R0
        067164  104414                          TRAP    C$PNTB
        067166  062706  000004                  ADD     #4,SP
        067172  005137  002276                  COM     CKERR               ;SET THE REGISTER COMPARE ERROR INDICATOR
        067176                          75$:
    83  067176                          L10067:
        067176  104401                          TRAP    C$ETST
```

TEST 26 SET ATTENTION 'B' BY COMMAND

```
                                        .SBTTL  TEST 26 SET ATTENTION 'B' BY COMMAND
                                        ;
                                        ;*TEST THE OPERATION OF THE PORT A AND PORT B ATTENTION BITS AFTER A
                                        ;*      COMMAND.
                                        ;*
                                        ;*  A.  ISSUE A RECALIBRATE COMMAND THROUGH PORT 'B'.
                                        ;*
                                        ;*  B.  WAIT FOR THE RECALIBRATE COMMAND TO COMPLETE ('DRY' TO BECOME
                                        ;*      '1').  VERIFY THAT THE ATTENTION BIT FOR PORT 'B' IS SET AND
                                        ;*      THAT THE ATTENTION BIT FOR PORT 'A' IS NOT SET.
                                        ;*
                                        ;*  C.  RELEASE THE DRIVE THROUGH PORT 'B'.  VERIFY THAT THE DRIVE RETURNED
                                        ;*      TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                        ;*

 067200                                 T26::
 067200  005737  002340                         TST     DRVBAD          ;SYSTEM OK??
 067204  001402                                BEQ     64$             ;TAKE BRANCH IF SO
 067206  104432                                TRAP    C$EXIT
 067210  001162                                .WORD   L10070-.
 067212                                 64$:

                                                ;CLEAR ATTENTION BITS FOR BOTH PORTS

 067212  113777  002246  113162                MOVB    PORTA,@RPCS2    ;SELECT PORT #A
 067220  005077  113160                        CLR     @RPDS           ;SEIZE THE DRIVE
 067224  012777  000011  113140                MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 067232  012777  000013  113132                MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

 067240  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 067244  012737  000050  002306                MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 067252  005737  002306         65$:           TST     WATCH
 067256  001375                                BNE     65$
 067260  113777  002250  113114                MOVB    PORTB,@RPCS2    ;SELECT PORT #B
 067266  005077  113112                        CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
 067272  012777  000011  113072                MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 067300  012777  000013  113064                MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

 067306  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 067312  012737  000050  002306                MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 067320  005737  002306         66$:           TST     WATCH
 067324  001375                                BNE     66$
 067326  113777  002250  113046                MOVB    PORTB,@RPCS2      ;SELECT PORT B
 067334  013737  002250  002266                MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 067342  013737  002250  002270                MOV     PORTB,SEIZPT    ;'SEIZED' PORT ADDRESS

                                        ;;**************************************************************************
                                        ;DO A RECALIBRATE THROUGH PORT B

 067350  012777  000007  113014                MOV     #7,@RPCS1       ;ISSUE A RECALIBRATE COMMAND THROUGH PORT B

                                        ;;**************************************************************************
                                        ;WAIT FOR DRIVE TO FINISH
```

```
067356  032777  000200  113020          BIT     #DRY,@RPDS      ;WAIT FOR DRIVE TO FINISH
067364  001774                          BEQ     .-6             ;BR IF NOT FINISHED

                                ;;**********************************************************************************
                                ;CONFIRM THAT ATTENTION IS SET FOR PORT B

067366  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
067372  017737  113006  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
067400  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
067406  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
067414  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
067422  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
067430  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
067436  001427                          BEQ     67$             ;BR IF OK
067440  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
067446  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
067454  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
067462  104456                          TRAP    C$ERHRD
067464  000003                          .WORD   3
067466  007630                          .WORD   EM32
067470  012654                          .WORD   ERR3
067472  012746  003716                  MOV     #FRMT17,-(SP)
067476  012746  000001                  MOV     #1,-(SP)
067502  010600                          MOV     SP,R0
067504  104414                          TRAP    C$PNTB
067506  062706  000004                  ADD     #4,SP
067512  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
067516                          67$:

                                ;RELEASE THE DRIVE FROM PORT B

067516  113777  002250  112656          MOVB    PORTB,@RPCS2      ;SELECT PORT B
067524  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
067532  012777  000013  112632          MOV     #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

067540  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
067544  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
067552  005737  002306          69$:    TST     WATCH
067556  001375                          BNE     69$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

067560  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
067564  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
067572  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
067600  113777  002246  112574          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
067606  017737  112572  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
067614  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
067622  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
067630  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
067636  113777  002250  112536          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
067644  017737  112534  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
067652  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
```

```
067660  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
067666  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
067674  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
067702  001021                          BNE     70$             ;BR IF NOT
067704  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
067710  001073                          BNE     72$             ;BR IF NOT
067712  104456                          TRAP    C$ERHRD
067714  000006                          .WORD   6
067716  010751                          .WORD   EM46
067720  013534                          .WORD   ERR15
067722  012746  003716                  MOV     #FRMT17,-(SP)
067726  012746  000001                  MOV     #1,-(SP)
067732  010600                          MOV     SP,R0
067734  104414                          TRAP    C$PNTB
067736  062706  000004                  ADD     #4,SP
067742  000137  070230                  JMP     74$             ;BYPASS THE REST OF THE CHECKS
067746  013737  002346  002332  70$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
067754  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
067762  113777  002250  112412          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
067770  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
067774  001414                          BEQ     71$             ;BR IF ZERO
067776  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
070004  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
070012  113777  002246  112362          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
070020  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
070024  001025                          BNE     72$             ;BR IF NOT
070026  012737  177777  002302  71$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
070034  012777  000011  112330          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
070042  012777  000013  112322          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
070050  104456                          TRAP    C$ERHRD
070052  000011                          .WORD   9
070054  007313                          .WORD   EM26
070056  013214                          .WORD   ERR9
070060  012746  003716                  MOV     #FRMT17,-(SP)
070064  012746  000001                  MOV     #1,-(SP)
070070  010600                          MOV     SP,R0
070072  104414                          TRAP    C$PNTB
070074  062706  000004                  ADD     #4,SP
070100  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
070106  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
070114  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
070122  001414                          BEQ     73$             ;BR IF OK FROM PORT A.
070124  104456                          TRAP    C$ERHRD
070126  000013                          .WORD   11
070130  006072                          .WORD   EM7
070132  013000                          .WORD   ERR5
070134  012746  003471                  MOV     #FRMT14,-(SP)
070140  012746  000001                  MOV     #1,-(SP)
070144  010600                          MOV     SP,R0
070146  104414                          TRAP    C$PNTB
070150  062706  000004                  ADD     #4,SP
070154  013737  002350  002332  73$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
070162  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
070170  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
070176  001414                          BEQ     74$             ;BR IF OK
070200  104456                          TRAP    C$ERHRD
070202  000014                          .WORD   12
```

```
070204  006072                          .WORD   EM7
070206  013000                          .WORD   EPR5
070210  012746  003522                  MOV     #FRMT15,-(SP)
070214  012746  000001                  MOV     #1,-(SP)
070220  010600                          MOV     SP,R0
070222  104414                          TRAP    C$PNTB
070224  062706  000004                  ADD     #4,SP
070230                          74$:
070230  113777  002246  112144          MOVB    PORTA,@RPCS2        ;SELECT PORT A
070236  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                        ;;*************************************************************************
                        ;CONFIRM THAT ATTENTION IS NOT SET FOR PORT A

070244  005037  002276                  CLR     CKERR               ;CLEAR THE 'CHECK ERROR' INDICATOR
070250  017737  112130  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
070256  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
070264  005037  002336                  CLR     EXPTED              ;WHAT REGISTER SHOULD BE
070270  013737  002332  002342          MOV     BADDAT,TMP0         ;MOVE REGISTER CONTENTS TO 'TMP0'
070276  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
070304  023737  002336  002342          CMP     EXPTED,TMP0         ;COMPARE THE BITS
070312  001427                          BEQ     75$                 ;BR IF OK
070314  013737  002332  002352          MOV     BADDAT,TMP4         ;COPY 'BAD DATA'
070322  042737  100000  002352          BIC     #ATA,TMP4           ;CLEAR THE MASKED BITS
070330  053737  002352  002336          BIS     TMP4,EXPTED         ;'OR' WITH GOOD DATA FOR TYPEOUT
070336  104456                          TRAP    C$ERHRD
070340  000003                          .WORD   3
070342  007630                          .WORD   EM32
070344  012654                          .WORD   ERR3
070346  012746  003716                  MOV     #FRMT17,-(SP)
070352  012746  000001                  MOV     #1,-(SP)
070356  010600                          MOV     SP,R0
070360  104414                          TRAP    C$PNTB
070362  062706  000004                  ADD     #4,SP
070366  005137  002276                  COM     CKERR               ;SET THE REGISTER COMPARE ERROR INDICATOR
070372                          75$:
 24 070372                      L10070:
070372  104401                          TRAP    C$ETST
```

```
TEST 27 TEST THAT PORT 'A' TIMEOUT DOES NOT RESET DRIVE

                                        .SBTTL  TEST 27 TEST THAT PORT 'A' TIMEOUT DOES NOT RESET DRIVE
                                        ;
                                        ;*VERIFY THAT PORT TIMEOUT DOES NOT INITIALIZE THE DRIVE.
                                        ;*
                                        ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                        ;*
                                        ;* B.  WRITE 03 INTO RPCS1 THROUGH PORT 'A' TO FORCE AN ATTENTION & ILF ERROR.
                                        ;*
                                        ;*  C.  WAIT FOR THE DRIVE TO TIMEOUT.  VERIFY THAT THE DRIVE RETURNED TO
                                        ;*      NEUTRAL; THAT ATTENTION IS SET FOR PORT 'A' AND NOT SET FOR
                                        ;*      PORT 'B'; AND THAT BOTH PORTS SEE 1'S IN THE ERROR REGISTER.
                                        ;*

 113 070374                             T27::
 117 070374  005737  002340                     TST     DRVBAD          ;SYSTEM OK??
     070400  001402                             BEQ     64$             ;TAKE BRANCH IF SO
     070402  104432                             TRAP    C$EXIT
     070404  001526                             .WORD   L10071-.
     070406                             64$:

                                                ;CLEAR ATTENTION BITS FOR BOTH PORTS

     070406  113777  002246  111766             MOVB    PORTA,@RPCS2    ;SELECT PORT #A
     070414  005077  111764                     CLR     @RPDS           ;SEIZE THE DRIVE
     070420  012777  000011  111744             MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
     070426  012777  000013  111736             MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

     070434  005037  002304                     CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
     070440  012737  000050  002306             MOV     #40.,WATCH      ;SET WATCH TO 40. MS
     070446  005737  002306             65$:    TST     WATCH
     070452  001375                             BNE     65$
     070454  113777  002250  111720             MOVB    PORTB,@RPCS2    ;SELECT PORT #B
     070462  005077  111716                     CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
     070466  012777  000011  111676             MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
     070474  012777  000013  111670             MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

     070502  005037  002304                     CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
     070506  012737  000050  002306             MOV     #40.,WATCH      ;SET WATCH TO 40. MS
     070514  005737  002306             66$:    TST     WATCH
     070520  001375                             BNE     66$
                                        ;;*******************************************************************************

                                                ;SEIZE THE DRIVE THROUGH PORT A

     070522  113777  002246  111652             MOVB    PORTA,@RPCS2    ;SELECT PORT A
     070530  013737  002246  002270             MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
     070536  005077  111642                     CLR     @RPDS           ;WRITE RPDS

     070542  013737  002250  002272             MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
                                        ;;*******************************************************************************
                                        ;FORCE AN ATTENTION BY SETTING ERRORS.

     070550  012777  000003  111614             MOV     #3,@RPCS1       ;SET ILF ERROR bit
```

```
                                        ;START THE TIMER

070556  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
070562  012737  002342  002306          MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
070570  113777  002250  111604          MOVB    PORTB,@RPCS2      ;SELECT PORT B
070576  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                ;;**************************************************************************
                                ;WAIT FOR DRIVE TO TIMEOUT

070604  005777  111574          1$:     TST     @RPDS           ;WAIT FOR THE DRIVE TO BE RELEASED
070610  001017                          BNE     2$              ;BR IF DRIVE RELEASED
070612  005737  002306                  TST     WATCH           ;WATCH AT ZERO ?
070616  001372                          BNE     1$              ;BR IF NOT
070620  104456                          TRAP    C$ERHRD
070622  000032                          .WORD   26
070624  010177                          .WORD   EM36
070626  013320                          .WORD   ERR11
070630  012746  003716                  MOV     #FRMT17,-(SP)
070634  012746  000001                  MOV     #1,-(SP)
070640  010600                          MOV     SP,R0
070642  104414                          TRAP    C$PNTB
070644  062706  000004                  ADD     #4,SP
070650                          2$:
070650  113777  002246  111524          MOVB    PORTA,@RPCS2      ;SELECT PORT A
070656  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                ;;**************************************************************************
                                ;THE ERROR BIT ('ERR') IN RPDS SHOULD STILL BE SET

070664  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
070670  017737  111510  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
070676  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
070704  012737  040000  002336          MOV     #ERR,EXPTED     ;;;WHAT REGISTER SHOULD BE
070712  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
070720  042737  137777  002342          BIC     #^CERR,TMP0  ;SAVE SPECIFIED BITS
070726  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
070734  001427                          BEQ     69$             ;BR IF OK
070736  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
070744  042737  040000  002352          BIC     #ERR,TMP4       ;CLEAR THE MASKED BITS
070752  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
070760  104456                          TRAP    C$ERHRD
070762  000003                          .WORD   3
070764  007123                          .WORD   EM23
070766  013262                          .WORD   ERR10
070770  012746  003716                  MOV     #FRMT17,-(SP)
070774  012746  000001                  MOV     #1,-(SP)
071000  010600                          MOV     SP,R0
071002  104414                          TRAP    C$PNTB
071004  062706  000004                  ADD     #4,SP
071010  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
071014                          69$:
                                ;;**************************************************************************
                                ;THE ERROR REGISTER SHOULD CONTAIN ILF BIT

071014  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
071020  017737  111362  002332          MOV     @RPER1,BADDAT  ;GET CONTENTS OF RPER1
071026  013737  002406  002334          MOV     RPER1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
```

TEST 27 TEST THAT PORT 'A' TIMEOUT DOES NOT RESET DRIVE

```
071034  012737  000001  002336          MOV     #1,EXPTED       ;;;WHAT REGISTER SHOULD BE
071042  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
071050  001416                          BEQ     71$             ;BR IF OK
071052  104456                          TRAP    C$ERHRD
071054  000004                          .WORD   4
071056  006146                          .WORD   EM10
071060  012654                          .WORD   ERR3
071062  012746  003716                  MOV     #FRMT17,-(SP)
071066  012746  000001                  MOV     #1,-(SP)
071072  010600                          MOV     SP,R0
071074  104414                          TRAP    C$PNTB
071076  062706  000004                  ADD     #4,SP
071102  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
071106                          71$:
                                ;;**************************************************************************************
                                ;THE ATTENTION BIT FOR PORT A SHOULD STILL BE SET

071106  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
071112  017737  111266  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
071120  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
071126  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
071134  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
071142  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
071150  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
071156  001427                          BEQ     73$             ;BR IF OK
071160  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
071166  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
071174  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
071202  104456                          TRAP    C$ERHRD
071204  000003                          .WORD   3
071206  010374                          .WORD   EM41
071210  013262                          .WORD   ERR10
071212  012746  003716                  MOV     #FRMT17,-(SP)
071216  012746  000001                  MOV     #1,-(SP)
071222  010600                          MOV     SP,R0
071224  104414                          TRAP    C$PNTB
071226  062706  000004                  ADD     #4,SP
071232  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
071236                          73$:
                                ;;**************************************************************************************

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

071236  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
071242  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
071250  012737  051700  002336          MOV     #51700,EXPTED  ;COMPARSION CONSTANT
071256  113777  002246  111116          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
071264  017737  111114  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
071272  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
071300  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
071306  042737  '00100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
071314  113777  002250  111060          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
071322  017737  111056  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
071330  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
071336  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
071344  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
071352  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
```

```
071360  001021                          BNE     75$             ;BR IF NOT
071362  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
071366  001073                          BNE     77$             ;BR IF NOT
071370  104456                          TRAP    C$ERHRD
071372  000006                          .WORD   6
071374  010751                          .WORD   EM46
071376  013534                          .WORD   ERR15
071400  012746  003716                  MOV     #FRMT17,-(SP)
071404  012746  000001                  MOV     #1,-(SP)
071410  010600                          MOV     SP,R0
071412  104414                          TRAP    C$PNTB
071414  062706  000004                  ADD     #4,SP
071420  000137  071722                  JMP     79$             ;BYPASS THE REST OF THE CHECKS
071424  013737  002346  002332  75$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
071432  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
071440  113777  002250  110734          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
071446  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
071452  001414                          BEQ     76$             ;BR IF ZERO
071454  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
071462  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
071470  113777  002246  110704          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
071476  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
071502  001025                          BNE     77$             ;BR IF NOT
071504  012737  177777  002302  76$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
071512  012777  000011  110652          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
071520  012777  000013  110644          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
071526  104456                          TRAP    C$ERHRD
071530  000011                          .WORD   9
071532  007313                          .WORD   EM26
071534  013214                          .WORD   ERR9
071536  012746  003716                  MOV     #FRMT17,-(SP)
071542  012746  000001                  MOV     #1,-(SP)
071546  010600                          MOV     SP,R0
071550  104414                          TRAP    C$PNTB
071552  062706  000004                  ADD     #4,SP
071556  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
071564  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
071572  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
071600  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
071606  001414                          BEQ     78$             ;BR IF OK FROM PORT A.
071610  104456                          TRAP    C$ERHRD
071612  000013                          .WORD   11
071614  006072                          .WORD   EM7
071616  013000                          .WORD   ERR5
071620  012746  003471                  MOV     #FRMT14,-(SP)
071624  012746  000001                  MOV     #1,-(SP)
071630  010600                          MOV     SP,R0
071632  104414                          TRAP    C$PNTB
071634  062706  000004                  ADD     #4,SP
071640  013737  002350  002332  78$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
071646  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
071654  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
071662  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
071670  001414                          BEQ     79$             ;BR IF OK
071672  104456                          TRAP    C$ERHRD
071674  000014                          .WORD   12
071676  006072                          .WORD   EM7
```

```
071700  013000                          .WORD   ERR5
071702  012746  003522                  MOV     #FRMT15,-(SP)
071706  012746  000001                  MOV     #1,-(SP)
071712  010600                          MOV     SP,R0
071714  104414                          TRAP    C$PNTB
071716  062706  000004                  ADD     #4,SP
071722                          79$:
                                ;;*************************************************************************
                                ;THE ATTENTION BIT FOR PORT B SHOULD NOT BE SET

071722  113777  002250  110452          MOVB    PORTB,@RPCS2        ;SELECT PORT B
071730  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
071736  005037  002276                  CLR     CKERR               ;CLEAR THE 'CHECK ERROR' INDICATOR
071742  017737  110436  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
071750  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
071756  005037  002336                  CLR     EXPTED              ;WHAT REGISTER SHOULD BE
071762  013737  002332  002342          MOV     BADDAT,TMP0         ;MOVE REGISTER CONTENTS TO 'TMP0'
071770  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
071776  023737  002336  002342          CMP     EXPTED,TMP0         ;COMPARE THE BITS
072004  001427                          BEQ     80$                 ;BR IF OK
072006  013737  002332  002352          MOV     BADDAT,TMP4         ;COPY 'BAD DATA'
072014  042737  100000  002352          BIC     #ATA,TMP4           ;CLEAR THE MASKED BITS
072022  053737  002352  002336          BIS     TMP4,EXPTED         ;'OR' WITH GOOD DATA FOR TYPEOUT
072030  104456                          TRAP    C$ERHRD
072032  000003                          .WORD   3
072034  011257                          .WORD   EM52
072036  040000                          .WORD   ERR
072040  012746  003716                  MOV     #FRMT17,-(SP)
072044  012746  000001                  MOV     #1,-(SP)
072050  010600                          MOV     SP,R0
072052  104414                          TRAP    C$PNTB
072054  062706  000004                  ADD     #4,SP
072060  005137  002276                  COM     CKERR               ;SET THE REGISTER COMPARE ERROR INDICATOR
072064                          80$:

                                ;CLEAR ATTENTION BIT FOR PORT A

072064  113777  002246  110310          MOVB    PORTA,@RPCS2  ;SELECT PORT #A
072072  005077  110306                  CLR     @RPDS               ;SEIZE THE DRIVE
072076  012777  000011  110266          MOV     #11,@RPCS1          ;ISSUE DRIVE CLEAR
072104  012777  000013  110260          MOV     #13,@RPCS1          ;RELEASE THE DRIVE

                                ;START THE TIMER

072112  005037  002304                  CLR     TIME                ;CLEAR THE ELAPSED TIME COUNTER
072116  012737  000050  002306          MOV     #40.,WATCH          ;SET WATCH TO 40. MS
072124  005737  002306          82$:    TST     WATCH
072130  001375                          BNE     82$
121 072132                      L10071:
072132  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 28 TEST THAT PORT 'B' TIMEOUT DOES NOT RESET DRIVE
                                        ;
                                        ;*VERIFY THAT PORT TIMEOUT DOES NOT INITIALIZE THE DRIVE.
                                        ;*
                                        ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                        ;*
                                        ;*  B.  WRITE 1'S INTO RPER1 THROUGH PORT 'B'.
                                        ;*
                                        ;*  C.  WAIT FOR THE DRIVE TO TIMEOUT.  VERIFY THAT THE DRIVE RETURNED TO
                                        ;*      NEUTRAL; THAT ATTENTION IS SET FOR PORT 'B' AND IS NOT SET FOR
                                        ;*      PORT 'A'; AND THAT BOTH PORTS SEE 1'S IN THE ERROR REGISTER.
                                        ;*
                                        ;
072134                                  T28::
072134  005737  002340                          TST     DRVBAD          ;SYSTEM OK??
072140  001402                                  BEQ     64$             ;TAKE BRANCH IF SO
072142  104432                                  TRAP    C$EXIT
072144  001526                                  .WORD   L10072-.
072146                                  64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
072146  113777  002246  110226                  MOVB    PORTA,@RPCS2    ;SELECT PORT #A
072154  005077  110224                          CLR     @RPDS           ;SEIZE THE DRIVE
072160  012777  000011  110204                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
072166  012777  000013  110176                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
072174  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
072200  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
072206  005737  002306          65$:    TST     WATCH
072212  001375                                  BNE     65$
072214  113777  002250  110160                  MOVB    PORTB,@RPCS2    ;SELECT PORT #B
072222  005077  110156                          CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
072226  012777  000011  110136                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
072234  012777  000013  110130                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
072242  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
072246  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
072254  005737  002306          66$:    TST     WATCH
072260  001375                                  BNE     66$
                                        ;;**************************************************************************
                                        ;SEIZE THE DRIVE THROUGH PORT B
072262  113777  002250  110112                  MOVB    PORTB,@RPCS2    ;SELECT PORT B
072270  013737  002250  002270                  MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
072276  005077  110102                          CLR     @RPDS           ;WRITE RPDS
072302  013737  002246  002272                  MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
                                        ;;**************************************************************************
                                        ;FORCE AN ATTENTION BY SETTING ERRORS.
072310  012777  000003  110054                  MOV     #3,@RPCS1       ;SET ILF ERROR BIT
```

```
                                        ;START THE TIMER

072316  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
072322  012737  002342  002306                MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
072330  113777  002246  110044                MOVB    PORTA,@RPCS2      ;SELECT PORT A
072336  013737  002246  002266                MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                    ;;**********************************************************************
                                    ;WAIT FOR DRIVE TO TIMEOUT

072344  005777  110034          1$:   TST     @RPDS           ;WAIT FOR THE DRIVE TO BE RELEASED
072350  001017                        BNE     2$              ;BR IF DRIVE RELEASED
072352  005737  002306                TST     WATCH           ;WATCH AT ZERO ?
072356  001372                        BNE     1$              ;BR IF NOT
072360  104456                        TRAP    C$ERHRD
072362  000032                        .WORD   26
072364  010177                        .WORD   EM36
072366  013320                        .WORD   ERR11
072370  012746  003716                MOV     #FRMT17,-(SP)
072374  012746  000001                MOV     #1,-(SP)
072400  010600                        MOV     SP,R0
072402  104414                        TRAP    C$PNTB
072404  062706  000004                ADD     #4,SP
072410                          2$:
072410  113777  002250  107764                MOVB    PORTB,@RPCS2      ;SELECT PORT B
072416  013737  002250  002266                MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                    ;;**********************************************************************
                                    ;THE ERROR BIT ('ERR') IN RPDS SHOULD STILL BE SET

072424  005037  002276                        CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
072430  017737  107750  002332                MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
072436  013737  002404  002334                MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
072444  012737  040000  002336                MOV     #ERR,EXPTED     ;;;WHAT REGISTER SHOULD BE
072452  013737  002332  002342                MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
072460  042737  137777  002342                BIC     #^CERR,TMP0  ;SAVE SPECIFIED BITS
072466  023737  002336  002342                CMP     EXPTED,TMP0     ;COMPARE THE BITS
072474  001427                        BEQ     69$             ;BR IF OK
072476  013737  002332  002352                MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
072504  042737  040000  002352                BIC     #ERR,TMP4       ;CLEAR THE MASKED BITS
072512  053737  002352  002336                BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
072520  104456                        TRAP    C$ERHRD
072522  000003                        .WORD   3
072524  007123                        .WORD   EM23
072526  013262                        .WORD   ERR10
072530  012746  003716                MOV     #FRMT17,-(SP)
072534  012746  000001                MOV     #1,-(SP)
072540  010600                        MOV     SP,R0
072542  104414                        TRAP    C$PNTB
072544  062706  000004                ADD     #4,SP
072550  005137  002276                COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
072554                          69$:
                                    ;;**********************************************************************
                                    ;THE ERROR REGISTER SHOULD CONTAIN ILF BIT

072554  005037  002276                        CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
072560  017737  107622  002332                MOV     @RPER1,BADDAT  ;GET CONTENTS OF RPER1
072566  013737  002406  002334                MOV     RPER1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
```

TEST 28 TEST THAT PORT 'B' TIMEOUT DOES NOT R^SET DRIVE

```
072574  012737  000001  002336          MOV     #1,EXPTED       ;;;WHAT REGISTER SHOULD BE
072602  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
072610  001416                          BEQ     71$             ;BR IF OK
072612  104456                          TRAP    C$ERHRD
072614  000004                          .WORD   4
072616  006146                          .WORD   EM10
072620  012654                          .WORD   ERR3
072622  012746  003716                  MOV     #FRMT17,-(SP)
072626  012746  000001                  MOV     #1,-(SP)
072632  010600                          MOV     SP,R0
072634  104414                          TRAP    C$PNTB
072636  062706  000004                  ADD     #4,SP
072642  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
072646                          71$:
                                ;;**************************************************************************
                                ;THE ATTENTION BIT FOR PORT B SHOULD STILL BE SET

072646  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
072652  017737  107526  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
072660  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
072666  012737  100000  002336          MOV     #ATA,EXPTED     ;;;WHAT REGISTER SHOULD BE
072674  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
072702  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
072710  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
072716  001427                          BEQ     73$             ;BR IF OK
072720  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
072726  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
072734  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
072742  104456                          TRAP    C$ERHRD
072744  000003                          .WORD   3
072746  010374                          .WORD   EM41
072750  013262                          .WORD   ERR10
072752  012746  003716                  MOV     #FRMT17,-(SP)
072756  012746  000001                  MOV     #1,-(SP)
072762  010600                          MOV     SP,R0
072764  104414                          TRAP    C$PNTB
072766  062706  000004                  ADD     #4,SP
072772  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
072776                          73$:
                                ;;**************************************************************************

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

072776  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
073002  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
073010  012737  051700  002336          MOV     #51700,EXPTED  ;COMPARSION CONSTANT
073016  113777  002246  107356          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
073024  017737  107354  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
073032  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
073040  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
073046  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
073054  113777  002250  107320          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
073062  017737  107316  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
073070  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
073076  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
073104  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
073112  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
```

```
073120  001021                                  BNE     75$             ;BR IF NOT
073122  005737  002342                          TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
073126  001073                                  BNE     77$             ;BR IF NOT
073130  104456                                  TRAP    C$ERHRD
073132  000006                                  .WORD   6
073134  010751                                  .WORD   EM46
073136  013534                                  .WORD   ERR15
073140  012746  003716                          MOV     #FRMT17,-(SP)
073144  012746  000001                          MOV     #1,-(SP)
073150  010600                                  MOV     SP,R0
073152  104414                                  TRAP    C$PNTB
073154  062706  000004                          ADD     #4,SP
073160  000137  073462                          JMP     79$             ;BYPASS THE REST OF THE CHECKS
073164  013737  002346  002332  75$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
073172  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
073200  113777  002250  107174          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
073206  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
073212  001414                          BEQ     76$             ;BR IF ZERO
073214  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
073222  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
073230  113777  002246  107144          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
073236  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
073242  001025                          BNE     77$             ;BR IF NOT
073244  012737  177777  002302  76$:    MOV     #-1,RELERR      ;SET 'RELEASE FRROR' INDICATOR
073252  012777  000011  107112          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
073260  012777  000013  107104          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
073266  104456                          TRAP    C$ERHRD
073270  000011                          .WORD   9
073272  007313                          .WORD   EM26
073274  013214                          .WORD   ERR9
073276  012746  003716                  MOV     #FRMT17,-(SP)
073302  012746  000001                  MOV     #1,-(SP)
073306  010600                          MOV     SP,R0
073310  104414                          TRAP    C$PNTB
073312  062706  000004                  ADD     #4,SP
073316  013737  002346  002332  77$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
073324  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
073332  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
073340  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
073346  001414                          BEQ     78$             ;BR IF OK FROM PORT A.
073350  104456                          TRAP    C$ERHRD
073352  000013                          .WORD   11
073354  006072                          .WORD   EM7
073356  013000                          .WORD   ERR5
073360  012746  003471                  MOV     #FRMT14,-(SP)
073364  012746  000001                  MOV     #1,-(SP)
073370  010600                          MOV     SP,R0
073372  104414                          TRAP    C$PNTB
073374  062706  000004                  ADD     #4,SP
073400  013737  002350  002332  78$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
073406  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
073414  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
073422  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
073430  001414                          BEQ     79$             ;BR IF OK
073432  104456                          TRAP    C$ERHRD
073434  000014                          .WORD   12
073436  006072                          .WORD   EM7
```

```
073440  013000                          .WORD   ERR5
073442  012746  003522                  MOV     #FRMT15,-(SP)
073446  012746  000001                  MOV     #1,-(SP)
073452  010600                          MOV     SP,R0
073454  104414                          TRAP    C$PNTB
073456  062706  000004                  ADD     #4,SP
073462                          79$:
                                ;;*****************************************************************************
                                ;THE ATTENTION BIT FOR PORT A SHOULD NOT BE SET

073462  113777  002246  106712          MOVB    PORTA,@RPCS2        ;SELECT PORT A
073470  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
073476  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
073502  017737  106676  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
073510  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
073516  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
073522  013737  002332  002342          MOV     BADDAT,TMP0     ;MOVE REGISTER CONTENTS TO 'TMP0'
073530  042737  077777  002342          BIC     #^CATA,TMP0  ;SAVE SPECIFIED BITS
073536  023737  002336  002342          CMP     EXPTED,TMP0     ;COMPARE THE BITS
073544  001427                          BEQ     80$             ;BR IF OK
073546  013737  002332  002352          MOV     BADDAT,TMP4     ;COPY 'BAD DATA'
073554  042737  100000  002352          BIC     #ATA,TMP4       ;CLEAR THE MASKED BITS
073562  053737  002352  002336          BIS     TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
073570  104456                          TRAP    C$ERHRD
073572  000003                          .WORD   3
073574  011257                          .WORD   EM52
073576  040000                          .WORD   ERR
073600  012746  003716                  MOV     #FRMT17,-(SP)
073604  012746  000001                  MOV     #1,-(SP)
073610  010600                          MOV     SP,R0
073612  104414                          TRAP    C$PNTB
073614  062706  000004                  ADD     #4,SP
073620  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
073624                          80$:

                                ;CLEAR ATTENTION BIT FOR PORT B

073624  113777  002250  106550          MOVB    PORTB,@RPCS2  ;SELECT PORT #B
073632  005077  106546                  CLR     @RPDS           ;SEIZE THE DRIVE
073636  012777  000011  106526          MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
073644  012777  000013  106520          MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                ;START THE TIMER

073652  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
073656  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
073664  005737  002306          82$:    TST     WATCH
073670  001375                          BNE     82$
22 073672                       L10072:
073672  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 29 PORT 'A' RETRIGGER BY DEMAND
                                        ;
                                        ;*VERIFY THAT THE PORT TIMEOUT ONE-SHOT CAN BE RETRIGGERED BY MASSBUS DEMAND.
                                        ;*
                                        ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                        ;*
                                        ;*  B.  WAIT 500 MS AND READ RPDS THROUGH PORT 'A'.
                                        ;*
                                        ;*  C.  VERIFY THAT THE TIMEOUT OCCURS WITHIN + OR - 25% OF THE SPECIFIED
                                        ;*      TIME.  (THE MEASUREMENT IS MADE FROM STEP 'B'.)
                                        ;*
                                        ;*  D.  VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION
                                        ;*      BIT IS SET.
                                        ;*
                                        ;
073674                                  T29::
073674  005737  002340                          TST     DRVBAD          ;SYSTEM OK?
073700  001402                                BEQ     64$             ;TAKE BRANCH IF SO
073702  104432                                TRAP    C$EXIT
073704  001010                                .WORD   L10073-.
073706                                  64$:
                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS
073706  113777  002246  106466                MOVB    PORTA,@RPCS2    ;SELECT PORT #A
073714  005077  106464                        CLR     @RPDS           ;SEIZE THE DRIVE
073720  012777  000011  106444                MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
073726  012777  000013  106436                MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
073734  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
073740  012737  000050  002306                MOV     #40.,WATCH      ;SET WATCH TO 40. MS
073746  005737  002306                65$:    TST     WATCH
073752  001375                                BNE     65$
073754  113777  002250  106420                MOVB    PORTB,@RPCS2    ;SELECT PORT #B
073762  005077  106416                        CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
073766  012777  000011  106376                MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
073774  012777  000013  106370                MOV     #13,@RPCS1      ;RELEASE THE DRIVE
                                        ;START THE TIMER
074002  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
074006  012737  000050  002306                MOV     #40.,WATCH      ;SET WATCH TO 40. MS
074014  005737  002306                66$:    TST     WATCH
074020  001375                                BNE     66$
                                        ;;*************************************************************************
                                        ;SEIZE THE DRIVE THROUGH PORT A
074022  113777  002246  106352                MOVB    PORTA,@RPCS2    ;SELECT PORT A
074030  013737  002246  002270                MOV     PORTA,SEIZPT    ;STORE SEIZING PORT'S ADDRESS
074036  005077  106342                        CLR     @RPDS           ;WRITE RPDS
074042  013737  002250  002272                MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
                                        ;;*************************************************************************
                                        ;WAIT 500 MS
```

TEST 29 PORT 'A' RETRIGGER BY DEMAND

```
                                        ;START THE TIMER

074050  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
074054  012737  000764  002306          MOV     #500.,WATCH     ;SET WATCH TO 500. MS
074062  005737  002306          1$:     TST     WATCH           ;WATCH EQUAL TO ZERO
074066  001375                  BNE     1$              ;BR IF NOT

                                        ;START THE TIMER

074070  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
074074  012737  002342  002306          MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
                                ;;**************************************************************************
                                ;RETRIGGER THE TIMEOUT ONE-SHOT

074102  005777  106276                  TST     @RPDS           ;RETRIGGER THE ONE-SHOT
074106  113777  002250  106266          MOVB    PORTB,@RPCS2      ;SELECT PORT B
074114  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
074122  005777  106256          2$:     TST     @RPDS           ;WAIT FOR TIMEOUT
074126  001017                  BNE     3$              ;BR IF TIMEOUT OCCURRED
074130  005737  002306                  TST     WATCH           ;WATCH EQUAL TO ZERO ?
074134  001372                  BNE     2$              ;BR IF NOT
074136  104456                  TRAP    C$ERHRD
074140  000033                  .WORD   27
074142  010177                  .WORD   EM36
074144  013320                  .WORD   ERR11
074146  012746  003716          MOV     #FRMT17,-(SP)
074152  012746  000001          MOV     #1,-(SP)
074156  010600                  MOV     SP,R0
074160  104414                  TRAP    C$PNTB
074162  062706  000004          ADD     #4,SP
074166  013737  002304  002324  3$:     MOV     TIME,TIMES      ;SAVE THE ELAPSED TIME VALUE

                                ;;**************************************************************************

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

074174  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
074200  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
074206  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
074214  113777  002246  106160          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
074222  017737  106156  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
074230  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
074236  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
074244  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
074252  113777  002250  106122          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
074260  017737  106120  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
074266  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
074274  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
074302  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
074310  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
074316  001021                  BNE     69$             ;BR IF NOT
074320  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
074324  001073                  BNE     71$             ;BR IF NOT
074326  104456                  TRAP    C$ERHRD
074330  000006                  .WORD   6
```

TEST 29 PORT 'A' RETRIGGER BY DEMAND

```
074332  010751                          .WORD   EM46
074334  013534                          .WORD   ERR15
074336  012746  003716                  MOV     #FRMT17,-(SP)
074342  012746  000001                  MOV     #1,-(SP)
074346  010600                          MOV     SP,R0
074350  104414                          TRAP    C$PNTB
074352  062706  000004                  ADD     #4,SP
074356  000137  074644                  JMP     73$             ;BYPASS THE REST OF THE CHECKS
074362  013737  002346  002332  69$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
074370  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
074376  113777  002250  105776          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
074404  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
074410  001414                          BEQ     70$             ;BR IF ZERO
074412  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
074420  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
074426  113777  002246  105746          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
074434  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
074440  001025                          BNE     71$             ;BR IF NOT
074442  012737  177777  002302  70$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
074450  012777  000011  105714          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
074456  012777  000013  105706          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
074464  104456                          TRAP    C$ERHRD
074466  000010                          .WORD   8
074470  007400                          .WORD   EM27
074472  000000                          .WORD   0
074474  012746  003716                  MOV     #FRMT17,-(SP)
074500  012746  000001                  MOV     #1,-(SP)
074504  010600                          MOV     SP,R0
074506  104414                          TRAP    C$PNTB
074510  062706  000004                  ADD     #4,SP
074514  013737  002346  002332  71$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
074522  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
074530  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
074536  001414                          BEQ     72$             ;BR IF OK FROM PORT A.
074540  104456                          TRAP    C$ERHRD
074542  000013                          .WORD   11
074544  006072                          .WORD   EM7
074546  013000                          .WORD   ERR5
074550  012746  003471                  MOV     #FRMT14,-(SP)
074554  012746  000C01                  MOV     #1,-(SP)
074560  010600                          MOV     SP,R0
074562  104414                          TRAP    C$PNTB
074564  062706  000004                  ADD     #4,SP
074570  013737  002350  002332  72$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
074576  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
074604  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
074612  001414                          BEQ     73$             ;BR IF OK
074614  104456                          TRAP    C$ERHRD
074616  000014                          .WORD   12
074620  006072                          .WORD   EM7
074622  013000                          .WORD   ERR5
074624  012746  003522                  MOV     #FRMT15,-(SP)
074630  012746  000001                  MOV     #1,-(SP)
074634  010600                          MOV     SP,R0
074636  104414                          TRAP    C$PNTB
074640  062706  000004                  ADD     #4,SP
074644                          73$:
```

```
                                        ;;*************************************************************************************
                                        ;CHECK THE TIME FROM RETRIGGER TO TIMEOUT

     074644  023737  002324  002312            CMP     TIMES,TIMEAP    ;MEASURED TIME GREATER THAN +25% TOLERANCE ?
     074652  003020                            BGT     4$              ;BR IF GREATER
     074654  023737  002324  002314            CMP     TIMES,TIMEAM    ;MEASURED TIME LESS THAN -25% TOLERANCE
     074662  002014                            BGE     4$              ;BR IF NOT
     074664  104456                            TRAP    C$ERHRD
     074666  000034                            .WORD   28
     074670  007250                            .WORD   EM25
     074672  013320                            .WORD   ERR11
     074674  012746  003471                    MOV     #FRMT14,-(SP)
     074700  012746  000001                    MOV     #1,-(SP)
     074704  010600                            MOV     SP,R0
     074706  104414                            TRAP    C$PNTB
     074710  062706  000004                    ADD     #4,SP
     074714                          4$:
 116 074714                          L10073:
     074714  104401                            TRAP    C$ETST
```

TEST 30 PORT 'B' RETRIGGER BY DEMAND

```
                                        .SBTTL  TEST 30 PORT 'B' RETRIGGER BY DEMAND
                                        ;
                                        ;*VERIFY THAT THE PORT TIMEOUT ONE-SHOT CAN BE RETRIGGERED BY MASSBUS DEMAND.
                                        ;*
                                        ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                        ;*
                                        ;*  B.  WAIT 500 MS AND WRITE 0'B INTO RPDS THROUGH PORT 'A'.
                                        ;*
                                        ;*  C.  VERIFY THAT THE TIMEOUT OCCURS WITHIN + OR - 25% OF THE SPECIFIED
                                        ;*      TIME.  (THE MEASUREMENT IS MADE FROM STEP 'B'.)
                                        ;*
                                        ;*  D.  VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AND THAT NEITHER ATTE! TION
                                        ;*      BIT IS SET.
                                        ;*
                                        T30::
074716  005737  002340                          TST     DRVBAD          ;SYSTEM OK?
074722  001402                                BEQ     64$             ;TAKE BRANCH IF SO
074724  104432                                TRAP    C$EXIT
074726  001010                                .WORD   L10074-.
074730                                  64$:
                                                ;CLEAR ATTENTION BITS FOR BOTH PORTS

074730  113777  002246  105444                  MOVB    PORTA,@RPCS2    ;SELECT PORT #A
074736  005077  105442                          CLR     @RPDS           ;SEIZE THE DRIVE
074742  012777  000011  105422                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
074750  012777  000013  105414                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

074756  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
074762  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
074770  005737  002306          65$:            TST     WATCH
074774  001375                                BNE     65$
074776  113777  002250  105376                  MOVB    PORTB,@RPCS2    ;SELECT PORT #B
075004  005077  105374                          CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
075010  012777  000011  105354                  MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
075016  012777  000013  105346                  MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

075024  005037  002304                          CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
075030  012737  000050  002306                  MOV     #40.,WATCH      ;SET WATCH TO 40. MS
075036  005737  002306          66$:            TST     WATCH
075042  001375                                BNE     66$
                                        ;;**************************************************************************************

                                                ;SEIZE THE DRIVE THRCUGH PORT B

075044  113777  002250  105330                  MOVB    PORTB,@RPCS2    ;SELECT PORT B
075052  013737  002250  002270                  MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
075060  005077  105320                          CLR     @RPDS           ;WRITE RPDS

075064  013737  002246  002272                  MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
                                        ;;**************************************************************************************
                                        ;WAIT 500 MS
```

```
                                        ;START THE TIMER

075072  005037  002304                    CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
075076  012737  000764  002306            MOV     #500.,WATCH     ;SET WATCH TO 500. MS
075104  005737  002306          1$:       TST     WATCH           ;WATCH EQUAL TO ZERO
075110  001375                            BNE     1$              ;BR IF NOT

                                        ;START THE TIMER

075112  005037  002304                    CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
075116  012737  002342  002306            MOV     #1250.,WATCH    ;SET WATCH TO 1250. MS
                                ;;**************************************************************************
                                ;RETRIGGER THE TIMEOUT ONE-SHOT

075124  005777  105254                    TST     @RPDS           ;RETRIGGER THE ONE-SHOT
075130  113777  002246  105244            MOVB    PORTA,@RPCS2      ;SELECT PORT A
075136  013737  002246  002266            MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
075144  005777  105234          2$:       TST     @RPDS           ;WAIT FOR TIMEOUT
075150  001017                            BNE     3$              ;BR IF TIMEOUT OCCURRED
075152  005737  002306                    TST     WATCH           ;WATCH EQUAL TO ZERO ?
075156  001372                            BNE     2$              ;BR IF NOT
075160  104456                            TRAP    C$ERHRD
075162  000033                            .WORD   27
075164  010177                            .WORD   EM36
075166  013320                            .WORD   ERR11
075170  012746  003716                    MOV     #FRMT17,-(SP)
075174  012746  000001                    MOV     #1,-(SP)
075200  010600                            MOV     SP,R0
075202  104414                            TRAP    C$PNTB
075204  062706  000004                    ADD     #4,SP
075210  013737  002304  002324  3$:       MOV     TIME,TIMES      ;SAVE THE ELAPSED TIME VALUE

                                ;;**************************************************************************

                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

075216  005037  002302                    CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
075222  013737  002404  002334            MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
075230  012737  011700  002336            MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
075236  113777  002246  105136            MOVB    PORTA,@RPCS2    ;SELECT PORT A.
075244  017737  105134  002346            MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
075252  042737  024005  002346            BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
075260  013737  002346  002342            MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
075266  042737  100100  002342            BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
075274  113777  002250  105100            MOVB    PORTB,@RPCS2    ;SELECT PORT B.
075302  017737  105076  002350            MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
075310  042737  024005  002350            BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
075316  013737  002350  002344            MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
075324  042737  100100  002344            BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
075332  023737  002342  002344            CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
075340  001021                            BNE     69$             ;BR IF NOT
075342  005737  002342                    TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
075346  001073                            BNE     71$             ;BR IF NOT
075350  104456                            TRAP    C$ERHRD
075352  000006                            .WORD   6
```

```
075354  010751                          .WORD   EM46
075356  013534                          .WORD   ERR15
075360  012746  003716                  MOV     #FRMT17,-(SP)
075364  012746  000001                  MOV     #1,-(SP)
075370  010600                          MOV     SP,R0
075372  104414                          TRAP    C$PNTB
075374  062706  000004                  ADD     #4,SP
075400  000137  075666                  JMP     73$             ;BYPASS THE REST OF THE CHECKS
075404  013737  002346  002332  69$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
075412  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
075420  113737  002250  104754          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
075426  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
075432  001414                          BEQ     70$             ;BR IF ZERO
075434  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
075442  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
075450  113737  002246  104724          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
075456  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
075462  001025                          BNE     71$             ;BR IF NOT
075464  012737  177777  002302  70$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
075472  012777  000011  104672          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
075500  012777  000013  104664          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
075506  104456                          TRAP    C$ERHRD
075510  000010                          .WORD   8
075512  007400                          .WORD   EM27
075514  000000                          .WORD   0
075516  012746  003716                  MOV     #FRMT17,-(SP)
075522  012746  000001                  MOV     #1,-(SP)
075526  010600                          MOV     SP,R0
075530  104414                          TRAP    C$PNTB
075532  062706  000004                  ADD     #4,SP
075536  013737  002346  002332  71$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
075544  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
075552  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
075560  001414                          BEQ     72$             ;BR IF OK FROM PORT A.
075562  104456                          TRAP    C$ERHRD
075564  000013                          .WORD   11
075566  006072                          .WORD   EM7
075570  013000                          .WORD   ERR5
075572  012746  003471                  MOV     #FRMT14,-(SP)
075576  012746  000001                  MOV     #1,-(SP)
075602  010600                          MOV     SP,R0
075604  104414                          TRAP    C$PNTB
075606  062706  000004                  ADD     #4,SP
075612  013737  002350  002332  72$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
075620  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
075626  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
075634  001414                          BEQ     73$             ;BR IF OK
075636  104456                          TRAP    C$ERHRD
075640  000014                          .WORD   12
075642  006072                          .WORD   EM7
075644  013000                          .WORD   ERR5
075646  012746  003522                  MOV     #FRMT15,-(SP)
075652  012746  000001                  MOV     #1,-(SP)
075656  010600                          MOV     SP,R0
075660  104414                          TRAP    C$PNTB
075662  062706  000004                  ADD     #4,SP
075666                          73$:
```

```
                                        ;;*************************************************************************************
                                        ;CHECK THE TIME FROM RETRIGGER TO TIMEOUT

     075666  023737  002324  002320             CMP     TIMES,TIMEBP    ;MEASURED TIME GREATER THAN +25% TOLERANCE ?
     075674  003020                             BGT     4$              ;BR IF GREATER
     075676  023737  002324  002322             CMP     TIMES,TIMEBM    ;MEASURED TIME LESS THAN -25% TOLERANCE
     075704  002014                             BGE     4$              ;BR IF NOT
     075706  104456                             TRAP    C$ERHRD
     075710  000034                             .WORD   28
     075712  007250                             .WORD   EM25
     075714  013320                             .WORD   ERR11
     075716  012746  003522                     MOV     #FRM[15 -(SP)
     075722  012746  000001                     MOV     #1,-(SP,
     075726  010600                             MOV     SP,R0
     075730  104414                             TRAP    C$PNTB
     075732  062706  000004                     ADD     #4,SP
     075736                          4$:
  24 075736                          L10074:
     075736  104401                             TRAP    C$ETST
```

```
TEST 31 PORT 'A' TIMEOUT/RELEASE

                                        .SBTTL  TEST 31 PORT 'A' TIMEOUT/RELEASE
                                        ;
                                        ;*VERIFY THAT THE TIMEOUT ONE-SHOT IS TRIGGERED WHEN THE DRIVE
                                        ;*      SWITCHES PORTS AND SEIZING PORT PERFORMS NO REGISTER ACCESSES.
                                        ;*
                                        ;*  A.  SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
                                        ;*
                                        ;*  B.  SET PORT REQUEST BY WRITING 0'S INTO RPDS FROM PORT 'A'.
                                        ;*
                                        ;*  C.  ISSUE A RELEASE COMMAND FROM PORT 'B'.  VERIFY THAT THE DRIVE
                                        ;*      HAS SWITCHED TO THE OTHER PORT AND THAT THE 'ATA' BIT DID NOT
                                        ;*      SET FOR PORT 'B'.  REGISTERS WILL NOT BE CHECKED THROUGH PORT 'A'.
                                        ;*
                                        ;*  D.  WAIT THE TIMEOUT INTERVAL + 25%.  VERIFY THAT THE DRIVE HAS
                                        ;*      BEEN RELEASED.
                                        ;*
                                        ;*  E.  RELEASE THE DRIVE THROUGH PORT 'A'.  VERIFY THAT THE DRIVE
                                        ;*      RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
                                        ;*

 075740                                 T31::
 075740  005737  002340                         TST     DRVBAD          ;SYSTEM OK?
 075744  001402                                BEQ     64$             ;TAKE BRANCH IF SO
 075746  104432                                TRAP    C$EXIT
 075750  001040                                .WORD   L10075-.
 075752                                 64$:

                                                ;CLEAR ATTENTION BITS FOR BOTH PORTS

 075752  113777  002246  104422                MOVB    PORTA,@RPCS2    ;SELECT PORT #A
 075760  005077  104420                        CLR     @RPDS           ;SEIZE THE DRIVE
 075764  012777  000011  104400                MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 075772  012777  000013  104372                MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

 076000  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 076004  012737  000050  002306                MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 076012  005737  002306         65$:           TST     WATCH
 076016  001375                                BNE     65$
 076020  113777  002250  104354                MOVB    PORTB,@RPCS2    ;SELECT PORT #B
 076026  005077  104352                        CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
 076032  012777  000011  104332                MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
 076040  012777  000013  104324                MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                                ;START THE TIMER

 076046  005037  002304                        CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
 076052  012737  000050  002306                MOV     #40.,WATCH      ;SET WATCH TO 40. MS
 076060  005737  002306         66$:           TST     WATCH
 076064  001375                                BNE     66$
                                        ;;**************************************************************************

                                                ;SEIZE THE DRIVE THROUGH PORT B

 076066  113777  002250  104306                MOVB    PORTB,@RPCS2    ;SELECT PORT B
 076074  013737  002250  002270                MOV     PORTB,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
```

TEST 31 PORT 'A' TIMEOUT/RELEASE

```
076102  005077  104276                  CLR     @RPDS           ;WRITE RPDS

076106  013737  002246  002272          MOV     PORTA,OPPRT     ;'OPPOSITE' PORT ADDRESS
076114  113777  002246  104260          MOVB    PORTA,@RPCS2      ;SELECT PORT A
076122  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                        ;;**************************************************************************
                        ;SET REQUEST THROUGH PORT A

076130  005077  104250                  CLR     @RPDS           ;SET REQUEST FOR PORT A
076134  113777  002250  104240          MOVB    PORTB,@RPCS2      ;SELECT PORT B
076142  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                        ;;**************************************************************************
                        ;RELEASE THE DRIVE THROUGH PORT B

076150  012777  000013  104214          MOV     #13,@RPCS1      ;RELEASE DRIVE THROUGH PORT B

                        ;START THE TIMER

076156  005037  002304                  CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
076162  012737  000050  002306          MOV     #40.,WATCH      ;SET WATCH TO 40. MS
076170  005737  002306          69$:    TST     WATCH
076174  001375                  BNE     69$

                        ;;**************************************************************************
                        ;WAIT THE MEASURED TIMEOUT FOR THE PORT (+ 25%)

076176  013737  002312  002306          MOV     TIMEAP,WATCH    ;SET WATCH TO MEASURED TIMEOUT VALUE + 25%

                        ;;**************************************************************************
                        ;VERIFY THAT THE DRIVE IS SEIZED BY PORT A

076204  005037  002276                  CLR     CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
076210  017737  104170  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
076216  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
076224  005037  002336                  CLR     EXPTED          ;WHAT REGISTER SHOULD BE
076230  023737  002336  002332          CMP     EXPTED,BADDAT   ;IS THE REGISTER OK ?
076236  001416                          BEQ     70$             ;BR IF OK
076240  104456                          TRAP    C$ERHRD
076242  000003                          .WORD   3
076244  007553                          .WORD   EM31
076246  013362                          .WORD   ERR12
076250  012746  003716                  MOV     #FRMT17,-(SP)
076254  012746  000001                  MOV     #1,-(SP)
076260  010600                          MOV     SP,R0
076262  104414                          TRAP    C$PNTB
076264  062706  000004                  ADD     #4,SP
076270  005137  002276                  COM     CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
076274                          70$:
076274  005737  002276                  TST     CKERR           ;REGISTER OK ?
076300  001402                          BEQ     .+6             ;BR IF OK
076302  000137  077010                  JMP     1$              ;BYPASS REST OF TEST IF NOT


                        ;WAIT FOR THE TIMER TO RELEASE THE DRIVE
076306  005737  002306                  TST     WATCH           ;WATCH EQUAL ZERO ?
076312  001375                          BNE     .-4             ;BR IF NOT
```

```
                                ;;*****************************************************************************
                                ;CONFIRM THAT THE DRIVE HAS TIMED OUT


                                        ;VERIFY THAT THE DRIVE IS IN NEUTRAL

076314  005037  002302                  CLR     RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
076320  013737  002404  002334          MOV     RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
076326  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
076334  113777  002246  104040          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
076342  017737  104036  002346          MOV     @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
076350  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
076356  013737  002346  002342          MOV     TMP2,TMP0       ;COPY IT INTO 'TMP0'
076364  042737  100100  002342          BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
076372  113777  002250  104002          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
076400  017737  104000  002350          MOV     @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
076406  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
076414  013737  002350  002344          MOV     TMP3,TMP1       ;COPY IT INTO 'TMP1'
076422  042737  100100  002344          BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
076430  023737  002342  002344          CMP     TMP0,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
076436  001021                          BNE     72$             ;BR IF NOT
076440  005737  002342                  TST     TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
076444  001077                          BNE     74$             ;BR IF NOT
076446  104456                          TRAP    C$ERHRD
076450  000006                          .WORD   6
076452  010751                          .WORD   EM46
076454  013534                          .WORD   ERR15
076456  012746  003716                  MOV     #FRMT17,-(SP)
076462  012746  000001                  MOV     #1,-(SP)
076466  010600                          MOV     SP,R0
076470  104414                          TRAP    C$PNTB
076472  062706  000004                  ADD     #4,SP
076476  000137  077010                  JMP     76$             ;BYPASS THE REST OF THE CHECKS
076502  013737  002346  002332  72$:    MOV     TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
076510  013737  002250  002266          MOV     PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
076516  113777  002250  103656          MOVB    PORTB,@RPCS2    ;SELECT PORT B.
076524  005737  002342                  TST     TMP0            ;SEE IF STATUS EQ 0 FROM PORT A.
076530  001414                          BEQ     73$             ;BR IF ZERO
076532  013737  002246  002266          MOV     PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
076540  013737  002350  002332          MOV     TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
076546  113777  002246  103626          MOVB    PORTA,@RPCS2    ;SELECT PORT A.
076554  005737  002344                  TST     TMP1            ;SEE IF STATUS EQ ZERO FROM PORT B.
076560  001031                          BNE     74$             ;BR IF NOT
076562  012737  177777  002302  73$:    MOV     #-1,RELERR      ;SET 'RELEASE ERROR' INDICATOR
076570  012777  000011  103574          MOV     #11,@RPCS1      ;CLEAR THE DRIVE
076576  012777  000013  103566          MOV     #13,@RPCS1      ;RELEASE THE DRIVE
076604  104456                          TRAP    C$ERHRD
076606  000007                          .WORD   7
076610  010106                          .WORD   EM35
076612  013152                          .WORD   ERR8
076614  104456                          TRAP    C$ERHRD
076616  000010                          .WORD   8
076620  010106                          .WORD   EM35
076622  000000                          .WORD   0
076624  012746  003716                  MOV     #FRMT17,-(SP)
076630  012746  000001                  MOV     #1,-(SP)
076634  010600                          MOV     SP,R0
```

```
        076636  104414                          TRAP    C$PNTB
        076640  062706  000004                  ADD     #4,SP
        076644  013737  002346  002332  74$:    MOV     TMP2,BADDAT     ;LOOK FOR BIT FAILURES WHEN RPDS READ
        076652  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
        076660  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
        076666  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
        076674  001414                          BEQ     75$             ;BR IF OK FROM PORT A.
        076676  104456                          TRAP    C$ERHRD
        076700  000013                          .WORD   11
        076702  006072                          .WORD   EM7
        076704  013000                          .WORD   ERR5
        076706  012746  003471                  MOV     #FRMT14,-(SP)
        076712  012746  000001                  MOV     #1,-(SP)
        076716  010600                          MOV     SP,R0
        076720  104414                          TRAP    C$PNTB
        076722  062706  000004                  ADD     #4,SP
        076726  013737  002350  002332  75$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
        076734  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
        076742  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
        076750  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
        076756  001414                          BEQ     76$             ;BR IF OK
        076760  104456                          TRAP    C$ERHRD
        076762  000014                          .WORD   12
        076764  006072                          .WORD   EM7
        076766  013000                          .WORD   ERR5
        076770  012746  003522                  MOV     #FRMT15,-(SP)
        076774  012746  000001                  MOV     #1,-(SP)
        077000  010600                          MOV     SP,R0
        077002  104414                          TRAP    C$PNTB
        077004  062706  000004                  ADD     #4,SP
        077010                          76$:
        077010                          1$:
    118 077010                          L10075:
        077010  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 32 PORT 'B' TIMEOUT/RELEASE
                                ;
                                ;*VERIFY THAT THE TIMEOUT ONE-SHOT IS TRIGGERED WHEN THE DRIVE
                                ;*      SWITCHES PORTS AND SEIZING PORT PERFORMS NO REGISTER ACCESSES.
                                ;*
                                ;*  A.  SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
                                ;*
                                ;*  B.  SET PORT REQUEST BY WRITING 0'S INTO RPDS FROM PORT 'B'.
                                ;*
                                ;*  C.  ISSUE A RELEASE COMMAND FROM PORT 'A'.  VERIFY THAT THE DRIVE
                                ;*      HAS SWITCHED TO THE OTHER PORT AND THAT THE 'ATA' BIT DID NOT
                                ;*      SET FOR PORT 'A'.  REGISTERS WILL NOT BE CHECKED THROUGH PORT 'B'.
                                ;*
                                ;*  D.  WAIT THE TIMEOUT INTERVAL + 25%.  VERIFY THAT THE DRIVE HAS
                                ;*      BEEN RELEASED.
                                ;*

077012                          T32::
022 077012  005737  002340              TST     DRVBAD          ;SYSTEM OK?
    077016  001402                      BEQ     64$             ;TAKE BRANCH IF SO
    077020  104432                      TRAP    C$EXIT
    077022  001040                      .WORD   L10076-.
    077024                      64$:

                                        ;CLEAR ATTENTION BITS FOR BOTH PORTS

    077024  113777  002246  103350      MOVB    PORTA,@RPCS2    ;SELECT PORT #A
    077032  005077  103346              CLR     @RPDS           ;SEIZE THE DRIVE
    077036  012777  000011  103326      MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
    077044  012777  000013  103320      MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                        ;START THE TIMER

    077052  005037  002304              CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
    077056  012737  000050  002306      MOV     #40.,WATCH      ;SET WATCH TO 40. MS
    077064  005737  002306      65$:    TST     WATCH
    077070  001375                      BNE     65$
    077072  113777  002250  103302      MOVB    PORTB,@RPCS2    ;SELECT PORT #B
    077100  005077  103300              CLR     @RPDS           ;SEIZE THE DRIVE THROUGH PORT 'B'
    077104  012777  000011  103260      MOV     #11,@RPCS1      ;ISSUE DRIVE CLEAR
    077112  012777  000013  103252      MOV     #13,@RPCS1      ;RELEASE THE DRIVE

                                        ;START THE TIMER

    077120  005037  002304              CLR     TIME            ;CLEAR THE ELAPSED TIME COUNTER
    077124  012737  000050  002306      MOV     #40.,WATCH      ;SET WATCH TO 40. MS
    077132  005737  002306      66$:    TST     WATCH
    077136  001375                      BNE     66$
                                ;;**************************************************************************

                                        ;SEIZE THE DRIVE THROUGH PORT A

    077140  113777  002246  103234      MOVB    PORTA,@RPCS2    ;SELECT PORT A
    077146  013737  002246  002270      MOV     PORTA,SEIZPT  ;STORE SEIZING PORT'S ADDRESS
    077154  005077  103224              CLR     @RPDS           ;WRITE RPDS

    077160  013737  002250  002272      MOV     PORTB,OPPRT     ;'OPPOSITE' PORT ADDRESS
```

TEST 32 PORT 'B' TIMEOUT/RELEASE

```
077166  113777  002250  103206          MOVB    PORTB,@RPCS2        ;SELECT PORT B
077174  013737  002250  002266          MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                ;;*************************************************************************
                                ;SET REQUEST THROUGH PORT B

077202  005077  103176                  CLR     @RPDS               ;SET REQUEST FOR PORT B
077206  113777  002246  103166          MOVB    PORTA,@RPCS2        ;SELECT PORT A
077214  013737  002246  002266          MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
                                ;;*************************************************************************
                                ;RELEASE THE DRIVE THROUGH PORT A

077222  012777  000013  103142          MOV     #13,@RPCS1          ;RELEASE DRIVE THROUGH PORT A

                                        ;START THE TIMER

077230  005037  002304                  CLR     TIME                ;CLEAR THE ELAPSED TIME COUNTER
077234  012737  000050  002306          MOV     #40.,WATCH          ;SET WATCH TO 40. MS
077242  005737  002306          69$:    TST     WATCH
077246  001375                  BNE     69$

                                ;;*************************************************************************
                                ;WAIT THE MEASURED TIMEOUT FOR THE PORT (+ 25%)

077250  013737  002320  002306          MOV     TIMEBP,WATCH        ;SET WATCH TO MEASURED TIMEOUT VALUE + 25%

                                ;;*************************************************************************
                                ;VERIFY THAT THE DRIVE IS SEIZED BY PORT B

077256  005037  002276                  CLR     CKERR               ;CLEAR THE 'CHECK ERROR' INDICATOR
077262  017737  103116  002332          MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
077270  013737  002404  002334          MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
077276  005037  002336                  CLR     EXPTED              ;WHAT REGISTER SHOULD BE
077302  023737  002336  002332          CMP     EXPTED,BADDAT       ;IS THE REGISTER OK ?
077310  001416                  BEQ     70$                 ;BR IF OK
077312  104456                  TRAP    C$ERHRD
077314  000003                  .WORD   3
077316  007553                  .WORD   EM31
077320  013362                  .WORD   ERR12
077322  012746  003716          MOV     #FRMT17,-(SP)
077326  012746  000001          MOV     #1,-(SP)
077332  010600                  MOV     SP,R0
077334  104414                  TRAP    C$PNTB
077336  062706  000004          ADD     #4,SP
077342  005137  002276          COM     CKERR               ;SET THE REGISTER COMPARE ERROR INDICATOR
077346                  70$:
077346  005737  002276          TST     CKERR               ;REGISTER OK ?
077352  001402                  BEQ     .+6                 ;BR IF OK
077354  000137  100062          JMP     1$                  ;BYPASS REST OF TEST IF NOT


                                ;WAIT FOR THE TIMER TO RELEASE THE DRIVE
077360  005737  002306                  TST     WATCH               ;WATCH EQUAL ZERO ?.
077364  001375                  BNE     .-4                 ;BR IF NOT

                                ;;*************************************************************************
                                ;CONFIRM THAT THE DRIVE HAS TIMED OUT
```

```
                                                ;VERIFY THAT THE DRIVE IS 'N NEUTRAL

077366  005037  002302                  CLR     RELERR                  ;CLEAR THE 'RELEASE ERROR ' INDICATOR
077372  013737  002404  002334          MOV     RPDS,BADADR             ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
077400  012737  011700  002336          MOV     #MOL!PGM!DPR!DRY!VV,EXPTED  ;COMPARISON CONSTANT
077406  113777  002246  102766          MOVB    PORTA,@RPCS2            ;SELECT PORT A.
077414  017737  102764  002346          MOV     @RPDS,TMP2              ;GET THE DRIVE STATUS REGISTER FROM PORT A.
077422  042737  024005  002346          BIC     #PIP!WRL!OM!ILV,TMP2    ;CLEAR DONT CARES
077430  013737  002346  002342          MOV     TMP2,TMP0               ;COPY IT INTO 'TMP0'
077436  042737  100100  002342          BIC     #ATA!VV,TMP0            ;CLEAR PORT DEPENDENT BITS FROM THE COPY
077444  113777  002250  102730          MOVB    PORTB,@RPCS2            ;SELECT PORT B.
077452  017737  102726  002350          MOV     @RPDS,TMP3              ;GET THE DRIVE STATUS REGISTER FROM PORT B.
077460  042737  024005  002350          BIC     #PIP!WRL!OM!ILV,TMP3    ;CLEAR DONT CARES
077466  013737  002350  002344          MOV     TMP3,TMP1               ;COPY IT INTO 'TMP1'
077474  042737  100100  002344          BIC     #ATA!VV,TMP1            ;CLEAR PORT DEPENDENT BITS FROM THE COPY
077502  023737  002342  002344          CMP     TMP0,TMP1               ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
077510  001021                          BNE     72$                     ;BR IF NOT
077512  005737  002342                  TST     TMP0                    ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
077516  001077                          BNE     74$                     ;BR IF NOT
077520  104456                          TRAP    C$ERHRD
077522  000006                          .WORD   6
077524  010751                          .WORD   EM46
077526  013534                          .WORD   ERR15
077530  012746  003716                  MOV     #FRMT17,-(SP)
077534  012746  000001                  MOV     #1,-(SP)
077540  010600                          MOV     SP,R0
077542  104414                          TRAP    C$PNTB
077544  062706  000004                  ADD     #4,SP
077550  000137  100062                  JMP     76$                     ;BYPASS THE REST OF THE CHECKS
077554  013737  002346  002332  72$:    MOV     TMP2,BADDAT             ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
077562  013737  002250  002266          MOV     PORTB,PTNBR             ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
077570  113777  002250  102604          MOVB    PORTB,@RPCS2            ;SELECT PORT B.
077576  005737  002342                  TST     TMP0                    ;SEE IF STATUS EQ 0 FROM PORT A.
077602  001414                          BEQ     73$                     ;BR IF ZERO
077604  013737  002246  002266          MOV     PORTA,PTNBR             ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
077612  013737  002350  002332          MOV     TMP3,BADDAT             ;'BAD DATA' FOR ERROR TYPE OUT
077620  113777  002246  102554          MOVB    PORTA,@RPCS2            ;SELECT PORT A.
077626  005737  002344                  TST     TMP1                    ;SEE IF STATUS EQ ZERO FROM PORT B.
077632  001031                          BNE     74$                     ;BR IF NOT
077634  012737  177777  002302  73$:    MOV     #-1,RELERR              ;SET 'RELEASE ERROR' INDICATOR
077642  012777  000011  102522          MOV     #11,@RPCS1              ;CLEAR THE DRIVE
077650  012777  000013  102514          MOV     #13,@RPCS1              ;RELEASE THE DRIVE
077656  104456                          TRAP    C$ERHRD
077660  000007                          .WORD   7
077662  010106                          .WORD   EM35
077664  013152                          .WORD   ERR8
077666  104456                          TRAP    C$ERHRD
077670  000010                          .WORD   8
077672  010106                          .WORD   EM35
077674  000000                          .WORD   0
077676  012746  003716                  MOV     #FRMT17,-(SP)
077702  012746  000001                  MOV     #1,-(SP)
077706  010600                          MOV     SP,R0
077710  104414                          TRAP    C$PNTB
077712  062706  000004                  ADD     #4,SP
077716  013737  002346  002332  74$:    MOV     TMP2,BADDAT             ;LOOK FOR BIT FAILURES WHEN RPDS READ
```

TEST 32 PORT 'B' TIMEOUT/RELEASE

```
077724  013737  002246  002266          MOV     PORTA,PTNBR     ;CHANGE PORT NUMBER
077732  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
077740  023737  002336  002332          CMP     EXPTED,BADDAT   ;ALL BITS OK ?
077746  001414                          BEQ     75$             ;BR IF OK FROM PORT A.
077750  104456                          TRAP    C$ERHRD
077752  000013                          .WORD   11
077754  006072                          .WORD   EM7
077756  013000                          .WORD   ERR5
077760  012746  003471                  MOV     #FRMT14,-(SP)
077764  012746  000001                  MOV     #1,-(SP)
077770  010600                          MOV     SP,R0
077772  104414                          TRAP    C$PNTB
077774  062706  000004                  ADD     #4,SP
100000  013737  002350  002332  75$:    MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
100006  013737  002250  002266          MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
100014  042737  100000  002332          BIC     #ATA,BADDAT     ;DON'T CHECK THE ATTN BIT
100022  023737  002336  002332          CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
100030  001414                          BEQ     76$             ;BR IF OK
100032  104456                          TRAP    C$ERHRD
100034  000014                          .WORD   12
100036  006072                          .WORD   EM7
100040  013000                          .WORD   ERR5
100042  012746  003522                  MOV     #FRMT15,-(SP)
100046  012746  000001                  MOV     #1,-(SP)
100052  010600                          MOV     SP,R0
100054  104414                          TRAP    C$PNTB
100056  062706  000004                  ADD     #4,SP
100062                          76$:
100062                          1$:
                                26              .EVEN
                                27
100062                          28 L10076:
100062  104401                          TRAP    C$ETST
                                29
```

```
      2                                 .TITLE PARAMETER CODING
     13
     14                                 .SBTTL  HARDWARE PARAMETER CODING SECTION
     42
     44                                 ;++
     45                                 ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
     46                                 ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
     47                                 ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
     48                                 ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
     49                                 ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
     50                                 ; WITH THE OPERATOR.
     51                                 ;--
     52
     53 100064  000032                          .WORD L10077-L$HARD/2
        100066                          L$HARD::
     54                                                          ;PRINT 'RPCS1 ADRS?'
     55 100066  000031                          .WORD   T$CODE
        100070  100152                          .WORD   MESG1
        100072  160000                          .WORD   T$LOLIM
        100074  177777                          .WORD   T$HILIM
     56                                                          ;PRINT 'VECTOR ADRS?'
     57 100076  001031                          .WORD   T$CODE
        100100  100165                          .WORD   MESG4
        100102  000000                          .WORD   T$LOLIM
        100104  000377                          .WORD   T$HILIM
     58                                                          ;PRINT 'BR LEVEL?'
     59 100106  002032                          .WORD   T$CODE
        100110  100201                          .WORD   MESG5
        100112  000340                          .WORD   340
        100114  000000                          .WORD   T$LOLIM
        100116  000007                          .WORD   T$HILIM
     60                                                          ;PRINT 'PORT A DRIVE #?'
     61 100120  003032                          .WORD   T$CODE
        100122  100212                          .WORD   MESG6
        100124  000007                          .WORD   7
        100126  000000                          .WORD   T$LOLIM
        100130  000007                          .WORD   T$HILIM
     62                                                          ;PRINT 'PORT B DRIVE #?'
     63 100132  004032                          .WORD   T$CODE
        100134  100231                          .WORD   MESG7
        100136  000007                          .WORD   7
        100140  000000                          .WORD   T$LOLIM
        100142  000007                          .WORD   T$HILIM
     64                                                          ;PRINT MESSAGE #10
     65 100144  005130                          .WORD   T$CODE
        100146  100250                          .WORD   MESG10
        100150  000001                          .WORD   1
     66                                         .EVEN
        100152                          L10077:
     67
     71 100152      122     120     103 MESG1:  .ASCIZ  /RPCS1 ADRS/
     72 100165      126     105     103 MESG4:  .ASCIZ  /VECTOR ADRS/
     73 100201      102     122     040 MESG5:  .ASCIZ  /BR LEVEL/
     74 100212      120     117     122 MESG6:  .ASCIZ  /PORT A DRIVE #/
     75 100231      120     117     122 MESG7:  .ASCIZ  /PORT B DRIVE #/
     76 100250      015     012     120 MESG10: .ASCII  <CR><LF>/PORT A "OUT" MUST BE CONNECTED TO  PORT B "IN"  AND/
     77 100335      015     012     120         .ASCII  <CR><LF>/PORT B "OUT" MUST BE CONNECTED TO A TERMINATOR./
```

```
     78 100416      015     012     124          .ASCII  <CR><LF>/THE DRIVE MUST BE ONLINE, WRITE ENABLED, READY  AND/
     79 100503      015     012     120          .ASCII  <CR><LF>@PORT SELECT SWITCH MUST BE IN THE A/B POSITION.@
     80 100564      015     012     101          .ASCII  <CR><LF>/ALSO, EACH  PORT MUST HAVE  A UNIQUE  DRIVE NUMBER./
     81 100651      015     012     012          .ASCIZ  <CR><LF><LF>/CONTINUE/
     82
     83                                          .EVEN
```

```
      1                                 .SBTTL  SOFTWARE PARAMETER CODING SECTION
      2
      3                                 ;++
      4                                 ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
      5                                 ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
      6                                 ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
      7                                 ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
      8                                 ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
      9                                 ; WITH THE OPERATOR.
     10                                 ;--
     11
     12 100666  000000                          .WORD L10100-L$SOFT/2
        100670                          L$SOFT::
     13
     22
     23                                         .EVEN
     24
     25                                         .EVEN
        100670                          L10100:
     26
     33
     34 100670                          $PATCH::.BLKW   50.
     35
     42
     43                                         .EVEN
        101034  101060                          .WORD T$FREE
        101036  000010                          .WORD T$SIZE
        101040                          L$LAST::
```

```
     13
     15 101040  000000                          .WORD   0
        101042  000006                          .WORD   L10103-./2-1
        101044                          L10101:
     16 101044  176700                          .WORD   176700
     17 101046  000254                          .WORD   254
     18 101050  000240                          .WORD   240
     19 101052  000000                          .WORD   0
     20 101054  000001                          .WORD   1
     21 101056  000001                          .WORD   1
     22 101060                          L10103:
     24         000001                          .END
```

SYMBOL TABLE

```
ABC     002330 G    CNFBAD  002326 G    DCU    = 000040      EM34    010003      EWN    = 000002
ADR    = 000020 G   CR     = 000015 G   DFPTBL  002226 G     EM35    010106      EXPTED  002336 G
AIR    = 000004     CRLF    002564 G    DGE    = 000001      EM36    010177      E$END = 002100
AOE    = 001000     C$AU   = 000052     DIAGMC= 000000       EM37    010251      E$LOAD= 000035
ASRA    002262 G    C$AUTO= 000061      DLT    = 100000      EM4     005705      FER    = 000020
ASRB    002264 G    C$BRK  = 000022     DMD    = 100000      EM40    010317      FMT16 = 010000
ASR1    002260 G    C$BSEG= 000004      DMPREG  016350       EM41    010374      FRMT01  002626
ASSEMB= 000010      C$BSUB= 000002      DPE    = 000010      EM42    010436      FRMT03  002701
ATA    = 100000     C$CEFG= 000045      DPR    = 000400      EM43    010524      FRMT04  002751
ATABIT  002446 G    C$CLCK= 000062      DRQ    = 004000      EM44    010601      FRMT05  003073
AT0    = 000001     C$CLEA= 000012      DRVBAD  002340 G     EM45    010672      FRMT07  003155
AT1    = 000002     C$CLOS= 000035      DRVINI  014714       EM46    010751      FRMT11  003302
AT2    = 000004     C$CLP1= 000006      DRVSN   002370 G     EM47    011020      FRMT13  003355
AT3    = 000010     C$CVEC= 000036      DRY    = 000200      EM5     005736      FRMT14  003471
AT4    = 000020     C$DCLN= 000044      DSNMSG  002567 G     EM50    011106      FRMT15  003522
AT5    = 000040     C$DODU= 000051      DTE    = 010000      EM51    011170      FRMT16  003553
AT6    = 000100     C$DRPT= 000024      DT00   = 000001      EM52    011257      FRMT17  003716
AT7    = 000200     C$DU   = 000053     DT01   = 000002      EM53    011352      FRMT22  003754
A16    = 000400     C$EDIT= 000003      DT02   = 000004      EM54    011424      FRMT23  004026
A17    = 001000     C$ERDF= 000055      DT03   = 000010      EM55    011517      FRMT26  004107
BADADR  002334 G    C$ERHR= 000056      DT04   = 000020      EM56    011564      FRMT31  004135
BADDAT  002332 G    C$ERRO= 000060      DT05   = 000040      EM6     006004      FRMT36  004212
BAI    = 000010     C$ERSF= 000054      DT06   = 000100      EM60    011670      FRMT44  004226
BELL   = 000007 G   C$ERSO= 000057      DT07   = 000200      EM61    011734      FRMT46  004304
BIT0   = 000001 G   C$ESCA= 000010      DT08   = 000400      EM62    011766      FRMT55  004353
BIT00  = 000001 G   C$ESEG= 000005      DVA    = 004000      EM63    012034      FRMT56  004426
BIT01  = 000002 G   C$ESUB= 000003      DVC    = 000200      EM64    012106      FRMT57  004464
BIT02  = 000004 G   C$ETST= 000001      ECH    = 000100      EM65    012136      FRMT64  004603
BIT03  = 000010 G   C$EXIT= 000032      ECI    = 004000      EM66    012174      FRMT65  004713
BIT04  = 000020 G   C$GETB= 000026      EF.CON= 000036 G     EM67    012236      FRMT66  005023
BIT05  = 000040 G   C$GETW= 000027      EF.NEW= 000035 G     EM7     006072      FRMT67  005114
BIT06  = 000100 G   C$GMAN= 000043      EF.PWR= 000034 G     EM70    012317      FRMT70  005174
BIT07  = 000200 G   C$GPHR= 000042      EF.RES= 000037 G     EM71    012400      FRMT71  005265
BIT08  = 000400 G   C$GPLO= 000030      EF.STA= 000040 G     ERR    = 040000      FRMT72  005345
BIT09  = 001000 G   C$GPRI= 000040      EM1     005560       ERRVEC= 000004      FRMT73  005437
BIT1   = 000002 G   C$INIT= 000011      EM10    006146       ERR0    012462 G    FRMT74  005521
BIT10  = 002000 G   C$INLP= 000020      EM11    006171       ERR1    012530 G    FRMT75  005541
BIT11  = 004000 G   C$MANI= 000050      EM12    006255       ERR10   013262 G    F$AU   = 000015
BIT12  = 010000 G   C$MEM  = 000031     EM13    006342       ERR11   013320 G    F$AUTO= 000020
BIT13  = 020000 G   C$MSG  = 000023     EM14    006427       ERR12   013362 G    F$BGN  = 000040
BIT14  = 040000 G   C$OPEN= 000034      EM15    006472       ERR13   013430 G    F$CLEA= 000007
BIT15  = 100000 G   C$PNTB= 000014      EM16    006551       ERR14   013472 G    F$DU   = 000016
BIT2   = 000004 G   C$PNTF= 000017      EM17    006624       ERR15   013534 G    F$END  = 000041
BIT3   = 000010 G   C$PNTS= 000016      EM2     005601       ERR16   013576 G    F$HARD= 000004
BIT4   = 000020 G   C$PNTX= 000015      EM20    006703       ERR17   013640 G    F$HW   = 000013
BIT5   = 000040 G   C$QIO  = 000377     EM21    006763       ERR18   013676 G    F$INIT= 000006
BIT6   = 000100 G   C$RDBU= 000007      EM22    007036       ERR19   013750 G    F$JMP  = 000050
BIT7   = 000200 G   C$REFG= 000047      EM23    007123       ERR2    012576 G    F$MOD  = 000000
BIT8   = 000400 G   C$RESE= 000033      EM24    007171       ERR20   014016 G    F$MSG  = 000011
BIT9   = 001000 G   C$REVI= 000003      EM25    007250       ERR3    012654 G    F$PROT= 000021
BOE    = 000400 G   C$RFLA= 000021      EM26    007313       ERR4    012726 G    F$PWR  = 000017
BPE    = 000020     C$RPT  = 000025     EM27    007400       ERR5    013000 G    F$RPT  = 000012
BSE    = 100000     C$SEFG= 000046      EM3     005623       ERR6    013046 G    F$SEG  = 000003
CKERR   002276 G    C$SPRI= 000041      EM30    007456       ERR7    013114 G    F$SOFT= 000005
CLKSTA  002244 G    C$SVEC= 000037      EM31    007553       ERR8    013152 G    F$SRV  = 000010
CLR    = 000040     C$TPRI= 000013      EM32    007630       ERR9    013214 G    F$SUB  = 000002
CMOD   = 100000     DCK    = 100000     EM33    007701       EVL    = 000004 G   F$SW   = 000014
```

SYMBOL TABLE

```
F$TEST= 000001          I$SETU= 000041          L$REV   002010 G        L10057  052342          PIP    = 020000
F0     = 000002          I$SFT = 000041          L$RPT   016714 G        L10060  054242          PKB      014434
F1     = 000004          I$SRV = 000041          L$SOFT  100670 G        L10061  056142          PKC      014436
F2     = 000010          I$SUB = 000041          L$SPC   002056 G        L10062  060032          PKCS     014432
F3     = 000020          I$TST = 000041          L$SPCF  002020 G        L10063  061722          PKV      014440
F4     = 000040          J$JMP = 000167          L$SPTP  002024 G        L10064  063346          PNT    = 001000 G
G0     = 000001          KWSRV   014610          L$STA   002030 G        L10065  064564          PORTA    002246 G
G$CNTO= 000200          LBT   = 002000          L$SW    002244 G        L10066  066002          PORTB    002250 G
G$DELM= 000372          LCE   = 001000          L$TEST  002114 G        L10067  067176          PORTC    002252 G
G$DISP= 000003          LCLKTB  014444          L$TIML  002014 G        L10070  070372          PRI    = 002000 G
G$EXCP= 000400          LF    = 000012 G        L$UNIT  002012 G        L10071  072132          PRI00  = 000000 G
G$HILI= 000002          LKS     014446          L10000  002242          L10072  073672          PRI01  = 000040 G
G$LOLI= 000001          LKV     014450          L10001  002244          L10073  074714          PRI02  = 000100 G
G$NO   = 000000         LOE   = 040000 G        L10002  012526          L10074  075736          PRI03  = 000140 G
G$OFFS= 000400          LOT   = 000010 G        L10003  012574          L10075  077010          PRI04  = 000200 G
G$OFSI= 000376          L$ACP   002110 G        L10004  012652          L10076  100062          PRI05  = 000240 G
G$PRMA= 000001          L$APT   002036 G        L10005  012724          L10077  100152          PRI06  = 000300 G
G$PRMD= 000002          L$AU    017372 G        L10006  012776          L10100  100670          PRI07  = 000340 G
G$PRML= 000000          L$AUT   002070 G        L10007  013044          L10101  101044          PSEL   = 002000
G$RADA= 000140          L$AUTO  017300 G        L10010  013112          L10103  101060          PTNBR    002266 G
G$RADB= 000000          L$CCP   002106 G        L10011  013150          MCPE   = 020000          RDY    = 000200
G$RADD= 000040          L$CLEA  017302 G        L10012  013212          MDPE   = 000400          REG      002456 G
G$RADL= 000120          L$CO    002032 G        L10013  013260          MESG1    100152          RELERR   002302 G
G$RADO= 000020          L$DEPO  002011 G        L10014  013316          MESG10   100250          RELOK  = 000001
G$XFER= 000004          L$DESC  002540 G        L10015  013360          MESG4    100165          RHEXT    002364 G
G$YES  = 000010          L$DESP  002076 G        L10016  013426          MESG5    100201          RHTYPE   002366 G
HCE    = 000200          L$DEVP  002060 G        L10017  013470          MESG6    100212          RMR    = 000004
HCI    = 002000          L$DISP  002124 G        L10020  013532          MESG7    100231          RPADR    002356 G
HCRC   = 000400          L$DLY   002116 G        L10021  013574          MOH    = 020000          RPAS     002410 G
HELP   = 000000          L$DTP   002040 G        L10022  013636          MOL    = 010000          RPBA     002376 G
HERTZ    014454          L$DTYP  002034 G        L10023  013674          MTD    = 040000          RPBAE    002442 G
HOE    = 100000 G        L$DU    017364 G        L10024  013746          MXF    = 001000          RPCC     002430 G
IAE    = 002000          L$DUT   002072 G        L10025  014014          NBA    = 100000          RPCS1    002372 G
IBE    = 010000 G        L$DVTY  002032 G        L10026  014062          NED    = 010000          RPCS2    002402 G
IDU    = 000040 G        L$EF    002052 G        L10027  014652          NEM    = 004000          RPCS3    002444 G
IE     = 000100          L$ENVI  002044 G        L10030  016720          NOATA  = 000001          RPDA     002400 G
IER    = 020000 G        L$ETP   002102 G        L10032  017276          NOSEIZ   002300 G        RPDB     002414 G
ILF    = 000001          L$EXP1  002046 G        L10033  017300          OFD    = 000200          RPDC     002426 G
ILR    = 000002          L$EXP4  002064 G        L10034  017362          OM     = 000001          RPDS     002404 G
ILV    = 000004          L$EXP5  002066 G        L10035  017370          ONEFIL = 000001          RPDT     002420 G
IR     = 000100          L$HARD  100066 G        L10036  017376          OPI    = 020000          RPEC1    002436 G
ISR    = 000100 G        L$HIME  002120 G        L10037  021154          OPPRT    002272 G        RPEC2    002440 G
IXE    = 004000 G        L$HPCP  002016 G        L10040  023102          OR     = 000200          RPER1    002406 G
IXU    = 000100          L$HPTP  002022 G        L10041  025030          O$APTS = 000000          RPER2    002432 G
I$AU   = 000041          L$HW    002226 G        L10042  026356          O$AU   = 000000          RPER3    002434 G
I$AUTO= 000041          L$ICP   002104 G        L10043  027704          O$BGNR = 000000          RPLA     002412 G
I$CLN  = 000041          L$INIT  016730 G        L10044  030730          O$BGNS = 000000          RPMR1    002416 G
I$DU   = 000041          L$LADP  002026 G        L10045  031754          O$DU   = 000000          RPOF     002424 G
I$HRD  = 000041          L$LAST  101040 G        L10046  033530          O$ERRT = 000000          RPSN     002422 G
I$INIT= 000041          L$LOAD  002100 G        L10047  035304          O$GNSW = 000000          RPVEC    002360 G
I$MOD  = 000041          L$LUN   002074 G        L10050  036754          O$POIN = 000001          RPWC     002374 G
I$MSG  = 000041          L$MREV  002050 G        L10051  040424          O$SETU = 000001          RQSTA    002254 G
I$PROT= 000040          L$NAME  002000 G        L10052  042230          PAR    = 000010          RQSTB    002256 G
I$PTAB= 000041          L$PRIO  002042 G        L10053  044034          PAT    = 000020          RWU1   = 002000
I$PWR  = 000041          L$PROT  016722 G        L10054  046730          PCLKTB   014430          RWU2   = 004000
I$RPT  = 000041          L$PRT   002112 G        L10055  047602          PGE    = 100000          RWU3   = 010000
I$SEG  = 000041          L$REPP  002062 G        L10056  051062          PGM    = 001000          SAVRPR   016276
```

SYMBOL TABLE

```
SC     = 100000          TIMEAM  002314 G        T$NS1 = 000005          T$$SRV= 010027          T32     077012 G
SC0    = 000100          TIMEAP  002312 G        T$PCNT= 000000          T$$SW = 010001          T4      025032 G
SC1    = 000200          TIMEB   002316 G        T$PTAB= 010102          T$$TES= 010076          T5      026360 G
SC2    = 000400          TIMEBM  002322 G        T$PTHV= 000001          T1      017400 G        T6      027706 G
SC3    = 001000          TIMEBP  002320 G        T$PTNU= 000001          T10     035306 G        T7      030732 G
SC4    = 002000          TIMES   002324 G        T$SAVL= 177777          T11     036756 G        T8      031756 G
SC5    = 000400          TMP0    002342 G        T$SEGL= 177777          T12     040426 G        T9      033532 G
SC6    = 001000          TMP1    002344 G        T$SIZE= 000010          T13     042232 G        UAM    = 000200 G
SEIZPT  002270 G         TMP2    002346 G        T$SUBN= 000000          T14     044036 G        UNIT    002354 G
SFPTBL  002244 G         TMP3    002350 G        T$TAGL= 177777          T15     046732 G        UNS    = 040000
SIZE70  014064           TMP4    002352 G        T$TAGN= 010104          T16     047604 G        UPE    = 020000
SKI    = 040000          TOLER   014654           T$TEMP= 000000          T17     051064 G        U0     = 000001
SNDIGT  002623 G         TPE    = 000002         T$TEST= 000040          T18     052344 G        U1     = 000002
STOPCK  014560           TRE    = 040000         T$TSTM= 177777          T19     054244 G        U2     = 000004
ST.CLK  014226           TSTNUM  002274 G        T$TSTS= 000001          T2      021156 G        VV     = 000100
ST.LCL  014522           T$ARGC= 000001          T$$AU = 010036          T20     056144 G        VVSET  = 000001
ST.PCL  014456           T$CODE= 005130          T$$AUT= 010033          T21     060034 G        WATCH   002306 G
SVCGBL= 000000           T$ERRN= 000014          T$$CLE= 010034          T22     061724 G        WCE    = 040000
SVCINS= 000000           T$EXCP= 000000          T$$DAT= 010103          T23     063350 G        WCF    = 000040
SVCSUB= 000000           T$FLAG= 000040          T$$DU = 010035          T24     064566 G        WLE    = 004000
SVCTAG= 000000           T$FREE= 101060          T$$HAR= 010077          T25     066004 G        WOR    = 001000
SVCTST= 000000           T$GMAN= 000000          T$$HW = 010000          T26     067200 G        WRL    = 004000
S$LSYM= 010000           T$HILI= 000007          T$$INI= 010032          T27     070374 G        WRYUNS= 000400
TABELD  016122 G         T$LAST= 000001          T$$MSG= 010026          T28     072134 G        X$ALWA= 000000
TAP    = 040000          T$LOLI= 000000          T$$PC = 000001          T29     073674 G        X$FALS= 000040
TCF    = 000400          T$LSYM= 010000          T$$PRO= 010031          T3      023104 G        X$OFFS= 000400
TICKMS  014426           T$LTNO= 000040          T$$PTA= 010102          T30     074716 G        X$TRUE= 000020
TIME    002304 G         T$NEST= 177777          T$$RPT= 010030          T31     075740 G        $PATCH  100670 G
TIMEA   002310 G         T$NS0 = 000000          T$$SOF= 010100

. ABS.  101060     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  46080 WORDS  ( 180 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  70 PAGES
CZRJNA.BIC,CZRJNA/C=[20,0]SVC34R.MLB,[20,12]CZRJNA.DOC,CZRJNA.HIS,CZRJNA
```

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE S-1 SEQ 0219
CROSS REFERENCE TABLE (CREF V04.00)

```
$$$ERR  13-104
$$$MFG   2-17     2-30     6-3      7-904    7-966
$PATCH  61-34#
A16     12-7#    16-33    16-38
A17     12-8#    16-33    16-38
ABC     13-34#
ADR     11-57#
AIR     12-150#
AOE     12-88#
ASR1    13-14#   17-146*  17-149*  40-142   41-57    49-103   50-18
ASRA    13-15#   17-145*  32-47    49-103   50-18
ASRB    13-16#   17-148*  33-12    49-103   50-18
ASSEMB   7-915    7-915
AT0     12-104#
AT1     12-105#
AT2     12-106#
AT3     12-107#
AT4     12-108#
AT5     12-109#
AT6     12-110#
AT7     12-111#
ATA     12-74#   28-199   28-199   28-199   28-199   29-22    29-22    29-22    29-22    30-116   30-116   30-116   30-116   30-116
        30-116   30-116   30-116   31-18    31-18    31-18    31-18    31-18    31-18    31-18    34-86    34-86    34-86
        34-86    34-86    35-23    35-23    35-23    35-23    35-23    36-104   36-104   36-104   37-24    37-24    37-24
        37-24    38-89    38-89    38-89    38-89    39-23    39-23    39-23    39-23    40-142   40-142   40-142   40-142   40-142
        40-142   40-142   40-142   40-142   40-142   41-57    41-57    41-57    41-57    42-82    42-82    42-82    42-82    42-82
        42-82    42-82    43-23    43-23    43-23    43-23    43-23    43-23    43-23    44-104   44-104   44-104   44-104   44-104
        44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    49-103   49-103   50-18
        50-18    51-79    51-79    51-79    51-79    51-79    51-79    51-79    52-20    52-20    52-20    52-20    52-20    52-20
        52-20    53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   54-18    54-18    54-18    54-18
        54-18    54-18    54-18    54-18    54-18    55-112   55-112   56-20    56-20    57-114   57-114   57-114   57-114   58-22
        58-22    58-22    58-22
ATABIT  13-79#   17-145   17-146   17-148   17-149
BADADR  13-36#   15-9     15-10    15-11    15-12    15-13    15-14    15-18    15-21    17-162*  17-190*  27-93*   27-93*   27-101*
        27-101*  27-110*  27-110*  27-110*  27-110*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*
        28-199*  28-199*  28-199*  29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*
        29-22*   30-116*  30-116*  30-116*  30-116*  31-18*   31-18*   31-18*   31-18*   32-47*   32-47*   32-47*   33-12*   33-12*
        33-12*   34-86*   34-86*   34-86*   34-86*   34-86*   35-23*   35-23*   35-23*   35-23*   35-23*   36-104*  36-104*  36-104*
        36-104*  36-104*  37-24*   37-24*   37-24*   37-24*   37-24*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   39-23*
        39-23*   39-23*   39-23*   39-23*   39-23*   40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  41-57*   42-82*   42-82*
        42-82*   43-23*   43-23*   43-23*   44-104*  44-104*  44-104*  44-104*  44-104*  44-104*  45-22*   45-22*   45-22*   45-22*
        45-22*   45-22*   46-101*  46-101*  46-101*  46-101*  46-101*  46-101*  47-24*   47-24*   47-24*   47-24*   47-24*   47-24*
        48-92*   48-92*   48-92*   48-92*   48-92*   49-103*  49-103*  49-103*  50-18*   50-18*   50-18*   51-79*   51-79*   51-79*
        52-20*   52-20*   52-20*   53-117*  53-117*  53-117*  53-117*  53-117*  54-18*   54-18*   54-18*   54-18*   54-18*   55-112*
        56-20*   57-114*  57-114*  58-22*   58-22*
BADDAT  13-35#   15-9     15-10    15-11    15-12    15-13    15-14    15-15    15-18    15-21    15-28    17-162   17-162   17-162*
        17-162*  17-162*  17-190   17-190   17-190*  17-190*  17-190*  27-93    27-93    27-93    27-93    27-93*   27-93*   27-101
        27-101   27-101   27-101   27-101*  27-101*  27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110*
        27-110*  27-110*  27-110*  27-118*  27-119   28-199   28-199   28-199   28-199   28-199*  28-199*  28-199*  28-199*  28-199*
        28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*  28-199*
        29-22    29-22    29-22    29-22    29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*
        29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   29-22*   30-116   30-116   30-116   30-116   30-116
```

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE S-2
CROSS REFERENCE TABLE (CREF V04.00)

SEQ 0220

```
        30-116  30-116  30-116  30-116* 30-116* 30-116* 30-116* 30-116* 30-116* 30-116* 30-116* 30-116* 31-18   31-18
        31-18   31-18   31-18   31-18   31-18   31-18   31-18*  31-18*  31-18*  31-18*  31-18*  31-18*  31-18*  31-18*
        31-18*  32-47   32-47   32-47   32-47   32-47   32-47   32-47*  32-47*  32-47*  32-47*  32-47*  32-47*  32-47*
        32-47*  32-47*  33-12   33-12   33-12   33-12   33-12   33-12   33-12*  33-12*  33-12*  33-12*  33-12*  33-12*
        33-12*  33-12*  33-12*  34-86   34-86   34-86   34-86   34-86   34-86   34-86   34-86*  34-86*  34-86*  34-86*
        34-86*  34-86*  34-86*  34-86*  34-86*  34-86*  34-86*  34-86*  34-86*  34-86*  35-23   35-23   35-23   35-23
        35-23   35-23   35-23   35-23*  35-23*  35-23*  35-23*  35-23*  35-23*  35-23*  35-23*  35-23*  35-23*  35-23*
        35-23*  35-23*  35-23*  36-104  36-104  36-104  36-104  36-104  36-104  36-104  36-104  36-104* 36-104* 36-104*
        36-104* 36-104* 36-104* 36-104* 36-104* 36-104* 37-24   37-24   37-24   37-24   37-24   37-24   37-24   37-24*
        37-24*  37-24*  37-24*  37-24*  37-24*  37-24*  37-24*  37-24*  37-24*  37-24*  38-89   38-89   38-89   38-89
        38-89   38-89   38-89   38-89   38-89   38-89   38-89   38-89*  38-89*  38-89*  38-89*  38-89*  38-89*  38-89*
        38-89*  38-89*  38-89*  38-89*  38-89*  38-89*  39-23   39-23   39-23   39-23   39-23   39-23   39-23   39-23
        39-23   39-23   39-23   39-23   39-23*  39-23*  39-23*  39-23*  39-23*  39-23*  39-23*  39-23*  39-23*  39-23*
        39-23*  39-23*  39-23*  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142*
        40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 40-142*
        40-142* 40-142* 40-142* 40-142* 40-142* 41-57   41-57   41-57*  41-57*  41-57*  41-57*  41-57*  41-57*  42-82
        42-82   42-82   42-82   42-82   42-82   42-82*  42-82*  42-82*  42-82*  42-82*  42-82*  43-23   43-23   43-23
        43-23   43-23   43-23   43-23*  43-23*  43-23*  43-23*  43-23*  43-23*  43-23*  44-104  44-104  44-104  44-104
        44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104* 44-104* 44-104* 44-104* 44-104* 44-104* 44-104*
        44-104* 44-104* 44-104* 44-104* 44-104* 44-104* 45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22
        45-22   45-22   45-22   45-22   45-22*  45-22*  45-22*  45-22*  45-22*  45-22*  45-22*  45-22*  45-22*  45-22*
        45-22*  45-22*  45-22*  46-101  46-101  46-101  46-101  46-101  46-101  46-101  46-101  46-101  46-101  46-101
        46-101  46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101*
        47-24   47-24   47-24   47-24   47-24   47-24   47-24   47-24   47-24   47-24   47-24   47-24   47-24*  47-24*
        47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  48-92   48-92   48-92
        48-92   48-92   48-92   48-92   48-92   48-92   48-92*  48-92*  48-92*  48-92*  48-92*  48-92*  48-92*  48-92*
        48-92*  49-103  49-103  49-103  49-103  49-103* 49-103* 49-103* 49-103* 49-103* 49-103* 50-18   50-18   50-18
        50-18   50-18*  50-18*  50-18*  50-18*  50-18*  50-18*  51-79   51-79   51-79   51-79   51-79   51-79   51-79*
        51-79*  51-79*  51-79*  51-79*  51-79*  52-20   52-20   52-20   52-20   52-20   52-20   52-20*  52-20*  52-20*
        52-20*  52-20*  52-20*  53-117  53-117  53-117  53-117  53-117  53-117  53-117  53-117  53-117* 53-117* 53-117*
        53-117* 53-117* 53-117* 53-117* 53-117* 53-117* 53-117* 53-117* 54-18   54-18   54-18   54-18   54-18   54-18
        54-18   54-18   54-18   54-18*  54-18*  54-18*  54-18*  54-18*  54-18*  54-18*  54-18*  54-18*  54-18*  55-112
        55-112  55-112* 55-112* 55-112* 55-112* 56-20   56-20   56-20*  56-20*  56-20*  56-20*  57-114  57-114  57-114
        57-114* 57-114* 57-114* 57-114* 57-114* 57-114* 57-114* 58-22   58-22   58-22   58-22*  58-22*  58-22*  58-22*
        58-22*  58-22*  58-22*
BAI     12-28#
BELL    14-17
BIT0    11-57#
BIT00   11-57   11-57#
BIT01   11-57   11-57#
BIT02   11-57   11-57#
BIT03   11-57   11-57#
BIT04   11-57   11-57#
BIT05   11-57   11-57#
BIT06   11-57   11-57#
BIT07   11-57   11-57#
BIT08   11-57   11-57#
BIT09   11-57   11-57#
BIT1    11-57#
BIT10   11-57#
BIT11   11-57#
BIT12   11-57#
BIT13   11-57#
BIT14   11-57#
BIT15   11-57#
BIT2    11-57#
```

CROSS REFERENCE TABLE (CREF V04.00)

```
BIT3     11-57#
BIT4     11-57#
BIT5     11-57#
BIT6     11-57#
BIT7     11-57#
BIT8     11-57#
BIT9     11-57#
BOE      11-57#
BPE      12-152#
BSE      12-159#
C$AU      7-915#  25-36
C$AUTO    7-915#  22-19
C$BRK     7-915#
C$BSEG    7-915#
C$BSUB    7-915#
C$CEFG    7-915#
C$CLCK    7-915#  17-16    17-35
C$CLEA    7-915#  23-48
C$CLOS    7-915#
C$CLP1    7-915#
C$CVEC    7-915#  23-18    23-21
C$DCLN    7-915#
C$DODU    7-915#
C$DRPT    7-915#
C$DU      7-915#  24-35
C$EDIT    7-915#   7-969
C$ERDF    7-915#  17-132   17-137   21-36
C$ERHR    7-915#  17-162   17-162   17-171   17-180   17-190   17-190   17-199   17-208   27-93    27-93    27-101   27-101   27-110
          27-110  27-110   27-110   27-124   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
          28-199  28-199   28-199   28-199   28-199   28-199   28-199   28-199   29-22    29-22    29-22    29-22    29-22    29-22
          29-22   29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    30-116   30-116
          30-116  30-116   30-116   30-116   30-116   30-116   31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18
          32-47   32-47    32-47    32-47    32-47    32-47    33-12    33-12    33-12    33-12    33-12    33-12    34-86    34-86
          34-86   34-86    34-86    34-86    34-86    34-86    34-86    34-86    35-23    35-23    35-23    35-23    35-23    35-23
          35-23   35-23    35-23    35-23    36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   37-24    37-24
          37-24   37-24    37-24    37-24    37-24    37-24    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
          38-89   38-89    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    40-142   40-142
          40-142  40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142
          41-57   41-57    41-57    41-57    41-57    42-82    42-82    42-82    42-82    42-82    42-82    43-23    43-23    43-23
          43-23   43-23    43-23    44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   45-22
          45-22   45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    46-101   46-101   46-101   46-101   46-101
          46-101  46-101   46-101   46-101   46-101   47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
          47-24   48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    49-103   49-103   49-103   49-103   49-103
          49-103  49-103   50-18    50-18    50-18    50-18    50-18    50-18    50-18    51-79    51-79    51-79    51-79    51-79
          51-79   52-20    52-20    52-20    52-20    52-20    52-20    53-117   53-117   53-117   53-117   53-117   53-117   53-117
          53-117  53-117   54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    55-112   55-112   55-112
          55-112  55-112   55-112   56-20    56-20    56-20    56-20    56-20    56-20    57-114   57-114   57-114   57-114   57-114
          57-114  58-22    58-22    58-22    58-22    58-22    58-22
C$ERRO    7-915#
C$ERSF    7-915#
C$ERSO    7-915#
C$ESCA    7-915#
C$ESEG    7-915#
C$ESUB    7-915#
C$ETST    7-915#  27-127   28-203   29-26    30-120   31-22    32-51    33-16    34-90    35-27    36-108   37-28    38-93    39-27
          40-146  41-61    42-86    43-27    44-108   45-26    46-105   47-28    48-96    49-107   50-22    51-83    52-24    53-121
```

	54-22	55-116	56-24	57-118	58-28									
C$EXIT	7-915#	21-37	21-93	23-33	27-71	28-199	29-22	30-116	31-18	32-47	33-12	34-86	35-23	36-104
	37-24	38-89	39-23	40-142	41-57	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18
	51-79	52-20	53-117	54-18	55-112	56-20	57-114	58-22						
C$GETB	7-915#													
C$GETW	7-915#													
C$GMAN	7-915#													
C$GPHR	7-915#	18-21												
C$GPLO	7-915#													
C$GPRI	7-915#													
C$INIT	7-915#	21-108												
C$INLP	7-915#													
C$MANI	7-915#													
C$MEM	7-915#													
C$MSG	7-915#	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18	15-19	15-20	15-21
	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29						
C$OPEN	7-915#													
C$PNTB	7-915#	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18	15-19	15-20	15-21
	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29	17-172	17-200	27-93	27-93	27-101	27-101
	27-110	27-110	27-110	27-110	27-125	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	30-116	30-116	30-116
	30-116	30-116	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	34-86
	34-86	34-86	34-86	34-86	34-86	34-86	34-86	35-23	35-23	35-23	35-23	35-23	35-23	35-23
	35-23	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	37-24	37-24	37-24	37-24	37-24
	37-24	37-24	37-24	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	41-57	41-57	42-82	42-82	42-82
	42-82	42-82	42-82	43-23	43-23	43-23	43-23	43-23	43-23	44-104	44-104	44-104	44-104	44-104
	44-104	44-104	44-104	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	48-92
	48-92	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	49-103	49-103	49-103	49-103	49-103
	50-18	50-18	50-18	50-18	50-18	50-18	50-18	51-79	51-79	51-79	51-79	51-79	51-79	52-20
	52-20	52-20	52-20	52-20	52-20	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	55-112	55-112	55-112	55-112	55-112
	55-112	56-20	56-20	56-20	56-20	56-20	56-20	57-114	57-114	57-114	57-114	57-114	58-22	58-22
	58-22	58-22	58-22											
C$PNTF	7-915#	21-24	21-46	21-59	21-64									
C$PNTS	7-915#													
C$PNTX	7-915#	18-79	18-80	18-81	18-82	18-83	18-84	18-87	18-88					
C$QIO	7-915#													
C$RDBU	7-915#													
C$REFG	7-915#	21-12	21-16	21-20										
C$RESE	7-915#	7-915#	21-10											
C$REVI	7-915#	7-969												
C$RFLA	7-915#													
C$RPT	7-915#	19-78												
C$SEFG	7-915#													
C$SPRI	7-915#	17-160	17-175	17-188	17-203	21-67	23-10	28-199	28-199	28-199	29-22	29-22	29-22	
C$SVEC	7-915#	17-79	17-87											
C$TPRI	7-915#													
CKERR	13-21#	27-93	27-93	27-93*	27-93*	27-93*	27-93*	27-101*	27-101*	27-101*	27-101*	27-110*	27-110*	27-110*
	27-110*	27-110*	27-110*	27-110*	27-110*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	31-18*	31-18*	31-18*
	31-18*	31-18*	31-18*	34-86	34-86*	34-86*	35-23	35-23*	35-23*	36-104	36-104*	36-104*	36-104*	36-104*
	36-104*	36-104*	36-104*	36-104*	37-24	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	38-89*
	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*

CROSS REFERENCE TABLE (CREF V04.00)

```
        39-23*  40-142*  40-142*  40-142*  40-142*  42-82*  42-82*  42-82*  42-82*  43-23*  43-23*  43-23*  43-23*  44-104
        44-104  44-104*  44-104*  44-104*  44-104*  44-104* 44-104* 44-104* 44-104* 45-22   45-22   45-22*  45-22*  45-22*
        45-22*  45-22*   45-22*   45-22*   45-22*   46-101  46-101  46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101*
        46-101* 47-24    47-24    47-24*   47-24*   47-24*  47-24*  47-24*  47-24*  47-24*  47-24*  48-92   48-92   48-92*
        48-92*  48-92*   48-92*   48-92*   48-92*   48-92*  48-92*  49-103  49-103  49-103* 49-103* 49-103* 49-103* 50-18
        50-18   50-18*   50-18*   50-18*   50-18*   51-79*  51-79*  51-79*  51-79*  52-20*  52-20*  52-20*  52-20*  53-117*
        53-117* 53-117*  53-117*  53-117*  53-117*  53-117* 53-117* 54-18*  54-18*  54-18*  54-18*  54-18*  54-18*  54-18*
        54-18*  57-114   57-114*  57-114*  58-22    58-22*  58-22*
CLKSTA  13-8#   17-13*   17-31*   17-46*   17-95    21-34   23-14
CLR     12-30#  21-31    23-11    27-75    27-93    27-93   30-116  31-18   36-104  37-24   38-89   39-23   48-92
CMOD    12-169#
CNFBAD  13-33#  17-130   18-44*
CR      14-15   60-76    60-77    60-78    60-79    60-80   60-81
CRLF    14-42#  21-24    21-64
DCK     12-94#
DCU     12-153#
DFPTBL   9-10#
DGE     12-148#
DIAGMC   7-915   7-915
DLT     12-40#
DMD     12-99#
DMPREG  15-9    15-10    15-11    15-12    15-13    15-14   15-15   15-16   15-17   15-18   15-19   15-20   15-21   15-22
        15-23   15-24    15-25    15-26    15-27    15-28   15-29   18-79#
DPE     12-151#
DPR     12-67#  17-162   17-190   27-110   27-110   28-199  28-199  29-22   29-22   30-116  31-18   32-47   32-47   32-47
        33-12   33-12    33-12    34-86    34-86    34-86   35-23   35-23   35-23   36-104  37-24   38-89   38-89   38-89
        38-89   39-23    39-23    39-23    39-23    40-142  40-142  40-142  40-142  40-142  40-142  41-57   42-82   43-23
        44-104  44-104   45-22    45-22    46-101   46-101  47-24   47-24   51-79   52-20   55-112  56-20   57-114  58-22
DRQ     12-129#
DRVBAD  13-38#  17-134*  17-215*  27-66    28-199   29-22   30-116  31-18   32-47   33-12   34-86   35-23   36-104  37-24
        38-89   39-23    40-142   41-57    42-82    43-23   44-104  45-22   46-101  47-24   48-92   49-103  50-18   51-79
        52-20   53-117   54-18    55-112   56-20    57-114  58-22
DRVINI  17-130#  21-65
DRVSN   13-50#   21-58*  21-59
DRY     12-66#  17-162   17-190   27-110   27-110   28-199  28-199  29-22   29-22   30-116  31-18   32-47   32-47   32-47
        33-12   33-12    33-12    34-86    34-86    34-86   35-23   35-23   35-23   36-104  37-24   38-89   38-89   38-89
        38-89   39-23    39-23    39-23    39-23    40-142  40-142  40-142  40-142  40-142  40-142  41-57   42-82   43-23
        44-104  44-104   45-22    45-22    46-101   46-101  47-24   47-24   51-79   51-79   52-20   52-20   55-112  56-20
        57-114  58-22
DSNMSG  14-43#  21-46
DT00    12-120#
DT01    12-121#
DT02    12-122#
DT03    12-123#
DT04    12-124#
DT05    12-125#
DT06    12-126#
DT07    12-127#
DT08    12-128#
DTE     12-91#
DVA     12-57#
DVC     12-155#
ESEND    7-915#
ESLOAD   7-915#  7-969
ECH     12-85#
ECI     12-166#
```

CROSS REFERENCE TABLE (CREF V04.00)

EF.CON	11-57#	21-16												
EF.NEW	11-57#	21-20												
EF.PWR	11-57#	21-12												
EF.RES	11-57#													
EF.STA	11-57#													
EM1	14-94#	27-101	27-101											
EM10	14-102#	34-86	35-23	36-104	37-24	40-142	40-142	44-104	44-104	45-22	45-22	46-101	46-101	47-24
	47-24	48-92	48-92	49-103	49-103	50-18	50-18	53-117	54-18					
EM11	14-103#	34-86	35-23											
EM12	14-104#	36-104	37-24											
EM13	14-105#	30-116	31-18											
EM14	14-106#													
EM15	14-107#													
EM16	14-108#	42-82	42-82	43-23	43-23									
EM17	14-109#	30-116	30-116	31-18	31-18									
EM2	14-95#	27-110	27-110											
EM20	14-111#													
EM21	14-112#	41-57	41-57											
EM22	14-113#													
EM23	14-114#	53-117	54-18											
EM24	14-115#	36-104	37-24											
EM25	14-116#	55-112	56-20											
EM26	14-117#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	42-82
	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18		
EM27	14-118#	34-86	35-23	40-142	40-142	55-112	56-20							
EM3	14-96#	27-124												
EM30	14-120#													
EM31	14-121#	34-86	35-23	57-114	58-22									
EM32	14-122#	51-79	51-79	52-20	52-20									
EM33	14-123#	38-89	38-89	39-23	39-23									
EM34	14-124#	38-89	38-89	39-23	39-23									
EM35	14-125#	57-114	57-114	58-22	58-22									
EM36	14-126#	17-171	17-199	28-199	29-22	30-116	31-18	53-117	54-18	55-112	56-20			
EM37	14-127#	27-93	27-93											
EM4	14-97#	17-162	17-190	28-199	29-22	32-47	32-47	32-47	33-12	33-12	33-12	34-86	35-23	38-89
	39-23	44-104	45-22	46-101	47-24									
EM40	14-129#													
EM41	14-130#	53-117	54-18											
EM42	14-131#	40-142												
EM43	14-132#	40-142												
EM44	14-133#	40-142	40-142											
EM45	14-134#	27-110	27-110											
EM46	14-135#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	41-57
	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18	55-112
	56-20	57-114	58-22											
EM47	14-136#	44-104	45-22											
EM5	14-98#	17-162	17-190	28-199	29-22	32-47	32-47	32-47	33-12	33-12	33-12	34-86	35-23	38-89
	39-23	44-104	45-22	46-101	47-24									
EM50	14-138#	44-104	45-22											
EM51	14-139#	48-92	48-92											
EM52	14-140#	53-117	54-18											
EM53	14-141#													
EM54	14-142#													
EM55	14-143#	28-199	29-22											
EM56	14-144#	17-180	17-208											
EM6	14-99#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22	29-22

	29-22	29-22	29-22	29-22	29-22	29-22	29-22						
EM60	14-146#	49-103	50-18										
EM61	14-147#	46-101	47-24										
EM62	14-148#	46-101	47-24										
EM63	14-149#												
EM64	14-150#	36-104	37-24										
EM65	14-151#												
EM66	14-152#												
EM67	14-153#	17-137											
EM7	14-100#	28-199	28-199	29-22	29-22	30-116	30-116	31-18	31-18	34-86	34-86	35-23	35-23	36-104
	36-104	37-24	37-24	38-89	38-89	39-23	39-23	40-142	40-142	40-142	40-142	41-57	41-57	42-82
	42-82	43-23	43-23	44-104	44-104	45-22	45-22	46-101	46-101	47-24	47-24	48-92	48-92	49-103
	49-103	50-18	50-18	51-79	51-79	52-20	52-20	53-117	53-117	54-18	54-18	55-112	55-112	56-20
	56-20	57-114	57-114	58-22	58-22									
EM70	14-155#	21-36												
EM71	14-156#	17-132												
ERR	12-73#	36-104	37-24	38-89	38-89	38-89	39-23	39-23	39-23	40-142	53-117	53-117	53-117	53-117
	54-18	54-18	54-18	54-18										
ERR0	15-9#	27-101	27-101	27-110	27-110									
ERR1	15-10#	27-124												
ERR10	15-19#	44-104	45-22	46-101	47-24	53-117	53-117	54-18	54-18					
ERR11	15-20#	17-171	17-199	28-199	29-22	30-116	31-18	38-89	39-23	53-117	54-18	55-112	55-112	56-20
	56-20													
ERR12	15-21#	34-86	35-23	57-114	58-22									
ERR13	15-22#													
ERR14	15-23#	40-142												
ERR15	15-24#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	41-57
	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18	55-112
	56-20	57-114	58-22											
ERR16	15-25#	17-180	17-208											
ERR17	15-26#	28-199	29-22											
ERR18	15-27#													
ERR19	15-28#													
ERR2	15-11#	17-137	17-162	17-190	28-199	29-22	32-47	32-47	32-47	33-12	33-12	33-12	34-86	35-23
	38-89	39-23	44-104	45-22	46-101	47-24								
ERR20	15-29#	36-104	37-24											
ERR3	15-12#	17-162	17-190	27-110	27-110	28-199	29-22	32-47	32-47	32-47	33-12	33-12	33-12	34-86
	34-86	35-23	35-23	36-104	37-24	38-89	39-23	40-142	40-142	44-104	44-104	44-104	45-22	45-22
	45-22	46-101	46-101	46-101	47-24	47-24	47-24	48-92	48-92	48-92	48-92	49-103	49-103	49-103
	50-18	50-18	50-18	51-79	51-79	52-20	52-20	53-117	54-18					
ERR4	15-13#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	30-116	31-18	44-104	45-22	46-101	47-24	
ERR5	15-14#	28-199	28-199	29-22	29-22	30-116	30-116	30-116	30-116	31-18	31-18	31-18	31-18	34-86
	34-86	34-86	35-23	35-23	35-23	36-104	36-104	37-24	37-24	38-89	38-89	39-23	39-23	40-142
	40-142	40-142	40-142	40-142	40-142	41-57	41-57	42-82	42-82	42-82	42-82	43-23	43-23	43-23
	43-23	44-104	44-104	45-22	45-22	46-101	46-101	47-24	47-24	48-92	48-92	49-103	49-103	50-18
	50-18	51-79	51-79	52-20	52-20	53-117	53-117	54-18	54-18	55-112	55-112	56-20	56-20	57-114
	57-114	58-22	58-22											
ERR6	15-15#	34-86	35-23											
ERR7	15-16#	36-104	37-24											
ERR8	15-17#	27-93	27-93	41-57	57-114	58-22								
ERR9	15-18#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	42-82
	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18		
ERRVEC	16-10	16-13	16-14*	16-41*										
EVL	11-57#													
EWN	12-63#													

EXPTED
13-37# 15-10 15-11 15-12 15-15 15-28 17-162 17-162 17-162 17-162* 17-162* 17-190 17-190 17-190
17-190* 17-190* 27-93 27-93 27-93* 27-93* 27-93* 27-93* 27-101 27-101 27-101* 27-101* 27-101* 27-101*
27-110 27-110 27-110 27-110 27-110* 27-110* 27-110* 27-110* 27-110* 27-110* 27-110* 27-110* 27-116* 27-119
28-199 28-199 28-199 28-199 28-199 28-199* 28-199* 28-199* 29-22 29-22 29-22 29-22 29-22 29-22*
29-22* 29-22* 30-116 30-116 30-116 30-116 30-116 30-116* 30-116* 30-116* 30-116* 30-116* 30-116* 30-116*
31-18 31-18 31-18 31-18 31-18 31-18* 31-18* 31-18* 31-18* 31-18* 31-18* 31-18* 32-47 32-47
32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47* 32-47* 32-47* 32-47* 32-47* 32-47* 33-12
33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12* 33-12* 33-12* 33-12* 33-12* 33-12*
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86* 34-86* 34-86* 34-86* 34-86* 35-23 35-23
35-23 35-23 35-23 35-23 35-23 35-23* 35-23* 35-23* 35-23* 35-23* 36-104 36-104 36-104 36-104
36-104 36-104 36-104* 36-104* 36-104* 36-104* 36-104* 36-104* 37-24 37-24 37-24 37-24 37-24 37-24
37-24* 37-24* 37-24* 37-24* 37-24* 37-24* 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89
38-89 38-89* 38-89* 38-89* 38-89* 38-89* 38-89* 38-89* 38-89* 38-89* 38-89* 38-89* 39-23 39-23
39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23* 39-23* 39-23* 39-23* 39-23* 39-23* 39-23*
39-23* 39-23* 39-23* 39-23* 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142* 40-142*
40-142* 40-142* 40-142* 40-142* 40-142* 40-142* 41-57 41-57 41-57* 42-82 42-82 42-82 42-82 42-82*
42-82* 42-82* 42-82* 42-82* 43-23 43-23 43-23 43-23 43-23* 43-23* 43-23* 43-23* 43-23* 44-104
44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104* 44-104* 44-104* 44-104* 44-104* 44-104*
44-104* 44-104* 44-104* 44-104* 44-104* 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22
45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 45-22* 46-101 46-101 46-101
46-101 46-101 46-101 46-101 46-101 46-101 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101* 46-101*
46-101* 46-101* 46-101* 47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24* 47-24*
47-24* 47-24* 47-24* 47-24* 47-24* 47-24* 47-24* 47-24* 47-24* 47-24* 48-92 48-92 48-92 48-92 48-92
48-92 48-92* 48-92* 48-92* 48-92* 48-92* 48-92* 48-92* 48-92* 48-92* 48-92* 49-103 49-103 49-103 49-103
49-103* 49-103* 49-103* 50-18 50-18 50-18 50-18 50-18* 50-18* 50-18* 51-79 51-79 51-79 51-79
51-79* 51-79* 51-79* 51-79* 51-79* 52-20 52-20 52-20 52-20 52-20* 52-20* 52-20* 52-20* 52-20*
53-117 53-117 53-117 53-117 53-117 53-117 53-117* 53-117* 53-117* 53-117* 53-117* 53-117* 53-117* 53-117*
54-18 54-18 54-18 54-18 54-18 54-18 54-18* 54-18* 54-18* 54-18* 54-18* 54-18* 54-18* 54-18*
55-112 55-112 55-112* 56-20 56-20 56-20* 57-114 57-114 57-11 57-114* 57-114* 58-22 58-22 58-22
58-22* 58-22*

FSAU
7-915# 25-9 25-36

FSAUTO
7-915# 22-10 22-19

FSBGN
7-915# 7-941 10-21 11-51 15-9 15-10 15-11 15-12 15-13 15-14 15-15 15-16 15-17 15-18
15-19 15-20 15-21 15-22 15-23 15-24 15-25 15-26 15-27 15-28 15-29 17-105 18-91 19-42
19-48 20-8 21-8 21-37 21-93 22-10 23-8 23-33 24-8 25-9 25-37 27-38 27-62 27-71
27-127 28-195 28-199 28-203 29-18 29-22 29-26 30-112 30-116 30-120 31-14 31-18 31-22 32-43
32-47 32-51 33-8 33-12 33-16 34-82 34-86 34-90 35-19 35-23 35-27 36-100 36-104 36-108
37-20 37-24 37-28 38-85 38-89 38-93 39-19 39-23 39-27 40-138 40-142 40-146 41-53 41-57
41-61 42-78 42-82 42-86 43-19 43-23 43-27 44-100 44-104 44-108 45-18 45-22 45-26 46-97
46-10. 46-105 47-20 47-24 47-28 48-88 48-92 48-96 49-99 49-103 49-107 50-14 50-18 50-22
51-75 51-79 51-83 52-16 52-20 52-24 53-113 53-117 53-121 54-14 54-18 54-22 55-108 55-112
55-116 56-16 56-20 56-24 57-110 57-114 57-118 58-18 58-22 58-28 59-1 60-43 60-53 61-12
61-44 62-14 62-15 62-15 62-22 62-23

FSCLEA
7-915# 23-8 23-48

FSDU
7-915# 24-8 24-35

FSEND
7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915 7-915
7-915 7-915 7-915# 7-941 10-21 11-51 15-9 15-10 15-11 15-12 15-13 15-14 15-15 15-16
15-17 15-18 15-19 15-20 15-21 15-22 15-23 15-24 15-25 15-26 15-27 15-28 15-29 17-115
18-91 19-42 19-62 19-78 21-37 21-93 21-108 22-19 23-33 23-48 24-19 24-35 25-20 25-36
25-37 27-38 27-62 27-62 27-62 27-71 27-127 27-127 28-195 28-195 28-195 28-199 28-203 28-203
29-18 29-18 29-18 29-22 29-26 29-26 30-112 30-112 30-112 30-116 30-120 30-120 31-14 31-14
31-14 31-18 31-22 31-22 32-43 32-43 32-43 32-47 32-51 32-51 33-8 33-8 33-8 33-12
33-16 33-16 34-82 34-82 34-82 34-86 34-90 34-90 35-19 35-19 35-19 35-23 35-27 35-27
36-100 36-100 36-100 36-104 36-108 36-108 37-20 37-20 37-20 37-24 37-28 37-28 38-85 38-85
38-85 38-89 38-93 38-93 39-19 39-19 39-19 39-23 39-27 39-27 40-138 40-138 40-138 40-142
40-146 40-146 41-53 41-53 41-53 41-57 41-61 41-61 42-78 42-78 42-78 42-82 42-86 42-86

CROSS REFERENCE TABLE (CREF V04.00)

	43-19	43-19	43-19	43-23	43-27	43-27	44-100	44-100	44-100	44-104	44-108	44-108	45-18	45-18
	45-18	45-22	45-26	45-26	46-97	46-97	46-97	46-101	46-105	46-105	47-20	47-20	47-20	47-24
	47-28	47-28	48-88	48-88	48-88	48-92	48-96	48-96	49-99	49-99	49-99	49-103	49-107	49-107
	50-14	50-14	50-14	50-18	50-22	50-22	51-75	51-75	51-75	51-79	51-83	51-83	52-16	52-16
	52-16	52-20	52-24	52-24	53-113	53-113	53-113	53-117	53-121	53-121	54-14	54-14	54-14	54-18
	54-22	54-22	55-108	55-108	55-108	55-112	55-116	55-116	56-16	56-16	56-16	56-20	56-24	56-24
	57-110	57-110	57-110	57-114	57-118	57-118	58-18	58-18	58-18	58-22	58-28	58-28	59-1	60-43
	60-66	61-25	61-44	62-14	62-15	62-22	62-23							
F$HARD	7-915#	60-53	60-66											
F$HW	7-915#	9-10	9-28											
F$INIT	7-915#	21-8	21-108											
F$JMP	7-915#	19-62	19-62	21-37	21-93	23-33	24-19	24-19	25-20	25-20	27-71	28-199	29-22	30-116
	31-18	32-47	33-12	34-86	35-23	36-104	37-24	38-89	39-23	40-142	41-57	42-82	43-23	44-104
	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18	55-112	56-20	57-114	58-22
F$MOD	7-915#	7-941	10-21	11-51	18-91	19-42	25-37	27-38	59-1	60-43	61-44			
F$MSG	7-915#	15-9	15-9	15-10	15-10	15-11	15-11	15-12	15-12	15-13	15-13	15-14	15-14	15-15
	15-15	15-16	15-16	15-17	15-17	15-18	15-18	15-19	15-19	15-20	15-20	15-21	15-21	15-22
	15-22	15-23	15-23	15-24	15-24	15-25	15-25	15-26	15-26	15-27	15-27	15-28	15-28	15-29
	15-29													
F$PROT	7-915#	20-8	20-12											
F$PWR	7-915#													
F$RPT	7-915#	19-48	19-78											
F$SEG	7-915#													
F$SOFT	7-915#	61-12	61-25											
F$SRV	7-915#	17-105	17-115											
F$SUB	7-915#													
F$SW	7-915#	10-10	10-20											
F$TEST	7-915#	27-62	27-127	28-195	28-203	29-18	29-26	30-112	30-120	31-14	31-22	32-43	32-51	33-8
	33-16	34-82	34-90	35-[illegible]	35-27	36-100	36-108	37-20	37-28	38-85	38-93	39-19	39-27	40-138
	40-146	41-53	41-61	42-78	42-86	43-19	43-27	44-100	44-108	45-18	45-26	46-97	46-105	47-20
	47-28	48-88	48-96	49-99	49-107	50-14	50-22	51-75	51-83	52-16	52-24	53-113	53-121	54-14
	54-22	55-108	55-116	56-16	56-24	57-110	57-118	58-18	58-28					
F0	12-52#													
F1	12-53#													
F2	12-54#													
F3	12-55#													
F4	12-56#													
FER	12-83#													
FMT16	12-167#													
FRMT01	14-46#	15-9	15-21											
FRMT03	14-47#	15-10	15-29											
FRMT04	14-48#	15-11												
FRMT05	14-50#	15-12												
FRMT07	14-51#													
FRMT11	14-54#	15-14												
FRMT13	14-55#	15-13												
FRMT14	14-57#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	29-22	30-116	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	41-57
	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	50-18	51-79	52-20	53-117	54-18
	55-112	55-112	56-20	57-114	58-22									
FRMT15	14-58#	28-199	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	30-116	31-18	31-18	34-86	34-86	34-86	35-23	35-23	35-23	36-104	37-24	38-89
	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	42-82	43-23	44-104	45-22	46-101
	47-24	48-92	49-103	49-103	50-18	51-79	52-20	53-117	54-18	55-112	56-20	56-20	57-114	58-22
FRMT16	14-59#	27-125												
FRMT17	14-61#	17-172	17-200	27-93	27-93	27-101	27-101	27-110	27-110	27-110	27-110	28-199	28-199	29-22

CROSS REFERENCE TABLE (CREF V04.00)

	29-22	30-116	30-116	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	34-86	34-86	34-86
	34-86	35-23	35-23	35-23	35-23	36-104	36-104	36-104	36-104	36-104	36-104	37-24	37-24	37-24
	37-24	37-24	37-24	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23	39-23
	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	42-82	42-82	42-82	42-82
	43-23	43-23	43-23	43-23	44-104	44-104	44-104	44-104	44-104	44-104	45-22	45-22	45-22	45-22
	45-22	45-22	46-101	46-101	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	47-24	47-24
	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	49-103	49-103	50-18	50-18	50-18	50-18
	51-79	51-79	51-79	51-79	52-20	52-20	52-20	52-20	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	54-18	54-18	54-18	54-18	54-18	54-18	54-18	55-112	55-112	55-112	56-20	56-20	56-20
	57-114	57-114	57-114	58-22	58-22	58-22								
FRMT22	14-63#	15-17	15-24											
FRMT23	14-64#	15-18												
FRMT26	14-65#													
FRMT31	14-67#	15-20												
FRMT36	14-68#	15-16	15-19											
FRMT44	14-70#	15-22												
FRMT46	14-71#	15-23												
FRMT55	14-73#	15-25												
FRMT56	14-74#	15-26												
FRMT57	14-75#	15-27												
FRMT64	14-78#	15-28												
FRMT65	14-80#	15-15												
FRMT66	14-83#	18-79												
FRMT67	14-84#	18-80												
FRMT70	14-85#	18-81												
FRMT71	14-86#	18-82												
FRMT72	14-87#	18-83												
FRMT73	14-88#	18-84												
FRMT74	14-89#	18-87												
FRMT75	14-90#	18-88												
G$CNTO	7-915#													
G$DELM	7-915#													
G$DISP	7-915#													
G$EXCP	7-915#													
G$HILI	7-915#													
G$LOLI	7-915#													
G$NO	7-915#													
G$OFFS	7-915#	60-55	60-57	60-59	60-61	60-63	60-65							
G$OFSI	7-915#	60-55	60-57	60-59	60-61	60-63	60-65							
G$PRMA	7-915#	60-55	60-57											
G$PRMD	7-915#	60-59	60-61	60-63										
G$PRML	7-915#	60-65												
G$RADA	7-915#													
G$RADB	7-915#													
G$RADD	7-915#													
G$RADL	7-915#	60-65												
G$RADO	7-915#	60-55	60-57	60-59	60-61	60-63								
G$XFER	7-915#													
G$YES	7-915#	60-55	60-57	60-59	60-61	60-63	60-65							
GO	12-51#													
HCE	12-86#													
HCI	12-165#													
HCRC	12-87#													
HELP	7-896#	7-910	7-932	7-949	7-972	8-10	9-18	10-12	11-4#	11-41	12-201	13-92	14-22	14-32
	14-163	14-174	15-31	19-4#	19-50	19-64	20-14	21-69	21-95	22-12	23-24	23-35	24-10	24-21
	25-11	25-22	26-5#	27-50	27-57	58-30	60-5#	61-14	61-27	61-36	62-1			

CROSS REFERENCE TABLE (CREF V04.00)

HERTZ 17-14* 17-30* 17-45* 17-52 17-75#
HOE 11-57#
I$AU 7-915# 25-9# 25-36#
I$AUTO 7-915# 22-10# 22-19#
I$CLN 7-915# 23-8# 23-33 23-48#
I$DU 7-915# 24-8# 24-35#
I$HRD 60-53# 60-66#
I$INIT 7-915# 21-8# 21-37 21-93 21-108#
I$MOD 7-915# 7-941 7-941# 10-21 10-21# 11-51 11-51# 18-91 18-91# 19-42 19-42# 25-37 25-37# 27-38
27-38# 59-1 59-1# 60-43 60-43# 61-44 61-44#
I$MSG 7-915# 15-9# 15-9# 15-10# 15-10# 15-11# 15-11# 15-12# 15-12# 15-13# 15-13# 15-14# 15-14# 15-15#
15-15# 15-16# 15-16# 15-17# 15-17# 15-18# 15-18# 15-19# 15-19# 15-20# 15-20# 15-21# 15-21# 15-22#
15-22# 15-23# 15-23# 15-24# 15-24# 15-25# 15-25# 15-26# 15-26# 15-27# 15-27# 15-28# 15-28# 15-29#
15-29#
I$PROT 7-915# 20-8#
I$PTAB 7-915# 62-15 62-15# 62-22 62-22#
I$PWR 7-915#
I$RPT 7-915# 19-48# 19-78#
I$SEG 7-915# 27-62 28-195 29-18 30-112 31-14 32-43 33-8 34-82 35-19 36-100 37-20 38-85 39-19
40-138 41-53 42-78 43-19 44-100 45-18 46-97 47-20 48-88 49-99 50-14 51-75 52-16 53-113
54-14 55-108 56-16 57-110 58-18
I$SETU 7-915# 62-14 62-14# 62-15 62-23 62-23#
I$SFT 61-12# 61-25#
I$SRV 7-915# 17-105# 17-115#
I$SUB 7-915# 27-62 28-195 29-18 30-112 31-14 32-43 33-8 34-82 35-19 36-100 37-20 38-85 39-19
40-138 41-53 42-78 43-19 44-100 45-18 46-97 47-20 48-88 49-99 50-14 51-75 52-16 53-113
54-14 55-108 56-16 57-110 58-18
I$TST 7-915# 27-62 27-62# 27-71 27-127 27-127# 27-127# 28-195 28-195# 28-199 28-203 28-203# 28-203# 29-18
29-18# 29-22 29-26 29-26# 29-26# 30-112 30-112# 30-116 30-120 30-120# 30-120# 31-14 31-14# 31-18
31-22 31-22# 31-22# 32-43 32-43# 32-47 32-51 32-51# 32-51# 33-8 33-8# 33-12 33-16 33-16#
33-16# 34-82 34-82# 34-86 34-90 34-90# 34-90# 35-19 35-19# 35-23 35-27 35-27# 35-27# 36-100
36-100# 36-104 36-108 36-108# 36-108# 37-20 37-20# 37-24 37-28 37-28# 37-28# 38-85 38-85# 38-89
38-93 38-93# 38-93# 39-19 39-19# 39-23 39-27 39-27# 39-27# 40-138 40-138# 40-142 40-146 40-146#
40-146# 41-53 41-53# 41-57 41-61 41-61# 41-61# 42-78 42-78# 42-82 42-86 42-86# 42-86# 43-19
43-19# 43-23 43-27 43-27# 43-27# 44-100 44-100# 44-104 44-108 44-108# 44-108# 45-18 45-18# 45-22
45-26 45-26# 45-26# 46-97 46-97# 46-101 46-105 46-105# 46-105# 47-20 47-20# 47-24 47-28 47-28#
47-28# 48-88 48-88# 48-92 48-96 48-96# 48-96# 49-99 49-99# 49-103 49-107 49-107# 49-107# 50-14
50-14# 50-18 50-22 50-22# 50-22# 51-75 51-75# 51-79 51-83 51-83# 51-83# 52-16 52-16# 52-20
52-24 52-24# 52-24# 53-113 53-113# 53-117 53-121 53-121# 53-121# 54-14 54-14# 54-18 54-22 54-22#
54-22# 55-108 55-108# 55-112 55-116 55-116# 55-116# 56-16 56-16# 56-20 56-24 56-24# 56-24# 57-110
57-110# 57-114 57-118 57-118# 57-118# 58-18 58-18# 58-22 58-28 58-28# 58-28#
IAE 12-89#
IBE 11-57#
IDU 11-57#
IE 12-5#
IER 11-57#
ILF 12-79#
ILR 12-80#
ILV 12-64# 17-162 17-190 28-199 28-199 28-199 29-22 29-22 29-22 30-116 30-116 31-18 31-18 32-47
32-47 32-47 33-12 33-12 33-12 34-86 34-86 34-86 34-86 34-86 35-23 35-23 35-23 35-23
35-23 36-104 36-104 37-24 37-24 38-89 38-89 38-89 39-23 39-23 39-23 40-142 40-142 40-142
40-142 40-142 40-142 40-142 40-142 41-57 41-57 42-82 42-82 43-23 43-23 44-104 44-104 44-104
45-22 45-22 45-22 46-101 46-101 46-101 47-24 47-24 47-24 48-92 48-92 49-103 49-103 50-18
50-18 51-79 51-79 52-20 52-20 53-117 53-117 54-18 54-18 55-112 55-112 56-20 56-20 57-114
57-114 58-22 58-22
IR 12-31#

CROSS REFERENCE TABLE (CREF V04.00)

```
ISR      11-57#
IXE      11-57#
IXU      12-154#
J$JMP     7-915#  19-62    24-19    25-20
KWSRV    17-79    17-87    17-106#
L$ACP     7-969#
L$APT     7-969#
L$AU     25-9#
L$AUT     7-969#
L$AUTO    7-969   22-10#
L$CCP     7-969#
L$CLEA    7-969   23-8#
L$CO      7-969#
L$DEPO    7-969#
L$DESC    7-969   14-30#
L$DESP    7-969#
L$DEVP    7-969#
L$DISP    7-969    8-8#
L$DLY     7-969#
L$DTP     7-969#
L$DTYP    7-969#
L$DU     24-8#
L$DUT     7-969#
L$DVTY    7-969   14-20#
L$EF      7-969#
L$ENVI    7-969#
L$ETP     7-969#
L$EXP1    7-969#
L$EXP4    7-969#
L$EXP5    7-969#
L$HARD    7-969   60-53    60-53#
L$HIME    7-969#
L$HPCP    7-969#
L$HPTP    7-969#
L$HW      7-969    9-10     9-10#
L$ICP     7-969#
L$INIT    7-969   21-8#
L$LADP    7-969#
L$LAST    7-969   61-43#   62-23
L$LOAD    7-969#
L$LUN     7-969#
L$MREV    7-969#
L$NAME    7-969#
L$PRIO    7-969#
L$PROT    7-969   20-8#
L$PRT     7-969#
L$REPP    7-969#
L$REV     7-969#
L$RPT    19-48#
L$SOFT   61-12    61-12#
L$SPC     7-969#
L$SPCP    7-969#
L$SPTP    7-969#
L$STA     7-969#
L$SW     10-10    10-10#
L$TEST    7-969#
```

CROSS REFERENCE TABLE (CREF V04.00)

```
L$TIML    7-969#
L$UNIT    7-969#
L10000    9-10      9-28#
L10001   10-10     10-20#
L10002   15-9#
L10003   15-10#
L10004   15-11#
L10005   15-12#
L10006   15-13#
L10007   15-14#
L10010   15-15#
L10011   15-16#
L10012   15-17#
L10013   15-18#
L10014   15-19#
L10015   15-20#
L10016   15-21#
L10017   15-22#
L10020   15-23#
L10021   15-24#
L10022   15-25#
L10023   15-26#
L10024   15-27#
L10025   15-28#
L10026   15-29#
L10027   17-115#
L10030   19-62     19-78#
L10032   21-37     21-93     21-108#
L10033   22-19#
L10034   23-33     23-48#
L10035   24-19     24-35#
L10036   25-20     25-36#
L10037   27-71     27-127#
L10040   28-199    28-203#
L10041   29-22     29-26#
L10042   30-116    30-120#
L10043   31-18     31-22#
L10044   32-47     32-51#
L10045   33-12     33-16#
L10046   34-86     34-90#
L10047   35-23     35-27#
L10050   36-104    36-108#
L10051   37-24     37-28#
L10052   38-89     38-93#
L10053   39-23     39-27#
L10054   40-142    40-146#
L10055   41-57     41-61#
L10056   42-82     42-86#
L10057   43-23     43-27#
L10060   44-104    44-108#
L10061   45-22     45-26#
L10062   46-101    46-105#
L10063   47-24     47-28#
L10064   48-92     48-96#
L10065   49-103    49-107#
L10066   50-18     50-22#
```

CROSS REFERENCE TABLE (CREF V04.00)

L10067	51-79	51-83#											
L10070	52-20	52-24#											
L10071	53-117	53-121#											
L10072	54-18	54-22#											
L10073	55-112	55-116#											
L10074	56-20	56-24#											
L10075	57-114	57-118#											
L10076	58-22	58-28#											
L10077	60-53	60-66#											
L10100	61-12	61-25#											
L10101	62-15#												
L10103	62-15	62-22#											
LBT	12-69#												
LCE	12-157#												
LCLKTB	17-41*	17-70#											
LF	14-16	60-76	60-77	60-78	60-79	60-80	60-81	60-81					
LKS	17-42*	17-72#	17-88*	17-100*									
LKV	17-44*	17-73#	17-87	23-21									
LOE	11-57#												
LOT	11-57#												
MCPE	12-10#	34-86	35-23										
MDPE	12-33#												
MESG1	60-55	60-71#											
MESG10	60-65	60-76#											
MESG4	60-57	60-72#											
MESG5	60-59	60-73#											
MESG6	60-61	60-74#											
MESG7	60-63	60-75#											
MOH	12-130#												
MOL	12-71#	17-162	17-190	27-110	27-110	28-199	28-199	29-22	29-22	30-116	31-18	32-47	32-47	32-47
	33-12	33-12	33-12	34-86	34-86	34-86	35-23	35-23	35-23	36-104	37-24	38-89	38-89	38-89
	38-89	39-23	39-23	39-23	39-23	40-142	40-142	40-142	40-142	40-142	40-142	41-57	42-82	43-23
	44-104	44-104	45-22	45-22	46-101	46-101	47-24	47-24	51-79	52-20	55-112	56-20	57-114	58-22
MTD	12-168#													
MXF	12-34#													
NBA	12-132#													
NED	12-37#	27-93	27-93	27-93	27-93									
NEM	12-36#													
NOATA	14-12#	28-199	28-199	28-199	28-199	29-22	29-22	29-22	29-22	30-116	30-116	30-116	30-116	31-18
	31-18	31-18	31-18	34-86	34-86	34-86	34-86	35-23	35-23	35-23	35-23	36-104	36-104	36-104
	36-104	37-24	37-24	37-24	37-24	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	41-57	41-57	42-82	42-82	42-82
	42-82	42-82#	42-82#	43-23	43-23	43-23	43-23	43-23#	43-23#	44-2#	44-104	44-104	44-104	44-104
	45-22	45-22	45-22	45-22	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	48-92	48-92
	48-92	48-92	48-92#	48-98#	49-103	49-103	49-103	49-103	50-18	50-18	50-18	50-18	51-79	51-79
	51-79	51-79	52-20	52-20	52-20	52-20	52-27#	53-117	53-117	53-117	53-117	53-117#	53-117#	54-18
	54-18	54-18	54-18	54-18#	54-18#	55-112	55-112	55-112	55-112	56-20	56-20	56-20	56-20	57-114
	57-114	57-114	57-114	57-114#	57-114#	58-22	58-22	58-22	58-22	58-22#	58-22#			
NOSEIZ	13-22#													
O$APTS	7-915#	7-969												
O$AU	7-915#	7-969												
O$BGNR	7-915#	7-969												
O$BGNS	7-915#	7-969												
O$DU	7-915#	7-969												
O$ERRT	7-915#	7-969												
O$GNSW	7-915#	7-969												

CROSS REFERENCE TABLE (CREF V04.00)

```
O$POIN   7-915#   7-947    7-947#   7-969
O$SETU   7-915#   7-947#   7-969    61-43
CFD      12-164#
OP       12-62#   17-162   17-190   28-199   28-199   28-199   29-22    29-22    29-22    30-116   30-116   31-18    31-18    32-47
         32-47    32-47    33-12    33-12    33-12    34-86    34-86    34-86    35-23    35-23    35-23    36-104   36-104   37-24
         37-24    38-89    38-89    38-89    39-23    39-23    39-23    40-142   40-142   40-142   40-142   41-57    41-57    42-82
         42-82    43-23    43-23    44-104   44-104   44-104   45-22    45-22    45-22    46-101   46-101   46-101   47-24    47-24
         47-24    48-92    48-92    49-103   49-103   50-18    50-18    51-79    51-79    52-20    52-20    53-117   53-117   54-18
         54-18    55-112   55-112   56-20    56-20    57-114   57-114   58-22    58-22
ONEFIL    2-4#     2-8      4-935    5-1      7-900#   7-936    10-22    11-1     11-8#    11-13    18-93    19-1     19-8#    19-14
         25-39    26-1     26-9#    27-3     59-2     60-1     60-9#    60-15
OPI      12-92#
OPPRT    13-19#   15-20    15-22    15-24    17-162*  17-190*  28-199*  29-22*   30-116*  31-18*   32-47*   32-47*   32-47*   33-12*
         33-12*   33-12*   34-86*   35-23*   36-104*  37-24*   38-89*   39-23*   40-142*  40-142*  42-82*   43-23*   44-104*  45-22*
         46-101*  47-24*   53-117*  54-18*   55-112*  56-20*   57-114*  58-22*
OR       12-32#
PAR      12-82#
PAT      12-29#
PCLKTB   17-22*   17-61#
PGE      12-35#   12-191#
PGM      12-68#   17-162   17-190   27-110   27-110   27-110   27-110   27-110   27-110   28-199   28-199   29-22    29-22    30-116
         31-18    32-47    32-47    32-47    33-12    33-12    33-12    34-86    34-86    34-86    35-23    35-23    35-23    36-104
         37-24    38-89    38-89    38-89    38-89    39-23    39-23    39-23    39-23    40-142   40-142   40-142   40-142   40-142
         40-142   41-57    42-82    43-23    44-104   44-104   45-22    45-22    46-101   46-101   47-24    47-24    51-79    52-20
         55-112   56-20    57-114   58-22
PIP      12-72#   17-162   17-190   28-199   28-199   28-199   29-22    29-22    29-22    30-116   30-116   31-18    31-18    32-47
         32-47    32-47    33-12    33-12    33-12    34-86    34-86    34-86    35-23    35-23    35-23    36-104   36-104   37-24
         37-24    38-89    38-89    38-89    39-23    39-23    39-23    40-142   40-142   40-142   40-142   41-57    41-57    42-82
         42-82    43-23    43-23    44-104   44-104   44-104   45-22    45-22    45-22    46-101   46-101   46-101   47-24    47-24
         47-24    48-92    48-92    49-103   49-103   50-18    50-18    51-79    51-79    52-20    52-20    53-117   53-117   54-18
         54-18    55-112   55-112   56-20    56-20    57-114   57-114   58-22    58-22
PKB      17-24*   17-25*   17-64#   17-80*
PKC      17-26*   17-27*   17-65#
PKCS     17-23*   17-63#   17-81*   17-98*
PKV      17-29*   17-66#   17-79    23-18
PNT      11-57#
PORTA    13-9#    15-29    17-135   17-139   17-144   17-162   17-162   17-162   17-162   17-190   17-190   17-190   17-191   17-191
         18-42*   18-80    21-45    21-46    23-12    27-93    27-93    27-101   27-101   27-110   27-110   27-115   28-199   28-199
         28-199   28-199   28-199   28-199   28-199   28-199   29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
         29-22    29-22    30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   31-18    31-18
         31-18    31-18    31-18    31-18    31-18    31-18    31-18    32-47    32-47    32-47    32-47    32-47    32-47    32-47
         32-47    32-47    32-47    32-47    32-47    32-47    32-47    32-47    32-47    32-47    32-47    33-12    33-12    33-12
         33-12    33-12    33-12    33-12    33-12    33-12    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86
         34-86    34-86    34-86    34-86    34-86    34-86    34-86    35-23    35-23    35-23    35-23    35-23    35-23    35-23
         35-23    35-23    35-23    35-23    35-23    35-23    36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
         36-104   36-104   36-104   36-104   36-104   37-24    37-24    37-24    37-24    37-24    37-24    37-24    38-89
         38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    39-23
         39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    40-142   40-142   40-142   40-142
         40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142
         40-142   40-142   40-142   40-142   40-142   40-142   40-142   41-57    41-57    41-57    41-57    41-57    42-82    42-82
         42-82    42-82    42-82    42-82    42-82    42-82    42-82    42-82    42-82    42-82    43-23    43-23    43-23    43-23
         43-23    43-23    43-23    43-23    43-23    43-23    43-23    44-104   44-104   44-104   44-104   44-104   44-104   44-104
         44-104   44-104   44-104   44-104   44-104   44-104   44-104   45-22    45-22    45-22    45-22    45-22    45-22    45-22
         45-22    45-22    45-22    45-22    45-22    45-22    46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
         46-101   46-101   46-101   46-101   46-101   46-101   47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
         47-24    47-24    47-24    47-24    47-24    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
```

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE S-16 SEQ 0234
CROSS REFERENCE TABLE (CREF V04.00)

	48-92	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	50-18	50-18
	50-18	50-18	50-18	50-18	50-18	50-18	50-18	51-79	51-79	51-79	51-79	51-79	51-79	51-79
	51-79	51-79	51-79	52-20	52-20	52-20	52-20	52-20	52-20	52-20	53-117	53-117	53-117	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	55-112	55-112	55-112	55-112	55-112	55-112	55-112	56-20	56-20	56-20	56-20	56-20
	56-20	56-20	56-20	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	58-22	58-22	58-22
	58-22	58-22	58-22	58-22	58-22	58-22								
PORTB	13-10#	15-29	17-135	17-142	17-147	17-162	17-162	17-162	17-163	17-163	17-190	17-190	17-190	17-190
	18-43*	21-46	27-93	27-93	27-101	27-101	27-110	27-110	27-117	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	30-116
	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	31-18
	31-18	31-18	31-18	31-18	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	33-12
	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12
	33-12	33-12	33-12	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
	34-86	34-86	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23
	35-23	35-23	35-23	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	37-24	37-24	37-24
	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	38-89	38-89	38-89	38-89
	38-89	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	41-57	41-57	41-57	41-57	41-57	42-82	42-82	42-82	42-82	42-82	42-82
	42-82	42-82	42-82	42-82	42-82	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
	43-23	43-23	43-23	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
	44-104	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	47-24	47-24
	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	48-92	48-92	48-92
	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	51-79	51-79	51-79	51-79
	51-79	51-79	51-79	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	56-20
	56-20	56-20	56-20	56-20	56-20	56-20	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114
	57-114	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22					
PORTC	13-11#	17-139*	17-140*	17-141*	17-142	40-142	41-57							
PRI	11-57#													
PRI00	11-57#													
PRI01	11-57#													
PRI02	11-57#													
PRI03	11-57#													
PRI04	11-57#													
PRI05	11-57#	17-160	17-188	21-67	28-199	28-199	29-22	29-22						
PRI06	11-57#	17-79	17-87											
PRI07	11-57#	17-175	17-203	23-10	28-199	29-22								
PSEL	12-9#													
PTNBR	13-17#	15-9	15-11	15-12	15-13	15-14	15-16	15-17	17-162*	17-162*	17-163*	17-190*	17-190*	17-191*
	27-93*	27-93*	27-101*	27-101*	27-110*	27-110*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*
	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*
	30-116*	30-116*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	32-47*	32-47*	32-47*	32-47*
	32-47*	32-47*	32-47*	32-47*	32-47*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*
	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	35-23*	35-23*
	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	36-104*	36-104*	36-104*	36-104*
	36-104*	36-104*	36-104*	36-104*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	38-89*	38-89*
	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	39-23*	39-23*	39-23*	39-23*	39-23*
	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*
	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*
	41-57*	41-57*	41-57*	41-57*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	43-23*

CROSS REFERENCE TABLE (CREF V04.00)

	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*
	44-104*	44-104*	44-104*	44-104*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*
	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	47-24*	47-24*	47-24*	47-24*
	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*
	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	50-18*	50-18*	50-18*	50-18*	50-18*	50-18*	50-18*
	51-79*	51-79*	51-79*	51-79*	51-79*	51-79*	51-79*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*
	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*
	55-112*	55-112*	55-112*	55-112*	55-112*	56-20*	56-20*	56-20*	56-20*	56-20*	57-114*	57-114*	57-114*	57-114*
	57-114*	57-114*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*						
RDY	12-6#													
REG	13-90#	18-67	18-80	18-80	18-80	18-80	18-80	18-80	18-82	18-82	18-82	18-82	18-82	18-82
	18-82	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-88	18-88				
RELERR	13-23#	28-199*	28-199*	29-22*	29-22*	30-116	30-116*	30-116*	31-18	31-18*	31-18*	34-86*	34-86*	34-86*
	35-23*	35-23*	35-23*	36-104*	36-104*	37-24*	37-24*	38-89*	38-89*	39-23*	39-23*	40-142*	40-142*	40-142*
	40-142*	40-142*	40-142*	41-57*	41-57*	42-82*	42-82*	43-23*	43-23*	44-104*	44-104*	45-22*	45-22*	46-101*
	46-101*	47-24*	47-24*	48-92	48-92*	48-92*	49-103	49-103*	49-103*	50-18	50-18*	50-18*	51-79*	51-79*
	52-20*	52-20*	53-117*	53-117*	54-18*	54-18*	55-112*	55-112*	56-20*	56-20*	57-114*	57-114*	58-22*	58-22*
RELOK	14-11#	28-199	29-22	30-116	31-18	32-3#	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142
	41-57	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18
	55-112	56-20	57-114	58-22										
RHEXT	13-48#	16-11*	16-20*	16-24*	16-30	18-32								
RHTYPE	13-49#	16-12*	16-40*	18-30	18-72	18-85								
RMR	12-81#													
RPADR	13-46#	18-39*												
RPAS	13-59#	32-47*	33-12*	40-142*	41-57*	49-103	49-103	49-103	49-103	49-103*	50-18	50-18	50-18	50-18
	50-18*													
RPBA	13-54#													
RPBAE	13-72#													
RPCC	13-67#													
RPCS1	13-52#	15-26	15-29	18-19	18-66	30-116*	31-18*	32-47	32-47*	32-47*	32-47*	33-12	33-12*	33-12*
	33-12*	34-86	34-86	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	35-23
	35-23	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	36-104	36-104	36-104*
	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	37-24	37-24	37-24*	37-24*
	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	38-89*	38-89*	38-89*	38-89*	39-23*
	39-23*	39-23*	39-23*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*
	40-142*	41-57*	41-57*	41-57*	41-57*	41-57*	41-57*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*
	42-82*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	44-104*	44-104*	44-104*	44-104*	45-22*
	45-22*	45-22*	45-22*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	47-24*	47-24*	47-24*	47-24*	47-24*
	47-24*	48-92*	48-92*	48-92*	48-92*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	50-18*
	50-18*	50-18*	50-18*	50-18*	50-18*	50-18*	50-18*	51-79*	51-79*	51-79*	51-79*	51-79*	51-79*	51-79*
	51-79*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	53-117*	53-117*	53-117*	53-117*	53-117*
	53-117*	53-117*	53-117*	53-117*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	55-112*
	55-112*	55-112*	55-112*	55-112*	55-112*	56-20*	56-20*	56-20*	56-20*	56-20*	56-20*	57-114*	57-114*	57-114*
	57-114*	57-114*	57-114*	57-114*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*			
RPCS2	13-56#	17-162*	17-162*	17-162*	17-163*	17-190*	17-190*	17-190*	17-191*	21-31*	21-45*	23-11*	23-12*	27-75*
	27-93	27-93	27-93	27-93	27-93*	27-93*	27-93*	27-93*	27-101*	27-101*	27-110*	27-110*	27-115*	27-117*
	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*
	29-22*	29-22*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	31-18*	31-18*
	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	32-47*	32-47*	32-47*	32-47*	32-47*	32-47*
	32-47*	32-47*	32-47*	32-47*	32-47*	32-47*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*
	33-12*	33-12*	33-12*	33-12*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*	34-86*
	34-86*	34-86*	34-86*	34-86*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*
	35-23*	35-23*	35-23*	35-23*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*
	36-104*	36-104*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*
	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	39-23*
	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	40-142*	40-142*

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE S-18 SEQ 0236
CROSS REFERENCE TABLE (CREF V04.00)

	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*
	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	41-57*	41-57*	41-57*	41-57*	41-57*	41-57*	41-57*
	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	43-23*	43-23*
	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	43-23*	44-104*	44-104*	44-104*	44-104*
	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	45-22*	45-22*
	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*
	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*
	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*
	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	49-103*	49-1 *
	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	49-103*	50-18*	50-18*	50-18*	50-1
	50-18*	50-18*	50-18*	50-16*	50-18*	50-18*	50-18*	50-18*	51-79*	51-79*	51-79*	51-79*	51-79*	51-7
	51-79*	51-79*	51-79*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	53-117*	53-11
	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	54-18*	54-18*	54-18*	54-18*	54-18*
	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	55-112*	55-112*	55-112*	55-112*	55-112*	55-112*	55-112*	55-112
	56-20*	56-20*	56-20*	56-20*	56-20*	56-20*	56-20*	56-20*	57-114*	57-114*	57-114*	57-114*	57-114*	57-114
	57-114*	57-114*	57-114*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*	58-22*		
RPCS3	13-73#													
RPDA	13-55#	17-162*	17-190*	28-199	28-199	28-199*	29-22	29-22	29-22*					
RPDB	13-61#													
RPDC	13-66#	28-199	28-199	29-22	29-22									
RPDS	13-57#	17-162	17-162	17-162	17-167	17-190	17-190	17-190	17-195	27-93	27-93	27-110	27-110	27-110
	27-110	27-110	27-110	27-110	27-110	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
	30-116	30-116*	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18*	32-47
	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	33-12	33-12	33-12	33-12	33-12	33-12
	33-12	33-12	33-12	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
	34-86*	34-86*	34-86*	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23
	35-23*	35-23*	35-23*	36-104	36-104	36-104	36-104	36-104	36-104*	36-104*	36-104*	37-24	37-24	37-24
	37-24	37-24	37-24*	37-24*	37-24*	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
	38-89	38-89	38-89	38-89	38-89	38-89*	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23*	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142*	40-142*
	41-57	41-57	41-57	41-57*	41-57*	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82*	42-82*
	42-82*	42-82*	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23*	43-23*	43-23*	43-23*	44-104
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
	44-104	44-104	44-104*	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22	45-22	45-22	45-22	45-22	45-22	45-22*	46-101	46-101	46-101	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101*	47-24	47-24	47-24
	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
	47-24*	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
	48-92	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103*	49-103*	50-18	50-18	50-18
	50-18	50-18	50-18	50-18	50-18	50-18*	50-18*	51-79	51-79	51-79	51-79	51-79	51-79	51-79
	51-79	51-79*	51-79*	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20*	52-20*	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117*	53-117*	53-117*	53-117*	54-18
	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18*	54-18*	54-18*	54-18*	55-112
	55-112	55-112	55-112	55-112	55-112*	55-112*	55-112*	56-20	56-20	56-20	56-20	56-20	56-20*	56-20*
	56-20*	57-114	57-114	57-114	57-114	57-114	57-114*	57-114*	57-114*	57-114*	58-22	58-22	58-22	58-22
	58-22	58-22*	58-22*	58-22*	58-22*									
RPDT	13-63#	27-101	27-101	27-101	27-101									
RPEC1	13-70#	28-199	28-199	29-22	29-22									
RPEC2	13-71#	28-199	28-199	29-22	29-22									
RPER1	13-58#	28-199	28-199	29-22	29-22	32-47*	33-12*	36-104	36-104	36-104	36-104	37-24	37-24	37-24
	37-24	44-104*	44-104*	45-22*	45-22*	53-117	53-117	54-18	54-18					
RPER2	13-68#													
RPER3	13-69#	28-199	28-199	29-22	29-22									
RPLA	13-60#	28-199	28-199	29-22	29-22									

RPMR1	13-62#	28-199	28-199	29-22	29-22									
RPOF	13-65#	28-199	28-199	29-22	29-22									
RPSN	13-64#	21-47	27-116	27-118	28-199	28-199	29-22	29-22						
RPVEC	13-47#	18-40*	18-41*											
RPWC	13-53#													
RQSTA	13-12#													
RQSTB	13-13#													
RWU1	12-188#													
RWU2	12-189#													
RWU3	12-190#													
S$LSYM	7-915#	9-28#	10-20#	15-9#	15-10#	15-11#	15-12#	15-13#	15-14#	15-15#	15-16#	15-17#	15-18#	15-19#
	15-20#	15-21#	15-22#	15-23#	15-24#	15-25#	15-26#	15-27#	15-28#	15-29#	17-115#	19-78#	21-108#	22-19#
	23-48#	24-35#	25-36#	27-127#	28-203#	29-26#	30-120#	31-22#	32-51#	33-16#	34-90#	35-27#	36-108#	37-28#
	38-93#	39-27#	40-146#	41-61#	42-86#	43-27#	44-108#	45-26#	46-105#	47-28#	48-96#	49-107#	50-22#	51-83#
	52-24#	53-121#	54-22#	55-116#	56-24#	57-118#	58-28#	60-66#	61-25#					
SAVRPR	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18	15-19	15-20	15-21	15-22
	15-23	15-24	15-25	15-26	15-27	15-28	15-29	18-65#						
SC	12-12#													
SC0	12-137#													
SC1	12-138#													
SC2	12-139#													
SC3	12-140#													
SC4	12-141#													
SC5	12-142#													
SC6	12-143#													
SEIZPT	13-18#	15-11	15-13	15-15	15-17	15-18	15-19	15-20	15-21	15-22	15-24	15-25	15-28	17-162*
	17-190*	28-199*	29-22*	30-116*	31-18*	32-47*	32-47*	32-47*	33-12*	33-12*	33-12*	34-86*	35-23*	36-104*
	37-24*	38-89*	39-23*	40-142*	40-142*	40-142*	42-82*	43-23*	44-104*	45-22*	46-101*	47-24*	51-79*	52-20*
	53-117*	54-18*	55-112*	56-20*	57-114*	58-22*								
SFPTBL	10-10#													
SIZE70	16-11#	18-29												
SKI	12-158#													
SNDIGT	14-44#	21-59												
ST.CLK	17-13#	21-33												
ST.LCL	17-47	17-85#												
ST.PCL	17-32	17-77#												
STOPCK	17-95#	23-13												
SVCGBL	7-915#	7-924#	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	8-8	8-8	8-8	9-10	9-10	9-10	9-10	9-10	9-10	10-10
	10-10	10-10	10-10	10-10	10-10	14-20	14-20	14-20	14-30	14-30	14-30	15-9	15-9	15-9
	15-10	15-10	15-10	15-11	15-11	15-11	15-12	15-12	15-12	15-13	15-13	15-13	15-14	15-14
	15-14	15-15	15-15	15-15	15-16	15-16	15-16	15-17	15-17	15-17	15-18	15-18	15-18	15-19
	15-19	15-19	15-20	15-20	15-20	15-21	15-21	15-21	15-22	15-22	15-22	15-23	15-23	15-23
	15-24	15-24	15-24	15-25	15-25	15-25	15-26	15-26	15-26	15-27	15-27	15-27	15-28	15-28
	15-28	15-29	15-29	15-29	19-48	19-48	19-48	20-8	20-8	20-8	21-8	21-8	21-8	22-10
	22-10	22-10	23-8	23-8	23-8	24-8	24-8	24-8	25-9	25-9	25-9	60-53	60-53	60-53
	61-12	61-12	61-12	61-43	61-43	61-43	61-43#							
SVCINS	7-915#	7-921#	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969

7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	8-8	8-8
8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	9-10	9-10	10-10	10-10	14-20	14-20
14-20	14-20	14-30	14-30	14-30	14-30	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9
15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-10	15-10	15-10	15-10
15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10
15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11
15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-12	15-12	15-12	15-12	15-12	15-12
15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12
15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13
15-13	15-13	15-13	15-13	15-13	15-13	15-14	15-14	15-14	15-14	15-14	15-14	15-14	15-14
15-14	15-14	15-14	15-14	15-14	15-14	15-14	15-14	15-14	15-14	15-15	15-15	15-15	15-15
15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15
15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16
15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17
15-17	15-17	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18
15-18	15-18	15-18	15-18	15-18	15-18	15-19	15-19	15-19	15-19	15-19	15-19	15-19	15-19
15-19	15-19	15-19	15-19	15-19	15-19	15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-20
15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-21	15-21	15-21	15-21	15-21	15-21
15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-22	15-22
15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22	15-22
15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23	15-23
15-23	15-23	15-24	15-24	15-24	15-24	15-24	15-24	15-24	15-24	15-24	15-24	15-24	15-24
15-24	15-24	15-24	15-24	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25
15-25	15-25	15-25	15-25	15-25	15-25	15-26	15-26	15-26	15-26	15-26	15-26	15-26	15-26
15-26	15-26	15-26	15-26	15-26	15-26	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27
15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-28	15-28
15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28
15-28	15-28	15-29	15-29	15-29	15-29	15-29	15-29	15-29	15-29	15-29	15-29	15-29	15-29
15-29	15-29	15-29	15-29	15-29	15-29	17-16	17-16	17-16	17-16	17-16	17-16	17-18	17-18
17-35	17-35	17-35	17-35	17-35	17-35	17-37	17-37	17-79	17-79	17-79	17-79	17-79	17-79
17-79	17-79	17-79	17-79	17-79	17-79	17-87	17-87	17-87	17-87	17-87	17-87	17-87	17-87
17-87	17-87	17-87	17-87	17-115	17-115	17-132	17-132	17-132	17-132	17-132	17-132	17-132	17-132
17-137	17-137	17-137	17-137	17-137	17-137	17-137	17-137	17-160	17-160	17-160	17-160	17-162	17-162
17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162
17-171	17-171	17-171	17-171	17-171	17-171	17-171	17-171	17-172	17-172	17-172	17-172	17-172	17-172
17-172	17-172	17-172	17-172	17-175	17-175	17-175	17-175	17-180	17-180	17-180	17-180	17-180	17-180
17-180	17-180	17-188	17-188	17-188	17-188	17-190	17-190	17-190	17-190	17-190	17-190	17-190	17-190
17-190	17-190	17-190	17-190	17-190	17-190	17-190	17-190	17-199	17-199	17-199	17-199	17-199	17-199
17-199	17-199	17-200	17-200	17-200	17-200	17-200	17-200	17-200	17-200	17-200	17-200	17-203	17-203
17-203	17-203	17-208	17-208	17-208	17-208	17-208	17-208	17-208	17-208	18-21	18-21	18-21	18-21
18-21	18-21	18-22	18-22	18-79	18-79	18-79	18-79	18-79	18-79	18-79	18-79	18-79	18-79
18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80
18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-81	18-81	18-81	18-81
18-81	18-81	18-81	18-81	18-81	18-81	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82
18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82
18-82	18-82	18-83	18-83	18-83	18-83	18-83	18-83	18-83	18-83	18-83	18-83	18-84	18-84
18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84
18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-87	18-87	18-87	18-87	18-87	18-87

18-87	18-87	18-87	18-87	18-88	18-88	18-88	18-88	18-88	18-88	18-88	18-88	18-88	18-88
18-88	18-88	18-88	18-88	19-62	19-62	19-62	19-62	19-78	19-78	21-10	21-10	21-12	21-12
21-12	21-12	21-14	21-14	21-16	21-16	21-16	21-16	21-18	21-18	21-20	21-20	21-20	21-20
21-22	21-22	21-24	21-24	21-24	21-24	21-24	21-24	21-24	21-24	21-24	21-24	21-36	21-36
21-36	21-36	21-36	21-36	21-36	21-36	21-37	21-37	21-37	21-37	21-46	21-46	21-46	21-46
21-46	21-46	21-46	21-46	21-46	21-46	21-46	21-46	21-46	21-46	21-59	21-59	21-59	21-59
21-59	21-59	21-59	21-59	21-59	21-59	21-59	21-59	21-64	21-64	21-64	21-64	21-64	21-64
21-64	21-64	21-64	21-64	21-67	21-67	21-67	21-67	21-93	21-93	21-93	21-93	21-108	21-108
22-19	22-19	23-10	23-10	23-10	23-10	23-18	23-18	23-18	23-18	23-21	23-21	23-21	23-21
23-33	23-33	23-33	23-33	23-48	23-48	24-19	24-19	24-19	24-19	24-35	24-35	25-20	25-20
25-20	25-20	25-36	25-36	27-71	27-71	27-71	27-71	27-93	27-93	27-93	27-93	27-93	27-93
27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93
27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93
27-93	27-93	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101
27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101
27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-110	27-110	27-110	27-110
27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110
27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110
27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110
27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110
27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-124	27-124
27-124	27-124	27-124	27-124	27-124	27-124	27-125	27-125	27-125	27-125	27-125	27-125	27-125	27-125
27-125	27-125	27-127	27-127	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-203	28-203
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22

29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-26	29-26	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-120	30-120	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-22	31-22	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47
32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47
32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47
32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-51	32-51
33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12
33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12
33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12
33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-16	33-16	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-90	34-90	35-23	35-23	35-23	35-23
35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23

```
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23    35-23
35-23    35-23    35-23    35-23    35-23    35-23    35-27    35-27    36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104
36-104   36-104   36-108   36-108   37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24
37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-28    37-28
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89
38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-93    38-93    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23
39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-27    39-27    40-142   40-142   40-142   40-142
```

```
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142
40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-142  40-146  40-146  41-57   41-57   41-57   41-57
41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57
41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57
41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57
41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57
41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57
41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-57   41-61   41-61   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82
42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-82   42-86   42-86
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23   43-23
43-27   43-27   44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104
44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-104  44-108  44-108
45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22   45-22
```

```
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-26    45-26    46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-105   46-105   47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24    47-24    47-28    47-28    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92    48-96    48-96    49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-107   49-107   50-18    50-18    50-18    50-18
        50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18
```

50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-22	50-22	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-83	51-83	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-24	52-24	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-121	53-121	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-22	54-22	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112

```
          55-112  55-112  55-112  55-112  55-112  55-112  55-116  55-116  56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20
          56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-20   56-24   56-24   57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114  57-114
          57-118  57-118  58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22   58-22
          58-22   58-22   58-22   58-22   58-22   58-22   58-28   58-28   60-53   60-53   60-55   60-55   60-55   60-55
          60-55   60-55   60-55   60-55   60-57   60-57   60-57   60-57   60-57   60-57   60-57   60-57   60-59   60-59
          60-59   60-59   60-59   60-59   60-59   60-59   60-59   60-59   60-61   60-61   60-61   60-61   60-61   60-61
          60-61   60-61   60-61   60-61   60-63   60-63   60-63   60-63   60-63   60-63   60-63   60-63   60-63   60-63
          60-65   60-65   60-65   60-65   60-65   60-65   60-66   60-66   61-12   61-12   61-25   61-25   61-43   61-43
          61-43   61-43   61-43   61-43   62-15   62-15   62-15   62-15
SVCSUB     7-915#  7-923#
SVCTAG     7-915#  7-925#  9-28    9-28    9-28   10-20   10-20   10-20   15-9    15-9    15-9    15-10   15-10   15-10
          15-11   15-11   15-11   15-12   15-12   15-12   15-13   15-13   15-13   15-14   15-14   15-14   15-15   15-15
          15-15   15-16   15-16   15-16   15-17   15-17   15-17   15-18   15-18   15-18   15-19   15-19   15-19   15-20
          15-20   15-20   15-21   15-21   15-21   15-22   15-22   15-22   15-23   15-23   15-23   15-24   15-24   15-24
          15-25   15-25   15-25   15-26   15-26   15-26   15-27   15-27   15-27   15-28   15-28   15-28   15-29   15-29
          15-29   17-115  17-115  17-115  19-78   19-78   19-78   21-108  21-108  21-108  22-19   22-19   22-19   23-48
          23-48   23-48   24-35   24-35   24-35   25-36   25-36   25-36   27-127  27-127  27-127  28-203  28-203  28-203
          29-26   29-26   29-26   30-120  30-120  30-120  31-22   31-22   31-22   32-51   32-51   32-51   33-16   33-16
          33-16   34-90   34-90   34-90   35-27   35-27   35-27   36-108  36-108  36-108  37-28   37-28   37-28   38-93
          38-93   38-93   39-27   39-27   39-27   40-146  40-146  40-146  41-61   41-61   41-61   42-86   42-86   42-86
          43-27   43-27   43-27   44-108  44-108  44-108  45-26   45-26   45-26   46-105  46-105  46-105  47-28   47-28
          47-28   48-96   48-96   48-96   49-107  49-107  49-107  50-22   50-22   50-22   51-83   51-83   51-83   52-24
          52-24   52-24   53-121  53-121  53-121  54-22   54-22   54-22   55-116  55-116  55-116  56-24   56-24   56-24
          57-118  57-118  57-118  58-28   58-28   58-28   60-66   60-66   60-66   61-25   61-25   61-25   62-15   62-15
          62-15   62-22   62-22   62-22
SVCTST     7-91[illegible]#  7-922#  27-62   27-62   27-62   28-195  28-195  28-195  29-18   29-18   29-18   30-112  30-112  30-112
          31-14   31-14   31-14   32-43   32-43   32-43   33-8    33-8    33-8    34-82   34-82   34-82   35-19   35-19
          35-19   36-100  36-100  36-100  37-20   37-20   37-20   38-85   38-85   38-85   39-19   39-19   39-19   40-138
          40-138  40-138  41-53   41-53   41-53   42-78   42-78   42-78   43-19   43-19   43-19   44-100  44-100  44-100
          45-18   45-18   45-18   46-97   46-97   46-97   47-20   47-20   47-20   48-88   48-88   48-88   49-99   49-99
          49-99   50-14   50-14   50-14   51-75   51-75   51-75   52-16   52-16   52-16   53-113  53-113  53-113  54-14
          54-14   54-14   55-108  55-108  55-108  56-16   56-16   56-16   57-110  57-110  57-110  58-18   58-18   58-18
T$$AU     25-9#   25-20   25-36
T$$AUT    22-1[illegible]#  22-19
T$$CLE    23-8#   23-33   23-48
T$$DAT    62-15   62-15#  62-22
```

CROSS REFERENCE TABLE (CREF V04.00)

```
T$$DU    24-8#   24-19   24-35
T$$HAR   60-53   60-53#  60-66
T$$HW     9-10    9-10#   9-28
T$$INI   21-8#   21-37   21-93   21-108
T$$MSG   15-9    15-9#   15-10   15-10#  15-11   15-11#  15-12   15-12#  15-13   15-13#  15-14   15-14#  15-15   15-15#
         15-16   15-16#  15-17   15-17#  15-18   15-18#  15-19   15-19#  15-20   15-20#  15-21   15-21#  15-22   15-22#
         15-23   15-23#  15-24   15-24#  15-25   15-25#  15-26   15-26#  15-27   15-27#  15-28   15-28#  15-29   15-29#
T$$PC    62-14#  62-23
T$$PRO   20-8#
T$$PTA   62-14#  62-15   62-15#
T$$RPT   19-48#  19-62   19-78
T$$SOF   61-12   61-12#  61-25
T$$SRV   17-105# 17-115
T$$SW    10-10   10-10#  10-20
T$$TES   27-62#  27-71   27-127  28-195#  28-199  28-203  29-18#  29-22   29-26   30-112#  30-116  30-120  31-14#  31-18
         31-22   32-43#  32-47   32-51    33-8#   33-12   33-16   34-82#  34-86   34-90    35-19#  35-23   35-27   36-100#
         36-104  36-108  37-20#  37-24    37-28   38-85#  38-89   38-93   39-19#  39-23    39-27   40-138#  40-142  40-146
         41-53#  41-57   41-61   42-78#   42-82   42-86   43-19#  43-23   43-27   44-100#  44-104  44-108  45-18#  45-22
         45-26   46-97#  46-101  46-105   47-20#  47-24   47-28   48-88#  48-92   48-96    49-99#  49-103  49-107  50-14#
         50-18   50-22   51-75#  51-79    51-83   52-16#  52-20   52-24   53-113#  53-117  53-121  54-14#  54-18   54-22
         55-108# 55-112  55-116  56-16#   56-20   56-24   57-110#  57-114  57-118  58-18#   58-22   58-28
T$ARGC    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969#   7-969#   7-969#
          7-969#   7-969#   7-969#   15-9     15-9     15-9     15-9     15-9     15-9#    15-9#    15-9#    15-9#    15-10    15-10
         15-10    15-10    15-10    15-10#   15-10#   15-10#   15-10#   15-11    15-11    15-11    15-11    15-11    15-11    15-11
         15-11#   15-11#   15-11#   15-11#   15-11#   15-11#   15-12    15-12    15-12    15-12    15-12    15-12    15-12#   15-12#
         15-12#   15-12#   15-12#   15-13    15-13    15-13    15-13    15-13    15-13    15-13#   15-13#   15-13#   15-13#   15-13#
         15-14    15-14    15-14    15-14    15-14    15-14#   15-14#   15-14#   15-14#   15-15    15-15    15-15    15-15    15-15
         15-15#   15-15#   15-15#   15-15#   15-16    15-16    15-16    15-16#   15-16#   15-17    15-17    15-17    15-17    15-17#
         15-17#   15-17#   15-18    15-18    15-18    15-18    15-18    15-18#   15-18#   15-18#   15-18#   15-19    15-19    15-19
         15-19#   15-19#   15-20    15-20    15-20    15-20    15-20#   15-20#   15-20#   15-21    15-21    15-21    15-21    15-21
         15-21#   15-21#   15-21#   15-21#   15-22    15-22    15-22    15-22    15-22#   15-22#   15-22#   15-23    15-23    15-23
         15-23    15-23#   15-23#   15-23#   15-24    15-24    15-24    15-24    15-24#   15-24#   15-24#   15-25    15-25    15-25
         15-25    15-25#   15-25#   15-25#   15-26    15-26    15-26    15-26#   15-26#   15-27    15-27    15-27    15-27    15-27
         15-27    15-27#   15-27#   15-27#   15-27#   15-27#   15-28    15-28    15-28    15-28    15-28    15-28#   15-28#   15-28#
         15-28#   15-29    15-29    15-29    15-29    15-29    15-29#   15-29#   15-29#   15-29#   17-172   17-172   17-172#  17-200
         17-200   17-200#  18-79    18-79    18-79#   18-80    18-80    18-80    18-80    18-80    18-80    18-80    18-80    18-80
         18-80#   18-80#   18-80#   18-80#   18-80#   18-80#   18-80#   18-80#   18-81    18-81    18-81#   18-82    18-82    18-82
         18-82    18-82    18-82    18-82    18-82    18-82    18-82#   18-82#   18-82#   18-82#   18-82#   18-82#   18-82#   18-82#
         18-83    18-83    18-83#   18-84    18-84    18-84    18-84    18-84    18-84    18-84    18-84    18-84    18-84#   18-84#
         18-84#   18-84#   18-84#   18-84#   18-84#   18-84#   18-87    18-87    18-87#   18-88    18-88    18-88    18-88    18-88#
         18-88#   18-88#   21-24    21-24    21-24#   21-46    21-46    21-46    21-46    21-46#   21-46#   21-46#   21-59    21-59
         21-59    21-59#   21-59#   21-64    21-64    21-64#   27-93    27-93    27-93    27-93    27-93#   27-93#   27-101   27-101
         27-101   27-101   27-101#  27-101#  27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110#  27-110#
         27-110#  27-110#  27-125   27-125   27-125#  28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
         28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
         28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199#  28-199#  28-199#
         28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
         29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
         29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
         29-22    29-22    29-22    29-22    29-22    29-22    29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
         29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   30-116   30-116   30-116   30-116   30-116
         30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116#  30-116#  30-116#
         30-116#  30-116#  30-116#  30-116#  30-116#  31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18
         31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18#   31-18#   31-18#   31-18#   31-18#   31-18#   31-18#
         31-18#   34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86
         34-86    34-86    34-86    34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   35-23    35-23    35-23
```

CROSS REFERENCE TABLE (CREF V04.00)

	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23#
	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	36-104	36-104	36-104	36-104	36-104	36-104	36-104
	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#
	36-104#	36-104#	36-104#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	38-89
	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
	38-89	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#
	39-23#	39-23#	39-23#	39-23#	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	41-57	41-57	41-57
	41-57	41-57	41-57	41-57	41-57	41-57#	41-57#	41-57#	41-57#	42-82	42-82	42-82	42-82	42-82
	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	43-23
	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#
	43-23#	43-23#	43-23#	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	45-22
	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	46-101	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101#	46-101#	46-101#
	46-101#	46-101#	46-101#	46-101#	46-101#	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
	47-24#	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
	48-92	48-92	48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	49-103	49-103	49-103
	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103#	49-103#	49-103#
	49-103#	49-103#	49-103#	49-103#	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
	50-18	50-18	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	51-79	51-79	51-79
	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#
	51-79#	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20#
	52-20#	52-20#	52-20#	52-20#	52-20#	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117#	53-117#	53-117#	53-117#	53-117#
	53-117#	53-117#	53-117#	53-117#	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	54-18#	54-18#	54-18#	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	56-20	56-20	56-20	56-20	56-20	56-20	56-20
	56-20	56-20	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	57-114	57-114	57-114
	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	58-22	58-22
	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22#	58-22#	58-22#	58-22#	58-22#	
T$CODE	60-55	60-55	60-55	60-55#	60-55#	60-55#	60-57	60-57	60-57	60-57#	60-57#	60-57#	60-59	60-59
	60-59	60-59#	60-59#	60-59#	60-61	60-61	60-61	60-61#	60-61#	60-61#	60-63	60-63	60-63	60-63#
	60-63#	60-63#	60-65	60-65	60-65	60-65#	60-65#	60-65#						
T$ERRN	7-915#	17-132	17-132#	17-137	17-137#	17-162	17-162	17-162#	17-162#	17-171	17-171#	17-180	17-180#	17-190
	17-190	17-190#	17-190#	17-199	17-199#	17-208	17-208#	21-36	21-36#	27-93	27-93	27-93#	27-93#	27-101
	27-101	27-101#	27-101#	27-110	27-110	27-110	27-110	27-110#	27-110#	27-110#	27-110#	27-124	27-124#	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22#	29-22#	29-22#
	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
	29-22#	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116#	30-116#	30-116#	30-116#	30-116#
	30-116#	30-116#	30-116#	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18#	31-18#	31-18#
	31-18#	31-18#	31-18#	31-18#	31-18#	32-47	32-47	32-47	32-47	32-47	32-47	32-47#	32-47#	32-47#
	32-47#	32-47#	32-47#	33-12	33-12	33-12	33-12	33-12	33-12	33-12#	33-12#	33-12#	33-12#	33-12#
	33-12#	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86#	34-86#	34-86#
	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	35-23	35-23	35-23	35-23	35-23	35-23	35-23
	35-23	35-23	35-23	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	36-104

CROSS REFERENCE TABLE (CREF V04.00)

	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
	36-104#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-24#
	37-24#	37-24#	37-24#	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89#
	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	41-57	41-57	41-57	41-57	41-57	41-57#	41-57#	41-57#	41-57#
	41-57#	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	43-23
	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	44-104	44-104	44-104
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
	44-104#	44-104#	44-104#	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22#
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	46-101	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	48-92	48-92	48-92	48-92	48-92	48-92	48-92
	48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	49-103	49-103	49-103	49-103	49-103
	49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	50-18	50-18	50-18	50-18	50-18
	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	51-79	51-79	51-79	51-79	51-79
	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	52-20	52-20	52-20	52-20	52-20	52-20	52-20#
	52-20#	52-20#	52-20#	52-20#	52-20#	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	55-112
	55-112	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	56-20	56-20	56-20
	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	57-114	57-114	57-114	57-114	57-114
	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	58-22	58-22	58-22	58-22	58-22	58-22	58-22#
	58-22#	58-22#	58-22#	58-22#	58-22#									
T$EXCP	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#				
T$FLAG	19-62	19-62#	19-62#	21-37	21-37	21-37#	21-37#	21-93	21-93	21-93#	21-93#	23-33	23-33	23-33#
	23-33#	24-19	24-19#	24-19#	25-20	25-20#	25-20#	27-71	27-71	27-71#	27-71#	28-199	28-199	28-199#
	28-199#	29-22	29-22	29-22#	29-22#	30-116	30-116	30-116#	30-116#	31-18	31-18	31-18#	31-18#	32-47
	32-47	32-47#	32-47#	33-12	33-12	33-12#	33-12#	34-86	34-86	34-86#	34-86#	35-23	35-23	35-23#
	35-23#	36-104	36-104	36-104#	36-104#	37-24	37-24	37-24#	37-24#	38-89	38-89	38-89#	38-89#	39-23
	39-23	39-23#	39-23#	40-142	40-142	40-142#	40-142#	41-57	41-57	41-57#	41-57#	42-82	42-82	42-82#
	42-82#	43-23	43-23	43-23#	43-23#	44-104	44-104	44-104#	44-104#	45-22	45-22	45-22#	45-22#	46-101
	46-101	46-101#	46-101#	47-24	47-24	47-24#	47-24#	48-92	48-92	48-92#	48-92#	49-103	49-103	49-103#
	49-103#	50-18	50-18	50-18#	50-18#	51-79	51-79	51-79#	51-79#	52-20	52-20	52-20#	52-20#	53-117
	53-117	53-117#	53-117#	54-18	54-18	54-18#	54-18#	55-112	55-112	55-112#	55-112#	56-20	56-20	56-20#
	56-20#	57-114	57-114	57-114#	57-114#	58-22	58-22	58-22#	58-22#					
T$FREE	61-43	62-23#												
T$GMAN	7-915#													
T$HILI	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#				
T$LAST	7-915#	61-43#	62-14											
T$LOLI	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#				
T$LSYM	7-915	7-915#	9-28	10-20	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18
	15-19	15-20	15-21	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29	17-115	19-78	21-108
	22-19	23-48	24-35	25-36	27-127	28-203	29-26	30-120	31-22	32-51	33-16	34-90	35-27	36-108
	37-28	38-93	39-27	40-146	41-61	42-86	43-27	44-108	45-26	46-105	47-28	48-96	49-107	50-22
	51-83	52-24	53-121	54-22	55-116	56-24	57-118	58-28	60-66	61-25				
T$LTNO	61-43#													
T$NEST	7-915#	7-941	7-941	7-941#	9-10	9-10	9-10#	9-28	9-28	9-28	9-28#	10-10	10-10	10-10#
	10-20	10-20	10-20	10-20#	10-21	10-21	10-21	10-21#	11-51	11-51	11-51#	15-9	15-9	15-9
	15-9	15-9	15-9#	15-9#	15-10	15-10	15-10	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11
	15-11	15-11	15-11#	15-11#	15-12	15-12	15-12	15-12	15-12	15-12#	15-12#	15-13	15-13	15-13
	15-13	15-13	15-13#	15-13#	15-14	15-14	15-14	15-14	15-14	15-14#	15-14#	15-15	15-15	15-15
	15-15	15-15	15-15#	15-15#	15-16	15-16	15-16	15-16	15-16	15-16#	15-16#	15-17	15-17	15-17

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE S-31 SEQ 0249
CROSS REFERENCE TABLE (CREF V04.00)

	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18	15-18	15-18	15-18#	15-18#	15-19	15-19	15-19
	15-19	15-19	15-19#	15-19#	15-20	15-20	15-20	15-20	15-20	15-20#	15-20#	15-21	15-21	15-21
	15-21	15-21	15-21#	15-21#	15-22	15-22	15-22	15-22	15-22	15-22#	15-22#	15-23	15-23	15-23
	15-23	15-23	15-23#	15-23#	15-24	15-24	15-24	15-24	15-24	15-24#	15-24#	15-25	15-25	15-25
	15-25	15-25	15-25#	15-25#	15-26	15-26	15-26	15-26	15-26	15-26#	15-26#	15-27	15-27	15-27
	15-27	15-27	15-27#	15-27#	15-28	15-28	15-28	15-28	15-28	15-28#	15-28#	15-29	15-29	15-29
	15-29	15-29	15-29#	15-29#	17-105	17-105	17-105#	17-115	17-115	17-115	17-115#	18-91	18-91	18-91
	18-91#	19-42	19-42	19-42#	19-48	19-48	19-48#	19-78	19-78	19-78	19-78#	20-8	20-8	20-8#
	20-12	20-12	20-12	20-12#	21-8	21-8	21-8#	21-108	21-108	21-108	21-108#	22-10	22-10	22-10#
	22-19	22-19	22-19	22-19#	23-8	23-8	23-8#	23-48	23-48	23-48	23-48#	24-8	24-8	24-8#
	24-35	24-35	24-35	24-35#	25-9	25-9	25-9#	25-36	25-36	25-36	25-36#	25-37	25-37	25-37
	25-37#	27-38	27-38	27-38#	27-62	27-62	27-62#	27-127	27-127	27-127	27-127#	28-195	28-195	28-195#
	28-203	28-203	28-203	28-203#	29-18	29-18	29-18#	29-26	29-26	29-26	29-26#	30-112	30-112	30-112#
	30-120	30-120	30-120	30-120#	31-14	31-14	31-14#	31-22	31-22	31-22	31-22#	32-43	32-43	32-43#
	32-51	32-51	32-51	32-51#	33-8	33-8	33-8#	33-16	33-16	33-16	33-16#	34-82	34-82	34-82#
	34-90	34-90	34-90	34-90#	35-19	35-19	35-19#	35-27	35-27	35-27	35-27#	36-100	36-100	36-100#
	36-108	36-108	36-108	36-108#	37-20	37-20	37-20#	37-28	37-28	37-28	37-28#	38-85	38-85	38-85#
	38-93	38-93	38-93	38-93#	39-19	39-19	39-19#	39-27	39-27	39-27	39-27#	40-138	40-138	40-138#
	40-146	40-146	40-146	40-146#	41-53	41-53	41-53#	41-61	41-61	41-61	41-61#	42-78	42-78	42-78#
	42-86	42-86	42-86	42-86#	43-19	43-19	43-19#	43-27	43-27	43-27	43-27#	44-100	44-100	44-100#
	44-108	44-108	44-108	44-108#	45-18	45-18	45-18#	45-26	45-26	45-26	45-26#	46-97	46-97	46-97#
	46-105	46-105	46-105	46-105#	47-20	47-20	47-20#	47-28	47-28	47-28	47-28#	48-88	48-88	48-88#
	48-96	48-96	48-96	48-96#	49-99	49-99	49-99#	49-107	49-107	49-107	49-107#	50-14	50-14	50-14#
	50-22	50-22	50-22	50-22#	51-75	51-75	51-75#	51-83	51-83	51-83	51-83#	52-16	52-16	52-16#
	52-24	52-24	52-24	52-24#	53-113	53-113	53-113#	53-121	53-121	53-121	53-121#	54-14	54-14	54-14#
	54-22	54-22	54-22	54-22#	55-108	55-108	55-108#	55-116	55-116	55-116	55-116#	56-16	56-16	56-16#
	56-24	56-24	56-24	56-24#	57-110	57-110	57-110#	57-118	57-118	57-118	57-118#	58-18	58-18	58-18#
	58-28	58-28	58-28	58-28#	59-1	59-1	59-1	59-1#	60-43	60-43	60-43#	60-53	60-53	60-53#
	60-66	60-66	60-66	60-66#	61-12	61-12	61-12#	61-25	61-25	61-25	61-25#	61-44	61-44	61-44
	61-44#													
T$NSO	7-941#	10-21	11-51#	18-91	19-42#	25-37	27-38#	59-1	60-43#	61-44				
T$NS1	9-10#	9-28	10-10#	10-20	15-9	15-9#	15-10	15-10#	15-11	15-11#	15-12	15-12#	15-13	15-13#
	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17	15-17#	15-18	15-18#	15-19	15-19#	15-20	15-20#
	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#	15-25	15-25#	15-26	15-26#	15-27	15-27#
	15-28	15-28#	15-29	15-29#	17-105#	17-115	19-48#	19-78	20-8#	20-12	21-8#	21-108	22-10#	22-19
	23-8#	23-48	24-8#	24-35	25-9#	25-36	27-62#	27-127	28-195#	28-203	29-18#	29-26	30-112#	30-120
	31-14#	31-22	32-43#	32-51	33-8#	33-16	34-82#	34-90	35-19#	35-27	36-100#	36-108	37-20#	37-28
	38-85#	38-93	39-19#	39-27	40-138#	40-146	41-53#	41-61	42-78#	42-86	43-19#	43-27	44-100#	44-108
	45-18#	45-26	46-97#	46-105	47-20#	47-28	48-88#	48-96	49-99#	49-107	50-14#	50-22	51-75#	51-83
	52-16#	52-24	53-113#	53-121	54-14#	54-22	55-108#	55-116	56-16#	56-24	57-110#	57-118	58-18#	58-28
	60-53#	60-66	61-12#	61-25										
T$PCNT	62-14#	62-15	62-15	62-15#										
T$PTAB	62-15	62-15#												
T$PTHV	7-969	62-23#												
T$PTNU	7-915#	62-15	62-15#	62-23	62-23									
T$SAVL	7-915#													
T$SEGL	7-915#													
T$SIZE	61-43	62-23#												
T$SUBN	7-915#	27-62#	28-195#	29-18#	30-112#	31-14#	32-43#	33-8#	34-82#	35-19#	36-100#	37-20#	38-85#	39-19#
	40-138#	41-53#	42-78#	43-19#	44-100#	45-18#	46-97#	47-20#	48-88#	49-99#	50-14#	51-75#	52-16#	53-113#
	54-14#	55-108#	56-16#	57-110#	58-18#									
T$TAGL	7-915#													
T$TAGN	7-915#	9-10	9-10	9-10#	10-10	10-10	10-10#	15-9	15-9	15-9#	15-10	15-10	15-10#	15-11
	15-11	15-11#	15-12	15-12	15-12#	15-13	15-13	15-13#	15-14	15-14	15-14#	15-15	15-15	15-15#
	15-16	15-16	15-16#	15-17	15-17	15-17#	15-18	15-18	15-18#	15-19	15-19	15-19#	15-20	15-20
	15-20#	15-21	15-21	15-21#	15-22	15-22	15-22#	15-23	15-23	15-23#	15-24	15-24	15-24#	15-25

```
        15-25   15-25#  15-26   15-26   15-26#  15-27   15-27   15-27#  15-28   15-28   15-28#  15-29   15-29   15-29#
        17-105  17-105  17-105# 19-48   19-48   19-48#  20-8    20-8    20-8#   21-8    21-8    21-8#   22-10   22-10
        22-10#  23-8    23-8    23-8#   24-8    24-8    24-8#   25-9    25-9    25-9#   27-62   27-62   27-62#  28-195
        28-195  28-195# 29-18   29-18   29-18#  30-112  30-112  30-112# 31-14   31-14   31-14#  32-43   32-43   32-43#
        33-8    33-8    33-8#   34-82   34-82   34-82#  35-19   35-19   35-19#  36-100  36-100  36-100# 37-20   37-20
        37-20#  38-85   38-85   38-85#  39-19   39-19   39-19#  40-138  40-138  40-138# 41-53   41-53   41-53#  42-78
        42-78   42-78#  43-19   43-19   43-19#  44-100  44-100  44-100# 45-18   45-18   45-18#  46-97   46-97   46-97#
        47-20   47-20   47-20#  48-88   48-88   48-88#  49-99   49-99   49-99#  50-14   50-14   50-14#  51-75   51-75
        51-75#  52-16   52-16   52-16#  53-113  53-113  53-113# 54-14   54-14   54-14#  55-108  55-108  55-108# 56-16
        56-16   56-16#  57-110  57-110  57-110# 58-18   58-18   58-18#  60-53   60-53   60-53#  61-12   61-12   61-12#
        62-14   62-14   62-14#  62-15   62-15   62-15   62-15   62-15#  62-15#
T$TEMP   8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8
         8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8
         8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8
         8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8
         8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8     8-8#    8-8#    8-8#    8-8#    8-8#    8-8#
         8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#
         8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    8-8#    9-28
         9-28#  10-20   10-20#  10-21   10-21#  15-9    15-9#   15-10   15-10#  15-11   15-11#  15-12   15-12#  15-13
        15-13#  15-14   15-14#  15-15   15-15#  15-16   15-16#  15-17   15-17#  15-18   15-18#  15-19   15-19#  15-20
        15-20#  15-21   15-21#  15-22   15-22#  15-23   15-23#  15-24   15-24#  15-25   15-25#  15-26   15-26#  15-27
        15-27#  15-28   15-28#  15-29   15-29#  17-115  17-115# 18-91   18-91#  19-62   19-62#  19-78   19-78#  20-12
        20-12#  21-37   21-37#  21-93   21-93#  21-108  21-108# 22-19   22-19#  23-33   23-33#  23-48   23-48#  24-19
        24-19#  24-35   24-35#  25-20   25-20#  25-36   25-36#  25-37   25-37#  27-71   27-71#  27-127  27-127# 28-199
        28-199# 28-203  28-203# 29-22   29-22#  29-26   29-26#  30-116  30-116# 30-120  30-120# 31-18   31-18#  31-22
        31-22#  32-47   32-47#  32-51   32-51#  33-12   33-12#  33-16   33-16#  34-86   34-86#  34-90   34-90#  35-23
        35-23#  35-27   35-27#  36-104  36-104# 36-108  36-108# 37-24   37-24#  37-28   37-28#  38-89   38-89#  38-93
        38-93#  39-23   39-23#  39-27   39-27#  40-142  40-142# 40-146  40-146# 41-57   41-57#  41-61   41-61#  42-82
        42-82#  42-86   42-86#  43-23   43-23#  43-27   43-27#  44-104  44-104# 44-108  44-108# 45-22   45-22#  45-26
        45-26#  46-101  46-101# 46-105  46-105# 47-24   47-24#  47-28   47-28#  48-92   48-92#  48-96   48-96#  49-103
        49-103# 49-107  49-107# 50-18   50-18#  50-22   50-22#  51-79   51-79#  51-83   51-83#  52-20   52-20#  52-24
        52-24#  53-117  53-117# 53-121  53-121# 54-18   54-18#  54-22   54-22#  55-112  55-112# 55-116  55-116# 56-20
        56-20#  56-24   56-24#  57-114  57-114# 57-118  57-118# 58-22   58-22#  58-28   58-28#  59-1    59-1#   60-55
        60-55   60-55   60-55#  60-55#  60-55#  60-57   60-57   60-57   60-57#  60-57#  60-57#  60-59   60-59   60-59
        60-59#  60-59#  60-59#  60-61   60-61   60-61   60-61#  60-61#  60-61#  60-63   60-63   60-63   60-63#  60-63#
        60-63#  60-65   60-65   60-65   60-65#  60-65#  60-65#  60-66   60-66#  61-25   61-25#  61-44   61-44#
T$TEST   7-915# 27-62   27-62   27-62#  28-195  28-195  28-195# 29-18   29-18   29-18#  30-112  30-112  30-112# 31-14
        31-14   31-14#  32-43   32-43   32-43#  33-8    33-8    33-8#   34-82   34-82   34-82#  35-19   35-19   35-19#
        36-100  36-100  36-100# 37-20   37-20   37-20#  38-85   38-85   38-85#  39-19   39-19   39-19#  40-138  40-138
        40-138# 41-53   41-53   41-53#  42-78   42-78   42-78#  43-19   43-19   43-19#  44-100  44-100  44-100# 45-18
        45-18   45-18#  46-97   46-97   46-97#  47-20   47-20   47-20#  48-88   48-88   48-88#  49-99   49-99   49-99#
        50-14   50-14   50-14#  51-75   51-75   51-75#  52-16   52-16   52-16#  53-113  53-113  53-113# 54-14   54-14
        54-14#  55-108  55-108  55-108# 56-16   56-16   56-16#  57-110  57-110  57-110# 58-18   58-18   58-18#  61-43
T$TSTM   7-915# 15-9    15-9    15-10   15-10   15-11   15-11   15-12   15-12   15-13   15-13   15-14   15-14   15-15
        15-15   15-16   15-16   15-17   15-17   15-18   15-18   15-19   15-19   15-20   15-20   15-21   15-21   15-22
        15-22   15-23   15-23   15-24   15-24   15-25   15-25   15-26   15-26   15-27   15-27   15-28   15-28   15-29
        15-29   17-16   17-35   17-79   17-87   17-132  17-137  17-160  17-162  17-162  17-171  17-172  17-175  17-180
        17-188  17-190  17-190  17-199  17-200  17-203  17-208  18-21   18-79   18-80   18-81   18-82   18-83   18-84
        18-87   18-88   19-78   21-10   21-12   21-16   21-20   21-24   21-36   21-37   21-46   21-59   21-64   21-67
        21-93   21-108  22-19   23-10   23-18   23-21   23-33   23-48   24-35   25-36   27-71   27-93   27-93   27-93
        27-93   27-101  27-101  27-101  27-101  27-110  27-110  27-110  27-110  27-110  27-110  27-110  27-110  27-124
        27-125  27-127  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199
        28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199
        28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-199  28-203
        29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22
        29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22   29-22
```

CROSS REFERENCE TABLE (CREF V04.00)

29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-26	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-120	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-22	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-51
33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-16	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-90
35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23
35-23	35-23	35-23	35-23	35-23	35-27	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104
36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-108	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-28
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-93	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-27	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-146	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57
41-61	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82
42-86	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
43-27	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-108	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-26	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-105	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-28	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-96	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-10?	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-107	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-22	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-83	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-24	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-121	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-22	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-116	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20
56-20	56-20	56-24	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114
57-114	57-118	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22
58-28													

T$TSTS	7-915#	27-62#	28-195#	29-18#	30-112#	31-14#	32-43#	33-8#	34-82#	35-19#	36-100#	37-20#	38-85#	39-19#
	40-138#	41-53#	42-78#	43-19#	44-100#	45-18#	46-97#	47-20#	48-88#	49-99#	50-14#	51-75#	52-16#	53-113#
	54-14#	55-108#	56-16#	57-110#	58-18#									
T1	8-8	27-62#												
T10	8-8	36-100#												
T11	8-8	37-20#												
T12	8-8	38-85#												
T13	8-8	39-19#												
T14	8-8	40-138#												
T15	8-8	41-53#												
T16	8-8	42-78#												
T17	8-8	43-19#												
T18	8-8	44-100#												
T19	8-8	45-18#												
T2	8-8	28-195#												
T20	8-8	46-97#												
T21	8-8	47-20#												
T22	8-8	48-88#												
T23	8-8	49-99#												

CROSS REFERENCE TABLE (CREF V04.00)

```
T24       8-8      50-14#
T25       8-8      51-75#
T26       8-8      52-16#
T27       8-8      53-113#
T28       8-8      54-14#
T29       8-8      55-108#
T3        8-8      29-18#
T30       8-8      56-16#
T31       8-8      57-110#
T32       8-8      58-18#
T4        8-8      30-112#
T5        8-8      31-14#
T6        8-8      32-43#
T7        8-8      33-8#
T8        8-8      34-82#
T9        8-8      35-19#
TABELD    18-17#   21-27
TAP       12-131#
TCF       12-156#
TICKMS    17-51*   17-54*   17-57#   17-106   17-111
TIME      13-24#   15-25    17-106*  17-108*  17-161*  17-176   17-178   17-182   17-189*  17-204   17-206   17-209   21-38*   28-199
          28-199*  29-22    29-22*   30-116*  30-116*  31-18*   31-18*   32-47*   32-47*   32-47*   33-12*   33-12*   33-12*   34-86*
          34-86*   34-86*   34-86*   35-23*   35-23*   35-23*   35-23*   36-104*  36-104*  36-104*  36-104*  37-24*   37-24*   37-24*
          37-24*   38-89*   39-23*   40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  41-57*   41-57*   42-82*   42-82*   42-82*
          42-82*   43-23*   43-23*   43-23*   43-23*   44-104*  45-22*   46-101*  47-24*   49-103*  49-103*  50-18*   50-18*   51-79*
          51-79*   51-79*   52-20*   52-20*   52-20*   53-117*  53-117*  53-117*  53-117*  54-18*   54-18*   54-18*   54-18*   55-112
          55-112*  55-112*  55-112*  55-112*  56-20    56-20*   56-20*   56-20*   56-20*   57-114*  57-114*  57-114*  58-22*   58-22*
          58-22*
TIMEA     13-26#   17-155*  17-182*  17-184
TIMEAM    13-28#   17-155*  17-186*  55-112
TIMEAP    13-27#   17-155*  17-185*  55-112   57-114
TIMEB     13-29#   17-155*  17-209*  17-211
TIMEBM    13-31#   17-155*  17-213*  56-20
TIMEBP    13-30#   17-155*  17-212*  56-20    58-22
TIMES     13-32#   55-112   55-112   55-112*  56-20    56-20    56-20*
TMP0      13-39#   15-27    17-162   17-162*  17-162*  17-190   17-190*  17-190*  27-93    27-93    27-93*   27-93*   27-93*   27-93*
          27-101   27-101   27-101*  27-101*  27-101*  27-101*  27-110   27-110   27-110   27-110   27-110*  27-110*  27-110*  27-110*
          27-110*  27-110*  27-110*  27-110*  28-199   28-199   28-199   28-199   28-199*  28-199*  28-199*  28-199*  29-22    29-22
          29-22    29-22    29-22*   29-22*   29-22*   29-22*   30-116   30-116   30-116   30-116   30-116   30-116   30-116*  30-116*
          30-116*  30-116*  30-116*  30-116*  30-116*  30-116*  31-18    31-18    31-18    31-18    31-18    31-18    31-18*   31-18*
          31-18*   31-18*   31-18*   31-18*   31-18*   31-18*   32-47    32-47    32-47    32-47*   32-47*   32-47*   32-47*   32-47*
          32-47*   33-12    33-12    33-12    33-12*   33-12*   33-12*   33-12*   33-12*   33-12*   34-86    34-86    34-86    34-86
          34-86    34-86    34-86*   34-86*   34-86*   34-86*   34-86*   34-86*   35-23    35-23    35-23    35-23    35-23    35-23
          35-23*   35-23*   35-23*   35-23*   35-23*   35-23*   36-104   36-104   36-104   36-104   36-104*  36-104*  36-104*  36-104*
          37-24    37-24    37-24    37-24    37-24*   37-24*   37-24*   37-24*   38-89    38-89    38-89    38-89    38-89    38-89
          38-89    38-89    38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*   38-89*
          39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23*   39-23*   39-23*   39-23*   39-23*   39-23*
          39-23*   39-23*   39-23*   39-23*   39-23*   39-23*   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142
          40-142   40-142   40-142   40-142   40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  40-142*
          40-142*  40-142*  41-57    41-57    41-57    41-57    41-57*   41-57*   41-57*   41-57*   42-82    42-82    42-82    42-82
          42-82    42-82*   42-82*   42-82*   42-82*   42-82*   42-82*   43-23    43-23    43-23    43-23    43-23    43-23*   43-23*
          43-23*   43-23*   43-23*   43-23*   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104*  44-104*
          44-104*  44-104*  44-104*  44-104*  44-104*  44-104*  44-104*  44-104*  44-104*  44-104*  45-22    45-22    45-22    45-22
          45-22    45-22    45-22    45-22    45-22*   45-22*   45-22*   45-22*   45-22*   45-22*   45-22*   45-22*   45-22*   45-22*
          45-22*   45-22*   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101*  46-101*  46-101*  46-101*
          46-101*  46-101*  46-101*  46-101*  46-101*  46-101*  46-101*  46-101*  47-24    47-24    47-24    47-24    47-24    47-24
```

	47-24	47-24	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*
	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*
	48-92*	48-92*	48-92*	49-103	49-103	49-103	49-103*	49-103*	50-18	50-18	50-18	50-18*	50-18*	51-79
	51-79	51-79	51-79	51-79	51-79*	51-79*	51-79*	51-79*	51-79*	51-79*	52-20	52-20	52-20	52-20
	52-20	52-20*	52-20*	52-20*	52-20*	52-20*	52-20*	53-117	53-117	53-117	53-117	53-117	53-117	53-117*
	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	54-18	54-18	54-18	54-18	54-18	54-18	54-18*
	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	55-112	55-112	55-112	55-112*	55-112*	56-20	56-20
	56-20	56-20*	56-20*	57-114	57-114	57-114	57-114*	57-114*	58-22	58-22	58-22	58-22*	58-22*	
TMP1	13-40#	15-27	17-162	17-162*	17-162*	17-190	17-190*	17-190*	28-199	28-199	28-199	28-199*	28-199*	28-199*
	28-199*	29-22	29-22	29-22	29-22*	29-22*	29-22*	29-22*	30-116	30-116	30-116*	30-116*	31-18	31-18
	31-18*	31-18*	32-47	32-47	32-47	32-47*	32-47*	32-47*	32-47*	32-47*	32-47*	33-12	33-12	33-12
	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	34-86	34-86	34-86	34-86*	34-86*	34-86*	34-86*	35-23
	35-23	35-23	35-23*	35-23*	35-23*	35-23*	36-104	36-104	36-104*	36-104*	37-24	37-24	37-24*	37-24*
	38-89	38-89	38-89	38-89*	38-89*	38-89*	38-89*	39-23	39-23	39-23	39-23*	39-23*	39-23*	39-23*
	40-142	40-142	40-142	40-142	40-142*	40-142*	40-142*	40-142*	41-57	41-57	41-57*	41-57*	42-82	42-82
	42-82*	42-82*	43-23	43-23	43-23*	43-23*	44-104	44-104	44-104	44-104*	44-104*	44-104*	44-104*	45-22
	45-22	45-22	45-22*	45-22*	45-22*	45-22*	46-101	46-101	46-101	46-101*	46-101*	46-101*	46-101*	47-24
	47-24	47-24	47-24*	47-24*	47-24*	47-24*	48-92	48-92	48-92*	48-92*	49-103	49-103	49-103*	49-103*
	50-18	50-18	50-18*	50-18*	51-79	51-79	51-79*	51-79*	52-20	52-20	52-20*	52-20*	53-117	53-117
	53-117*	53-117*	54-18	54-18	54-18*	54-18*	55-112	55-112	55-112*	55-112*	56-20	56-20	56-20*	56-20*
	57-114	57-114	57-114*	57-114*	58-22	58-22	58-22*	58-22*						
TMP2	13-41#	15-23	15-27	28-199	28-199	28-199	28-199*	28-199*	29-22	29-22	29-22	29-22*	29-22*	30-116
	30-116	30-116	30-116*	30-116*	31-18	31-18	31-18	31-18*	31-18*	34-86	34-86	34-86	34-86*	34-86*
	35-23	35-23	35-23	35-23*	35-23*	36-104	36-104	36-104	36-104*	36-104*	37-24	37-24	37-24	37-24*
	37-24*	38-89	38-89	38-89	38-89*	38-89*	39-23	39-23	39-23	39-23*	39-23*	40-142	40-142	40-142
	40-142	40-142	40-142	40-142*	40-142*	40-142*	40-142*	41-57	41-57	41-57	41-57*	41-57*	42-82	42-82
	42-82	42-82*	42-82*	43-23	43-23	43-23	43-23*	43-23*	44-104	44-104	44-104	44-104*	44-104*	45-22
	45-22	45-22	45-22*	45-22*	46-101	46-101	46-101	46-101*	46-101*	47-24	47-24	47-24	47-24*	47-24*
	48-92	48-92	48-92	48-92*	48-92*	49-103	49-103	49-103	49-103*	49-103*	50-18	50-18	50-18	50-18*
	50-18*	51-79	51-79	51-79	51-79*	51-79*	52-20	52-20	52-20	52-20*	52-20*	53-117	53-117	53-117
	53-117*	53-117*	54-18	54-18	54-18	54-18*	54-18*	55-112	55-112	55-112	55-112*	55-112*	56-20	56-20
	56-20	56-20*	56-20*	57-114	57-114	57-114	57-114*	57-114*	58-22	58-22	58-22	58-22*	58-22*	
TMP3	13-42#	15-23	15-27	28-199	28-199	28-199	28-199*	28-199*	29-22	29-22	29-22	29-22*	29-22*	30-116
	30-116	30-116	30-116*	30-116*	31-18	31-18	31-18	31-18*	31-18*	34-86	34-86	34-86	34-86*	34-86*
	35-23	35-23	35-23	35-23*	35-23*	36-104	36-104	36-104	36-104*	36-104*	37-24	37-24	37-24	37-24*
	37-24*	38-89	38-89	38-89	38-89*	38-89*	39-23	39-23	39-23	39-23*	39-23*	40-142	40-142	40-142
	40-142	40-142	40-142	40-142*	40-142*	40-142*	40-142*	41-57	41-57	41-57	41-57*	41-57*	42-82	42-82
	42-82	42-82*	42-82*	43-23	43-23	43-23	43-23*	43-23*	44-104	44-104	44-104	44-104*	44-104*	45-22
	45-22	45-22	45-22*	45-22*	46-101	46-101	46-101	46-101*	46-101*	47-24	47-24	47-24	47-24*	47-24*
	48-92	48-92	48-92	48-92*	48-92*	49-103	49-103	49-103	49-103*	49-103*	50-18	50-18	50-18	50-18*
	50-18*	51-79	51-79	51-79	51-79*	51-79*	52-20	52-20	52-20	52-20*	52-20*	53-117	53-117	53-117
	53-117*	53-117*	54-18	54-18	54-18	54-18*	54-18*	55-112	55-112	55-112	55-112*	55-112*	56-20	56-20
	56-20	56-20*	56-20*	57-114	57-114	57-114	57-114*	57-114*	58-22	58-22	58-22	58-22*	58-22*	
TMP4	13-43#	27-93	27-93	27-93*	27-93*	27-93*	27-93*	27-101	27-101	27-101*	27-101*	27-101*	27-101*	27-110
	27-110	27-110	27-110	27-110*	27-110*	27-110*	27-110*	27-110*	27-110*	27-110*	27-110*	30-116	30-116	30-116
	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	31-18	31-18	31-18	31-18*	31-18*	31-18*	31-18*	31-18*
	31-18*	36-104	36-104*	36-104*	37-24	37-24*	37-24*	38-89	38-89	38-89	38-89	38-89*	38-89*	38-89*
	38-89*	38-89*	38-89*	36-89*	38-89*	39-23	39-23	39-23	39-23	39-23*	39-23*	39-23*	39-23*	39-23*
	39-23*	39-23*	39-23*	40-142	40-142	40-142*	40-142*	40-142*	40-142*	42-82	42-82	42-82*	42-82*	42-82*
	42-82*	43-23	43-23	43-23*	43-23*	43-23*	43-23*	44-104	44-104	44-104	44-104	44-104*	44-104*	44-104*
	44-104*	44-104*	44-104*	44-104*	44-104*	45-22	45-22	45-22	45-22	45-22*	45-22*	45-22*	45-22*	45-22*
	45-22*	45-22*	45-22*	46-101	46-101	46-101	46-101	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*
	46-101*	47-24	47-24	47-24	47-24	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	48-92
	48-92	48-92	48-92	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	51-79	51-79	51-79*
	51-79*	51-79*	51-79*	52-20	52-20	52-20*	52-20*	52-20*	52-20*	53-117	53-117	53-117	53-117*	53-117*
	53-117*	53-117*	53-117*	53-117*	54-18	54-18	54-18	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	

CROSS REFERENCE TABLE (CREF V04.00)

```
TOLER   17-119#  17-183   17-210
TPE     12-149#
TRE     12-11#   34-86    35-23
TSTNUM  13-20#
U0      12-25#
U1      12-26#
U2      12-27#
UAM     11-57#
UNIT    13-45#   18-21    18-47*   18-48    21-25*   21-26*   21-28
UNS     12-93#
UPE     12-38#
VV      12-65#   17-162   17-190   28-199   28-199   28-199   28-199   29-22    29-22    29-22    29-22    30-116   30-116   30-116
        30-116   30-116   30-116   31-18    31-18    31-18    31-18    31-18    31-18    32-47    32-47    32-47    33-12    33-12
        33-12    34-86    34-86    34-86    34-86    34-86    35-23    35-23    35-23    35-23    35-23    36-104   36-104   36-104
        37-24    37-24    37-24    38-89    38-89    38-89    38-89    38-89    38-89    39-23    39-23    39-23    39-23    39-23
        39-23    40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   41-57    41-57    41-57
        42-82    42-82    42-82    43-23    43-23    43-23    44-104   44-104   44-104   44-104   45-22    45-22    45-22    45-22
        46-101   46-101   46-101   46-101   47-24    47-24    47-24    47-24    48-92    48-92    49-103   49-103   50-18    50-18
        51-79    51-79    51-79    52-20    52-20    52-20    53-117   53-117   54-18    54-18    55-112   55-112   55-112   56-20
        56-20    56-20    57-114   57-114   57-114   58-22    58-22    58-22
VVSET   14-10#   17-162   17-190   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    30-116   30-116   30-116   30-116   30-116   30-116   30-116   31-18    31-18
        31-18    31-18    31-18    31-18    31-18    32-2#    32-47    32-47    32-47    33-12    33-12    33-12    34-86    34-86
        34-86    34-86    34-86    34-86    34-86    34-86    34-86    35-23    35-23    35-23    35-23    35-23    35-23    35-23
        35-23    35-23    36-104   36-104   36-104   36-104   36-104   36-104   36-104   37-24    37-24    37-24    37-24    37-24
        37-24    37-24    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    39-23    39-23    39-23    39-23
        39-23    39-23    39-23    39-23    40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142
        40-142   40-142   40-142   40-142   40-142   40-142   41-57    41-57    41-57    41-57    41-57    41-57    42-82    42-82
        42-82    42-82    42-82    42-82    42-82    43-23    43-23    43-23    43-23    43-23    43-23    43-23    44-104   44-104
        44-104   44-104   44-104   44-104   44-104   44-104   45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    48-92    48-92    48-92    48-92    48-92    48-92    49-103   49-103   49-103   49-103   49-103   49-103
        50-18    50-18    50-18    50-18    50-18    50-18    51-79    51-79    51-79    51-79    51-79    51-79    51-79    52-20
        52-20    52-20    52-20    52-20    52-20    52-20    52-26#   52-28#   53-117   53-117   53-117   53-117   53-117   53-117
        54-18    54-18    54-18    54-18    54-18    54-18    55-112   55-112   55-112   55-112   55-112   55-112   56-20    56-20
        56-20    56-20    56-20    56-20    57-114   57-114   57-114   57-114   57-114   57-114   58-22    58-22    58-22    58-22
        58-22    58-22
WATCH   13-25#   17-109   17-111*  17-113*  17-161*  17-169   17-189*  17-197   21-38*   21-39    28-199   28-199*  29-22    29-22*
        30-116   30-116   30-116*  30-116*  31-18    31-18    31-18*   31-18*   32-47    32-47    32-47    32-47*   32-47*   32-47*
        33-12    33-12    33-12    33-12*   33-12*   33-12*   34-86    34-86    34-86    34-86    34-86*   34-86*   34-86*   34-86*
        35-23    35-23    35-23    35-23    35-23*   35-23*   35-23*   35-23*   36-104   36-104   36-104   36-104   36-104*  36-104*
        36-104*  36-104*  37-24    37-24    37-24    37-24    37-24*   37-24*   37-24*   37-24*   38-89    38-89*   39-23    39-23*
        40-142   40-142   40-142   40-142   40-142   40-142   40-142*  40-142*  40-142*  40-142*  40-142*  40-142*  41-57    41-57
        41-57*   41-57*   42-82    42-82    42-82    42-82    42-82*   42-82*   42-82*   42-82*   43-23    43-23    43-23    43-23
        43-23*   43-23*   43-23*   43-23*   44-104   44-104*  45-22    45-22*   46-101   46-101*  47-24    47-24*   49-103   49-103
        49-103*  49-103*  50-18    50-18    50-18*   50-18*   51-79    51-79    51-79    51-79*   51-79*   51-79*   52-20    52-20
        52-20    52-20*   52-20*   52-20*   53-117   53-117   53-117   53-117   53-117*  53-117*  53-117*  53-117*  54-18    54-18
        54-18    54-18    54-18*   54-18*   54-18*   54-18*   55-112   55-112   55-112   55-112   55-112*  55-112*  55-112*  55-112*
        56-20    56-20    56-20    56-20    56-20*   56-20*   56-20*   56-20*   57-114   57-114   57-114   57-114   57-114*  57-114*
        57-114*  57-114*  58-22    58-22    58-22    58-22    58-22*   58-22*   58-22*   58-22*
WCE     12-39#
WCF     12-84#
WLE     12-90#
WOR     12-187#
WRL     12-70#   28-199   28-199   29-22    29-22    30-116   30-116   31-18    31-18    34-86    34-86    35-23    35-23    36-104
        36-104   37-24    37-24    38-89    38-89    39-23    39-23    40-142   40-142   40-142   40-142   41-57    41-57    42-82
```

CROSS REFERENCE TABLE (CREF V04.00)

	42-82	43-23	43-23	44-104	44-104	45-22	45-22	46-101	46-101	47-24	47-24	48-92	48-92	49-103
	49-103	50-18	50-18	51-79	51-79	52-20	52-20	53-117	53-117	54-18	54-18	55-112	55-112	56-20
	56-20	57-114	57-114	58-22	58-22									
WRYUNS	12-186#													
X$ALWA	7-915#													
X$FALS	7-915#													
X$OFFS	7-915#													
X$TRUE	7-915#													

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE M-1 SEQ 0256
CROSS REFERENCE TABLE (CREF V04.00)

```
AA       28-19#   28-199   29-22
ADD1     46-20#   46-101   47-24
ADD10    49-16#   49-103   50-18
BCOMPL    1-15#    7-915#  21-14    21-18
BERROR    1-19#    7-915#
BGNAU     1-23#    7-915#  25-9
BGNAUT    1-31#    7-915#  22-10
BGNCLN    1-39#    7-915#  23-8
BGNDU     1-47#    7-915#  24-8
BGNHRD    1-55#    7-915#  60-53
BGNHW     1-66#    7-915#   9-10
BGNINI    1-77#    7-915#  21-8
BGNMOD    1-85#    7-915#   7-941   11-51   19-42   27-38   60-43
BGNMSG    1-98#    7-915#  15-9     15-10   15-11   15-12   15-13   15-14   15-15   15-16   15-17   15-18   15-19   15-20
         15-21    15-22    15-23    15-24   15-25   15-26   15-27   15-28   15-29
BGNPRO    1-106#   7-915#  20-8
BGNPTA    1-114#   7-915#  62-15
BGNRPT    1-144#   7-915#  19-48
BGNSEG    1-152#   7-915#
BGNSET    1-161#   7-915#  62-14
BGNSFT    1-182#   7-915#  61-12
BGNSRV    1-193#   7-915#  17-105
BGNSUB    1-201#   7-915#
BGNSW     1-225#   7-915#  10-10
BGNTST    1-236#   7-915#  27-62    28-195  29-18   30-112  31-14   32-43   33-8    34-82   35-19   36-100  37-20   38-85
         39-19    40-138   41-53    42-78   43-19   44-100  45-18   46-97   47-20   48-88   49-99   50-14   51-75   52-16
         53-113   54-14    55-108   56-16   57-110  58-18
BNCOMP    1-266#   7-915#  17-18    17-37   18-22   21-22
BNERRO    1-270#   7-915#
BREAK     1-274#   7-915#
BRESET    1-278#   7-915#  21-10
CC       30-15#   30-116   31-18
CC1      32-13#   32-47    33-12
CHECK     7-300#   27-93    27-93    27-101  27-101  27-110  27-110  27-110  27-110  30-116  30-116  30-116  31-18   31-18
         31-18    34-86    35-23    36-104  36-104  36-104  36-104  37-24   37-24   37-24   37-24   38-89   38-89   38-89
         38-89    39-23    39-23    39-23   39-23   40-142  40-142  42-82   42-82   43-23   43-23   44-104  44-104  44-104
         44-104   45-22    45-22    45-22   45-22   46-101  46-101  46-101  46-101  47-24   47-24   47-24   47-24   48-92
         48-92    48-92    48-92    49-103  49-103  50-18   50-18   51-79   51-79   52-20   52-20   53-117  53-117  53-117
         53-117   54-18    54-18    54-18   54-18   57-114  58-22
CKLOOP    1-282#   7-915#
CLOCK     1-286#   7-915#  17-16    17-35
CLOSE     1-292#   7-915#
CLRATA    7-724#   34-86    35-23    36-104  37-24   40-142  41-57   42-82   43-23   49-103  50-18   51-79   52-20   53-117
         53-117   54-18    54-18    55-112  56-20   57-114  58-22
CLRVEC    1-296#   7-915#  23-18    23-21
COMMEN    1-301#   7-915#
DELAY     1-322#   7-915#
DESCRI    1-317#   7-915#  14-30
DEVTYP    1-341#   7-915#  14-20
DISPAT    1-346#   7-915#   8-8
DISPLA    1-360#   7-915#
DOCLN     1-376#   7-915#
DODU      1-380#   7-915#
DORPT     1-385#   7-915#
EE       42-20#   42-82    43-23
ENDAU     1-389#   7-915#  25-36
```

CROSS REFERENCE TABLE (CREF V04.00)

```
ENDAUT    1-401#   7-915#  22-19
ENDCLN    1-413#   7-915#  23-48
ENDCOM    1-425#   7-915#
ENDDU     1-441#   7-915#  24-35
ENDHRD    1-453#   7-915#  60-66
ENDHW     1-465#   7-915#   9-28
ENDINI    1-475#   7-915#  21-108
ENDMOD    1-487#   7-915#  10-21    18-91    25-37    59-1     61-44
ENDMSG    1-500#   7-915#  15-9     15-10    15-11    15-12    15-13    15-14    15-15    15-16    15-17    15-18    15-19    15-20
          15-21    15-22   15-23    15-24    15-25    15-26    15-27    15-28    15-29
ENDPRO    1-512#   7-915#  20-12
ENDPTA    1-520#   7-915#  62-22
ENDRPT    1-529#   7-915#  19-78
ENDSEG    1-541#   7-915#
ENDSET    1-555#   7-915#  62-23
ENDSFT    1-568#   7-915#  61-25
ENDSRV    1-580#   7-915#  17-115
ENDSUB    1-596#   7-915#
ENDSW     1-614#   7-915#  10-20
ENDTST    1-624#   7-915#  27-127   28-203   29-26    30-120   31-22    32-51    33-16    34-90    35-27    36-108   37-28    38-93
          39-27    40-146  41-61    42-86    43-27    44-108   45-26    46-105   47-28    48-96    49-107   50-22    51-83    52-24
          53-121   54-22   55-116   56-24    57-118   58-28
EQUALS    1-642#   7-915#  11-57
ERRDF     1-714#   7-915#  17-132   17-137   21-36
ERRHRD    1-718#   7-915#  17-162   17-162   17-171   17-180   17-190   17-190   17-199   17-208   27-93    27-93    27-101   27-101
          27-110   27-110  27-110   27-110   27-124   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
          28-199   28-199  28-199   28-199   28-199   28-199   28-199   28-199   28-199   29-22    29-22    29-22    29-22    29-22
          29-22    29-22   29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    30-116
          30-116   30-116  30-116   30-116   30-116   30-116   30-116   31-18    31-18    31-18    31-18    31-18    31-18    31-18
          31-18    32-47   32-47    32-47    32-47    32-47    32-47    33-12    33-12    33-12    33-12    33-12    33-12    34-86
          34-86    34-86   34-86    34-86    34-86    34-86    34-86    34-86    34-86    35-23    35-23    35-23    35-23    35-23
          35-23    35-23   35-23    35-23    35-23    36-104   36-104   36-104   36-104   36-104   36-104   36-104   36-104   37-24
          37-24    37-24   37-24    37-24    37-24    37-24    37-24    38-89    38-89    38-89    38-89    38-89    38-89    38-89
          38-89    38-89   38-89    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    40-142
          40-142   40-142  40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142
          40-142   41-57   41-57    41-57    41-57    41-57    42-82    42-82    42-82    42-82    42-82    42-82    43-23    43-23
          43-23    43-23   43-23    43-23    44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104
          45-22    45-22   45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    46-101   46-101   46-101   46-101
          46-101   46-101  46-101   46-101   46-101   46-101   47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
          47-24    47-24   48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    49-103   49-103   49-103   49-103
          49-103   49-103  49-103   50-18    50-18    50-18    50-18    50-18    50-18    50-18    51-79    51-79    51-79    51-79
          51-79    51-79   52-20    52-20    52-20    52-20    52-20    52-20    53-117   53-117   53-117   53-117   53-117   53-117
          53-117   53-117  53-117   54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    55-112   55-112
          55-112   55-112  55-112   55-112   56-20    56-20    56-20    56-20    56-20    56-20    57-114   57-114   57-114   57-114
          57-114   57-114  58-22    58-22    58-22    58-22    58-22    58-22
ERROR     1-722#   7-915#
ERRSF     1-726#   7-915#
ERRSOF    1-730#   7-915#
ERRTBL    1-734#   7-915#
ESCAPE    1-744#   7-915#
ESTATE    7-126#   15-9     15-10    15-11    15-12    15-13    15-14    15-15    15-16    15-17    15-18    15-19    15-20    15-21
          15-22    15-23   15-24    15-25    15-26    15-27    15-28    15-29
EXIT      1-771#   7-915#  19-62    21-37    21-93    23-33    24-19    25-20    27-71    28-199   29-22    30-116   31-18    32-47
          33-12    34-86   35-23    36-104   37-24    38-89    39-23    40-142   41-57    42-82    43-23    44-104   45-22    46-101
          47-24    48-92   49-103   50-18    51-79    52-20    53-117   54-18    55-112   56-20    57-114   58-22
FEQUAL    1-810#   7-915#
```

CROSS REFERENCE TABLE (CREF V04.00)

FF1	34-20#	34-86	35-23											
GETBYT	1-824#	7-915#												
GETPRI	1-834#	7-915#												
GETWOR	1-829#	7-915#												
GG	40-16#	40-142												
GMANIA	1-839#	7-915#												
GMANID	1-848#	7-915#												
GMANIL	1-859#	7-915#												
GPHARD	1-868#	7-915#	18-21											
GPRMA	1-874#	7-915#	60-55	60-57										
GPRMD	1-903#	7-915#	60-59	60-61	60-63									
GPRML	1-934#	7-915#	60-65											
HEADER	1-954#	7-915#	7-969											
HH	41-13#	41-57												
II	53-15#	53-117	54-18											
INLOOP	1-962#	7-915#												
IOSETU	1-966#	7-915#												
IOSTAR	1-974#	7-915#												
JJ	36-21#	36-104	37-24											
KK	55-17#	55-112	56-20											
KT11	1-982#	7-915#												
LASTAD	1-:47#	7-915#	61-43											
MSBYTE	1-D00#	7-915#	7-969	7-969	7-969	7-969#								
MSCHEC	1-E18#	7-915#	19-62	19-62#	21-37	21-37#	21-93	21-93#	23-33	23-33#	24-19	24-19#	25-20	25-20#
	27-71	27-71#	28-199	28-199#	29-22	29-22#	30-116	30-116#	31-18	31-18#	32-47	32-47#	33-12	33-12#
	34-86	34-86#	35-23	35-23#	36-104	36-104#	37-24	37-24#	38-89	38-89#	39-23	39-23#	40-142	40-142#
	41-57	41-57#	42-82	42-82#	43-23	43-23#	44-104	44-104#	45-22	45-22#	46-101	46-101#	47-24	47-24#
	48-92	48-92#	49-103	49-103#	50-18	50-18#	51-79	51-79#	52-20	52-20#	53-117	53-117#	54-18	54-18#
	55-112	55-112#	56-20	56-20#	57-114	57-114#	58-22	58-22#						
MSCNTO	1-E82#	7-915#	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#	60-65	60-65#
MSCOUN	1-D66#	7-915#	15-9	15-9	15-9	15-9#	15-10	15-10	15-10	15-10#	15-11	15-11	15-11	15-11
	15-11	15-11#	15-12	15-12	15-12	15-12	15-12#	15-13	15-13	15-13	15-13	15-13#	15-14	15-14
	15-14	15-14#	15-15	15-15	15-15	15-15#	15-16	15-16#	15-17	15-17	15-17#	15-18	15-18	15-18
	15-18#	15-19	15-1?#	15-20	15-20	15-20#	15-21	15-21	15-21	15-21#	15-22	15-22	15-22#	15-23
	15-23	15-23#	15-24	15-24	15-24#	15-25	15-25	15-25#	15-26	15-26#	15-27	15-27	15-27	15-27
	15-27#	15-28	15-28	15-28	15-28#	15-29	15-29	15-29	15-29#	17-172	17-172#	17-200	17-200#	18-79
	18-79#	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80#	18-81	18-81#	18-82	18-82	18-82
	18-82	18-82	18-82	18-82	18-82#	18-83	18-83#	18-84	18-84	18-84	18-84	18-84	18-84	18-84
	18-84#	18-87	18-87#	18-88	18-88	18-88#	21-24	21-24#	21-46	21-46	21-46#	21-59	21-59#	21-64
	21-64#	27-93	27-93	27-93#	27-93#	27-101	27-101	27-101#	27-101#	27-110	27-110	27-110	27-110	27-110#
	27-110#	27-110#	27-110#	27-125	27-125#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
	29-22#	29-22#	29-22#	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116#	30-116#	30-116#
	30-116#	30-116#	30-116#	30-116#	30-116#	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18#
	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	34-86	34-86	34-86	34-86	34-86	34-86	34-86
	34-86	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	35-23	35-23	35-23	35-23	35-23
	35-23	35-23	35-23	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	36-104	36-104	36-104
	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	37-24
	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
	37-24#	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89#	38-89#	38-89#	38-89#	38-89#
	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#
	39-23#	39-23#	39-23#	39-23#	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#

CROSS REFERENCE TABLE (CREF V04.00)

```
        40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  41-57    41-57    41-57    41-57    41-57#
        41-57#   41-57#   41-57#   42-82    42-82    42-82    42-82    42-82    42-82    42-82#   42-82#   42-82#   42-82#   42-82#
        42-82#   43-23    43-23    43-23    43-23    43-23    43-23    43-23#   43-23#   43-23#   43-23#   43-23#   43-23#   44-104
        44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104#  44-104#  44-104#  44-104#  44-104#  44-104#  44-104#
        44-104#  45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22#   45-22#   45-22#   45-22#   45-22#
        45-22#   45-22#   45-22#   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101#  46-101#  46-101#
        46-101#  46-101#  46-101#  46-101#  46-101#  47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24#
        47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103#  49-103#  49-103#  49-103#  49-103#  49-103#  49-103#  50-18    50-18    50-18    50-18    50-18
        50-18    50-18    50-18#   50-18#   50-18#   50-18#   50-18#   50-18#   50-18#   51-79    51-79    51-79    51-79    51-79
        51-79    51-79#   51-79#   51-79#   51-79#   51-79#   51-79#   52-20    52-20    52-20    52-20    52-20    52-20    52-20#
        52-20#   52-20#   52-20#   52-20#   52-20#   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117
        53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  54-18    54-18    54-18    54-18    54-18
        54-18    54-18    54-18    54-18    54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   55-112
        55-112   55-112   55-112   55-112   55-112   55-112#  55-112#  55-112#  55-112#  55-112#  55-112#  56-20    56-20    56-20
        56-20    56-20    56-20    56-20#   56-20#   56-20#   56-20#   56-20#   56-20#   57-114   57-114   57-114   57-114   57-114
        57-114#  57-114#  57-114#  57-114#  57-114#  58-22    58-22    58-22    58-22    58-22    58-22#   58-22#   58-22#   58-22#
        58-22#
MSDATA   1-B67#   7-915#   7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969
         7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969
         7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969    7-969#   7-969#   14-20
        14-20#   14-30    14-30#
MSDECR   1-D29#   7-915#   9-28     9-28#    10-20    10-20#   10-21    10-21#   15-9     15-9#    15-10    15-10#   15-11    15-11#
        15-12    15-12#   15-13    15-13#   15-14    15-14#   15-15    15-15#   15-16    15-16#   15-17    15-17#   15-18    15-18#
        15-19    15-19#   15-20    15-20#   15-21    15-21#   15-22    15-22#   15-23    15-23#   15-24    15-24#   15-25    15-25#
        15-26    15-26#   15-27    15-27#   15-28    15-28#   15-29    15-29#   17-115   17-115#  18-91    18-91#   19-78    19-78#
        20-12    20-12#   21-108   21-108#  22-19    22-19#   23-48    23-48#   24-35    24-35#   25-36    25-36#   25-37    25-37#
        27-127   27-127#  28-203   28-203#  29-26    29-26#   30-120   30-120#  31-22    31-22#   32-51    32-51#   33-16    33-16#
        34-90    34-90#   35-27    35-27#   36-108   36-108#  37-28    37-28#   38-93    38-93#   39-27    39-27#   40-146   40-146#
        41-61    41-61#   42-86    42-86#   43-27    43-27#   44-108   44-108#  45-26    45-26#   46-105   46-105#  47-28    47-28#
        48-96    48-96#   49-107   49-107#  50-22    50-22#   51-83    51-83#   52-24    52-24#   53-121   53-121#  54-22    54-22#
        55-116   55-116#  56-24    56-24#   57-118   57-118#  58-28    58-28#   59-1     59-1#    60-66    60-66#   61-25    61-25#
        61-44    61-44#   62-15    62-15#
MSDEFA   1-E70#   7-915#   60-55    60-55#   60-57    60-57#   60-59    60-59#   60-61    60-61#   60-63    60-63#   60-65    60-65#
MSENDE   1-D74#   7-915#   9-28#    10-20#   10-21#   15-9#    15-10#   15-11#   15-12#   15-13#   15-14#   15-15#   15-16#   15-17#
        15-18#   15-19#   15-20#   15-21#   15-22#   15-23#   15-24#   15-25#   15-26#   15-27#   15-28#   15-29#   17-115#  18-91#
        19-78#   21-108#  22-19#   23-48#   24-35#   25-36#   25-37#   27-127#  28-203#  29-26#   30-120#  31-22#   32-51#   33-16#
        34-90#   35-27#   36-108#  37-28#   38-93#   39-27#   40-146#  41-61#   42-86#   43-27#   44-108#  45-26#   46-105#  47-28#
        48-96#   49-107#  50-22#   51-83#   52-24#   53-121#  54-22#   55-116#  56-24#   57-118#  58-28#   59-1#    60-66#   61-25#
        61-44#
MSERRI   1-A49#   7-915#   17-132   17-132#  17-137   17-137#  17-162   17-162   17-162#  17-162#  17-171   17-171#  17-180   17-180#
        17-190   17-190   17-190#  17-190#  17-199   17-199#  17-208   17-208#  21-36    21-36#   27-93    27-93    27-93#   27-93#
        27-101   27-101   27-101#  27-101#  27-110   27-110   27-110   27-110   27-110#  27-110#  27-110#  27-110#  27-124   27-124#
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116#  30-116#  30-116#  30-116#
        30-116#  30-116#  30-116#  30-116#  31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18#   31-18#
        31-18#   31-18#   31-18#   31-18#   31-18#   31-18#   32-47    32-47    32-47    32-47    32-47    32-47    32-47#   32-47#
        32-47#   32-47#   32-47#   32-47#   33-12    33-12    33-12    33-12    33-12    33-12    33-12#   33-12#   33-12#   33-12#
        33-12#   34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86    34-86#   34-86#
        34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   35-23    35-23    35-23    35-23    35-23    35-23
        35-23    35-23    35-23    35-23    35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   35-23#
```

CROSS REFERENCE TABLE (CREF V04.00)

	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
	36-104#	36-104#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#
	37-24#	37-24#	37-24#	37-24#	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
	39-23#	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	41-57	41-57	41-57	41-57	41-57	41-57#	41-57#	41-57#
	41-57#	41-57#	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	44-104	44-104
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
	44-104#	44-104#	44-104#	44-104#	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	46-101#	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	48-92	48-92	48-92	48-92	48-92	48-92
	48-92	48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	49-103	49-103	49-103	49-103
	49-103	49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	50-18	50-18	50-18	50-18
	50-18	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	51-79	51-79	51-79	51-79
	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	52-20	52-20	52-20	52-20	52-20	52-20
	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	55-112	55-112	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	56-20	56-20
	56-20	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	57-114	57-114	57-114	57-114
	57-114	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	58-22	58-22	58-22	58-22	58-22	58-22
	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#								
M$ESCA	1-D06#	7-915#												
M$ESCS	1-D10#	7-915#												
M$EXCP	1-E01#	7-915#	60-55	60-55	60-55#	60-57	60-57	60-57#	60-59	60-59	60-59#	60-61	60-61	60-61#
	60-63	60-63	60-63#											
M$EXIT	1-D14#	7-915#	19-62#	21-37	21-37#	21-93	21-93#	23-33	23-33#	24 19#	25-20#	27-71	27-71#	28-199
	28-199#	29-22	29-22#	30-116	30-116#	31-18	31-18#	32-47	32-47#	33-12	33-12#	34-86	34-86#	35-23
	35-23#	36-104	36-104#	37-24	37-24#	38-89	38-89#	39-23	39-23#	40-142	40-142#	41-57	41-57#	42-82
	42-82#	43-23	43-23#	44-104	44-104#	45-22	45-22#	46-101	46-101#	47-24	47-24#	48-92	48-92#	49-103
	49-103#	50-18	50-18#	51-79	51-79#	52-20	52-20#	53-117	53-117#	54-18	54-18#	55-112	55-112#	56-20
	56-20#	57-114	57-114#	58-22	58-22#									
M$EXSE	1-D22#	7-915#	19-62#	21-37#	21-93#	23-33#	24-19#	25-20#	27-71#	28-199#	29-22#	30-116#	31-18#	32-47#
	33-12#	34-86#	35-23#	36-104#	37-24#	38-89#	39-23#	40-142#	41-57#	42-82#	43-23#	44-104#	45-22#	46-101#
	47-24#	48-92#	49-103#	50-18#	51-79#	52-20#	53-117#	54-18#	55-112#	56-20#	57-114#	58-22#		
M$EXTJ	1-D18#	7-915#	19-62	19-62#	21-37#	21-93#	23-33#	24-19	24-19#	25-20	25-20#	27-71#	28-199#	29-22#
	30-116#	31-18#	32-47#	33-12#	34-86#	35-23#	36-104#	37-24#	38-89#	39-23#	40-142#	41-57#	42-82#	43-23#
	44-104#	45-22#	46-101#	47-24#	48-92#	49-103#	50-18#	51-79#	52-20#	53-117#	54-18#	55-112#	56-20#	57-114#
	58-22#													
M$GEN	1-D38#	7-915#	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	8-8	8-8#	9-10	9-10	9-10#	9-10#
	9-28	9-28#	10-10	10-10	10-10#	10-10#	10-20	10-20#	14-20	14-20#	14-30	14-30#	15-9	15-9
	15-9#	15-9#	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11#	15-11#	15-12	15-12	15-12#	15-12#
	15-13	15-13	15-13#	15-13#	15-14	15-14	15-14#	15-14#	15-15	15-15	15-15#	15-15#	15-16	15-16
	15-16#	15-16#	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18#	15-18#	15-19	15-19	15-19#	15-19#
	15-20	15-20	15-20#	15-20#	15-21	15-21	15-21#	15-21#	15-22	15-22	15-22#	15-22#	15-23	15-23
	15-23#	15-23#	15-24	15-24	15-24#	15-24#	15-25	15-25	15-25#	15-25#	15-26	15-26	15-26#	15-26#

CROSS REFERENCE TABLE (CREF V04.00)

	15-27	15-27	15-27#	15-27#	15-28	15-28	15-28#	15-28#	15-29	15-29	15-29#	15-29#	17-105#	17-115
	17-115#	19-48	19-48#	19-78	19-78#	20-8	20-8#	21-8	21-8#	21-108	21-108#	22-10	22-10#	22-19
	22-19#	23-8	23-8#	23-48	23-48#	24-8	24-8#	24-35	24-35#	25-9	25-9#	25-36	25-36#	27-62
	27-62#	27-127	27-127#	28-195	28-195#	28-203	28-203#	29-18	29-18#	29-26	29-26#	30-112	30-112#	30-120
	30-120#	31-14	31-14#	31-22	31-22#	32-43	32-43#	32-51	32-51#	33-8	33-8#	33-16	33-16#	34-82
	34-82#	34-90	34-90#	35-19	35-19#	35-27	35-27#	36-100	36-100#	36-108	36-108#	37-20	37-20#	37-28
	37-28#	38-85	38-85#	38-93	38-93#	39-19	39-19#	39-27	39-27#	40-138	40-138#	40-146	40-146#	41-53
	41-53#	41-61	41-61#	42-78	42-78#	42-86	42-86#	43-19	43-19#	43-27	43-27#	44-100	44-100#	44-108
	44-108#	45-18	45-18#	45-26	45-26#	46-97	46-97#	46-105	46-105#	47-20	47-20#	47-28	47-28#	48-88
	48-88#	48-96	48-96#	49-99	49-99#	49-107	49-107#	50-14	50-14#	50-22	50-22#	51-75	51-75#	51-83
	51-83#	52-16	52-16#	52-24	52-24#	53-113	53-113#	53-121	53-121#	54-14	54-14#	54-22	54-22#	55-108
	55-108#	55-116	55-116#	56-16	56-16#	56-24	56-24#	57-110	57-110#	57-118	57-118#	58-18	58-18#	58-28
	58-28#	60-53	60-53#	60-66	60-66#	61-12	61-12#	61-25	61-25#	61-43	61-43#	62-15	62-15#	62-22
	62-22#													
M$GENB	1-C38#	7-915#												
M$GETS	1-D35#	7-915#	9-28	9-28#	10-20	10-20#	10-21	10-21#	15-9	15-9#	15-10	15-10#	15-11	15-11#
	15-12	15-12#	15-13	15-13#	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17	15-17#	15-18	15-18#
	15-19	15-19#	15-20	15-20#	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#	15-25	15-25#
	15-26	15-26#	15-27	15-27#	15-28	15-28#	15-29	15-29#	17-115	17-115#	18-91	18-91#	19-78	19-78#
	20-12	20-12#	21-108	21-108#	22-19	22-19#	23-48	23-48#	24-35	24-35#	25-36	25-36#	25-37	25-37#
	27-127	27-127#	28-203	28-203#	29-26	29-26#	30-120	30-120#	31-22	31-22#	32-51	32-51#	33-16	33-16#
	34-90	34-90#	35-27	35-27#	36-108	36-108#	37-28	37-28#	38-93	38-93#	39-27	39-27#	40-146	40-146#
	41-61	41-61#	42-86	42-86#	43-27	43-27#	44-108	44-108#	45-26	45-26#	46-105	46-105#	47-28	47-28#
	48-96	48-96#	49-107	49-107#	50-22	50-22#	51-83	51-83#	52-24	52-24#	53-121	53-121#	54-22	54-22#
	55-116	55-116#	56-24	56-24#	57-118	57-118#	58-28	58-28#	59-1	59-1#	60-66	60-66#	61-25	61-25#
	61-44	61-44#												
M$GETT	1-B77#	7-915#	19-62#	21-37#	21-93#	23-33#	24-19#	25-20#	27-71#	28-199#	29-22#	30-116#	31-18#	32-47#
	33-12#	34-86#	35-23#	36-104#	37-24#	38-89#	39-23#	40-142#	41-57#	42-82#	43-23#	44-104#	45-22#	46-101#
	47-24#	48-92#	49-103#	50-18#	51-79#	52-20#	53-117#	54-18#	55-112#	56-20#	57-114#	58-22#		
M$GNGB	1-C02#	7-915#	7-941#	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	8-8	8-8#	9-10	9-10	9-10#
	10-10	10-10	10-10#	11-51#	14-20	14-20#	14-30	14-30#	15-9	15-9#	15-10	15-10#	15-11	15-11#
	15-12	15-12#	15-13	15-13#	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17	15-17#	15-18	15-18#
	15-19	15-19#	15-20	15-20#	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#	15-25	15-25#
	15-26	15-26#	15-27	15-27#	15-28	15-28#	15-29	15-29#	17-105	17-105#	19-42#	19-48	19-48#	20-8
	20-8#	21-8	21-8#	22-10	22-10#	23-8	23-8#	24-8	24-8#	25-9	25-9#	27-38#	60-43#	60-53
	60-53#	61-12	61-12#	61-43	61-43#									
M$GNIN	1-D49#	7-915#	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#
	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	7-969#	8-8	8-8	8-8	8-8	8-8	8-8
	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8#
	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#
	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#	8-8#
	8-8#	8-8#	8-8#	8-8#	9-10	9-10#	10-10	10-10#	14-20	14-20	14-20#	14-20#	14-30	14-30
	14-30#	14-30#	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9	15-9#	15-9#	15-9#
	15-9#	15-9#	15-9#	15-9#	15-9#	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10	15-10
	15-10#	15-10#	15-10#	15-10#	15-10#	15-10#	15-10#	15-10#	15-11	15-11	15-11	15-11	15-11	15-11

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE M-7 SEQ 0262
CROSS REFERENCE TABLE (CREF V04.00)

15-11	15-11	15-11	15-11	15-11	15-11#	15-11#	15-11#	15-11#	15-11#	15-11#	15-11#	15-11#	15-11#
15-11#	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12	15-12#	15-12#	15-12#
15-12#	15-12#	15-12#	15-12#	15-12#	15-12#	15-13	15-13	15-13	15-13	15-13	15-13	15-13	15-13
15-13	15-13	15-13#	15-13#	15-13#	15-13#	15-13#	15-13#	15-13#	15-13#	15-13#	15-14	15-14	15-14
15-14	15-14	15-14	15-14	15-14	15-14	15-14#	15-14#	15-14#	15-14#	15-14#	15-14#	15-14#	15-14#
15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15	15-15#	15-15#	15-15#	15-15#	15-15#
15-15#	15-15#	15-15#	15-16	15-16	15-16	15-16	15-16	15-16	15-16	15-16#	15-16#	15-16#	15-16#
15-16#	15-16#	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17	15-17#	15-17#	15-17#	15-17#
15-17#	15-17#	15-17#	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18	15-18#	15-18#
15-18#	15-18#	15-18#	15-18#	15-18#	15-18#	15-19	15-19	15-19	15-19	15-19	15-19	15-19	15-19#
15-19#	15-19#	15-19#	15-19#	15-19#	15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-20#
15-20#	15-20#	15-20#	15-20#	15-20#	15-20#	15-21	15-21	15-21	15-21	15-21	15-21	15-21	15-21
15-21	15-21#	15-21#	15-21#	15-21#	15-21#	15-21#	15-21#	15-21#	15-22	15-22	15-22	15-22	15-22
15-22	15-22	15-22	15-22#	15-22#	15-22#	15-22#	15-22#	15-22#	15-22#	15-23	15-23	15-23	15-23
15-23	15-23	15-23	15-23	15-23#	15-23#	15-23#	15-23#	15-23#	15-23#	15-23#	15-24	15-24	15-24
15-24	15-24	15-24	15-24	15-24	15-24#	15-24#	15-24#	15-24#	15-24#	15-24#	15-24#	15-25	15-25
15-25	15-25	15-25	15-25	15-25	15-25	15-25#	15-25#	15-25#	15-25#	15-25#	15-25#	15-25#	15-26
15-26	15-26	15-26	15-26	15-26	15-26	15-26#	15-26#	15-26#	15-26#	15-26#	15-26#	15-27	15-27
15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27	15-27#	15-27#	15-27#	15-27#	15-27#	15-27#
15-27#	15-27#	15-27#	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28	15-28#	15-28#
15-28#	15-28#	15-28#	15-28#	15-28#	15-28#	15-29	15-29	15-29	15-29	15-29	15-29	15-29	15-29
15-29	15-29#	15-29#	15-29#	15-29#	15-29#	15-29#	15-29#	15-29#	17-16	17-16	17-16	17-16#	17-16#
17-16#	17-18	17-18#	17-35	17-35	17-35	17-35#	17-35#	17-35#	17-37	17-37#	17-79	17-79	17-79
17-79	17-79	17-79	17-79#	17-79#	17-79#	17-79#	17-79#	17-79#	17-87	17-87	17-87	17-87	17-87
17-87	17-87#	17-87#	17-87#	17-87#	17-87#	17-87#	17-115	17-115#	17-132	17-132	17-132	17-132	17-132#
17-132#	17-132#	17-132#	17-132#	17-137	17-137	17-137	17-137	17-137#	17-137#	17-137#	17-137#	17-137#	17-160
17-160	17-160#	17-160#	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162	17-162#	17-162#	17-162#
17-162#	17-162#	17-162#	17-162#	17-162#	17-162#	17-162#	17-171	17-171	17-171	17-171	17-171#	17-171#	17-171#
17-171#	17-171#	17-172	17-172	17-172	17-172	17-172	17-172#	17-172#	17-172#	17-172#	17-175	17-175	17-175#
17-175#	17-180	17-180	17-180	17-180	17-180#	17-180#	17-180#	17-180#	17-180#	17-188	17-188	17-188#	17-188#
17-190	17-190	17-190	17-190	17-190	17-190	17-190	17-190	17-190#	17-190#	17-190#	17-190#	17-190#	17-190#
17-190#	17-190#	17-190#	17-190#	17-199	17-199	17-199	17-199	17-199#	17-199#	17-199#	17-199#	17-199#	17-200
17-200	17-200	17-200	17-200	17-200#	17-200#	17-200#	17-200#	17-203	17-203	17-203#	17-203#	17-208	17-208
17-208	17-208	17-208#	17-208#	17-208#	17-208#	17-208#	18-21	18-21	18-21	18-21#	18-21#	18-21#	18-22
18-22#	18-79	18-79	18-79	18-79	18-79	18-79#	18-79#	18-79#	18-79#	18-80	18-80	18-80	18-80
18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80#	18-80#	18-80#	18-80#	18-80#	18-80#
18-80#	18-80#	18-80#	18-80#	18-80#	18-81	18-81	18-81	18-81	18-81	18-81#	18-81#	18-81#	18-81#
18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82#	18-82#
18-82#	18-82#	18-82#	18-82#	18-82#	18-82#	18-82#	18-82#	18-82#	18-83	18-83	18-83	18-83	18-83
18-83#	18-83#	18-83#	18-83#	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84	18-84
18-84	18-84	18-84#	18-84#	18-84#	18-84#	18-84#	18-84#	18-84#	18-84#	18-84#	18-84#	18-84#	18-87
18-87	18-87	18-87	18-87	18-87#	18-87#	18-87#	18-87#	18-88	18-88	18-88	18-88	18-88	18-88
18-88	18-88#	18-88#	18-88#	18-88#	18-88#	18-88#	19-62	19-62	19-62#	19-62#	19-78	19-78#	21-10
21-10#	21-12	21-12	21-12#	21-12#	21-14	21-14#	21-16	21-16	21-16#	21-16#	21-18	21-18#	21-20
21-20	21-20#	21-20#	21-22	21-22#	21-24	21-24	21-24	21-24	21-24	21-24#	21-24#	21-24#	21-24#
21-36	21-36	21-36	21-36	21-36#	21-36#	21-36#	21-36#	21-36#	21-37	21-37	21-37#	21-37#	21-46
21-46	21-46	21-46	21-46	21-46	21-46	21-46#	21-46#	21-46#	21-46#	21-46#	21-46#	21-59	21-59
21-59	21-59	21-59	21-59	21-59#	21-59#	21-59#	21-59#	21-59#	21-64	21-64	21-64	21-64	21-64
21-64#	21-64#	21-64#	21-64#	21-67	21-67	21-67#	21-67#	21-93	21-93	21-93#	21-93#	21-108	21-108#
22-19	22-19#	23-10	23-10	23-10#	23-10#	23-18	23-18	23-18#	23-18#	23-21	23-21	23-21#	23-21#
23-33	23-33	23-33#	23-33#	23-48	23-48#	24-19	24-19	24-19#	24-19#	24-35	24-35#	25-20	25-20
25-20#	25-20#	25-36	25-36#	27-71	27-71	27-71#	27-71#	27-93	27-93	27-93	27-93	27-93	27-93
27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93	27-93#	27-93#
27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#	27-93#
27-93#	27-93#	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101	27-101
27-101	27-101	27-101	27-101	27-101	27-101	27-101#	27-101#	27-101#	27-101#	27-101#	27-101#	27-101#	27-101#

```
        27-101#  27-101#  27-101#  27-101#  27-101#  27-101#  27-101#  27-101#  27-101#  27-101#  27-110   27-110   27-110   27-110
        27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110
        27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110
        27-110   27-110   27-110   27-110   27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#
        27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#
        27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-124   27-124
        27-124   27-124   27-124#  27-124#  27-124#  27-124#  27-124#  27-125   27-125   27-125   27-125   27-125   27-125#  27-125#
        27-125#  27-125#  27-127   27-127#  28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-203
        28-203#  29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-26    29-26#   30-116   30-116
        30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116
```

30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116
30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116
30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116
30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116
30-116 30-116 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116#
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116#
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116#
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116#
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-120 30-120# 31-18 31-18 31-18 31-18 31-18 31-18
31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18
31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18
31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18
31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18# 31-18#
31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18#
31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18#
31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18#
31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18#
31-18# 31-18# 31-22 31-22# 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47
32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47
32-47 32-47 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47#
32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47#
32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-51 32-51# 33-12 33-12 33-12 33-12 33-12 33-12
33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12 33-12
33-12 33-12 33-12 33-12 33-12 33-12 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12#
33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12#
33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-16 33-16# 34-86
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-90 34-90# 35-23
35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23
35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23
35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23
35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23
35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-27 35-27# 36-104 36-104
36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104
36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104

36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104
36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104
36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-108	36-108#	37-24	37-24	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
37-24#	37-24#	37-28	37-28#	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-93	38-93#	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-27	39-27#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#

40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-146	40-146#	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57
41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57
41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57
41-57	41-57	41-57	41-57	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#
41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#
41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#
41-57#	41-57#	41-57#	41-57#	41-57#	41-61	41-61#	42-82	42-82	42-82	42-82	42-82	42-82	42-82
42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82
42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82
42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82
42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-86	42-86#	43-23	43-23	43-23	43-23	43-23
43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#
43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-27	43-27#	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-108	44-108#	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-26	45-26#	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101

46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-105	46-105#	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-28	47-28#	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
48-92#	48-92#	48-92#	48-92#	48-92#	48-96	48-96#	49-103	49-103	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-107	49-107#	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
50-18#	50-18#	50-18#	50-22	50-22#	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
51-79	51-79	51-79	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#

51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
51-79#	51-79#	51-79#	51-79#	51-79#	51-83	51-83#	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-24	52-24#	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-121	53-121#	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-16#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-22	54-22#	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#
55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-116	55-116#	56-20	56-20	56-20
56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20
56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20
56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20
56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20#	56-20#	56-20#
56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-24	56-24#	57-114
57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114
57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114
57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114
57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#

CROSS REFERENCE TABLE (CREF V04.00)

```
        57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#
        57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#
        57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  57-114#
        57-114#  57-114#  57-114#  57-114#  57-118   57-118#  58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22
        58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22
        58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22
        58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22    58-22
        58-22    58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#
        58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#
        58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#
        58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-22#   58-28    58-28#   60-53
        60-53#   60-55    60-55    60-55    60-55    60-55#   60-57    60-57    60-57    60-57    60-57#   60-59    60-59    60-59
        60-59    60-59    60-59#   60-61    60-61    60-61    60-61    60-61    60-61#   60-63    60-63    60-63    60-63    60-63
        60-63#   60-65    60-65    60-65    60-65#   60-66    60-66#   61-12    61-12#   61-25    61-25#   61-43    61-43    61-43
        61-43#   62-15    62-15    62-15#   62-15#
M$GNLS   1-C13#   7-915#
M$GNSU   1-B98#   7-915#
M$GNTA   1-B90#   7-915#    9-28     9-28#   10-20    10-20#   15-9     15-9#    15-10    15-10#   15-11    15-11#   15-12    15-12#
        15-13    15-13#   15-14    15-14#   15-15    15-15#   15-16    15-16#   15-17    15-17#   15-18    15-18#   15-19    15-19#
        15-20    15-20#   15-21    15-21#   15-22    15-22#   15-23    15-23#   15-24    15-24#   15-25    15-25#   15-26    15-26#
        15-27    15-27#   15-28    15-28#   15-29    15-29#   17-115   17-115#  19-78    19-78#   21-108   21-108#  22-19    22-19#
        23-48    23-48#   24-35    24-35#   25-36    25-36#   27-127   27-127#  28-203   28-203#  29-26    29-26#   30-120   30-120#
        31-22    31-22#   32-51    32-51#   33-16    33-16#   34-90    34-90#   35-27    35-27#   36-108   36-108#  37-28    37-28#
        38-93    38-93#   39-27    39-27#   40-146   40-146#  41-61    41-61#   42-86    42-86#   43-27    43-27#   44-108   44-108#
        45-26    45-26#   46-105   46-105#  47-28    47-28#   48-96    48-96#   49-107   49-107#  50-22    50-22#   51-83    51-83#
        52-24    52-24#   53-121   53-121#  54-22    54-22#   55-116   55-116#  56-24    56-24#   57-118   57-118#  58-28    58-28#
        60-66    60-66#   61-25    61-25#   62-15    62-15#   62-22    62-22#
M$GNTE   1-B94#   7-915#   27-62    27-62#   28-195   28-195#  29-18    29-18#   30-112   30-112#  31-14    31-14#   32-43    32-43#
        33-8     33-8#    34-82    34-82#   35-19    35-19#   36-100   36-100#  37-20    37-20#   38-85    38-85#   39-19    39-19#
        40-138   40-138#  41-53    41-53#   42-78    42-78#   43-19    43-19#   44-100   44-100#  45-18    45-18#   46-97    46-97#
        47-20    47-20#   48-88    48-88#   49-99    49-99#   50-14    50-14#   51-75    51-75#   52-16    52-16#   53-113   53-113#
        54-14    54-14#   55-108   55-108#  56-16    56-16#   57-110   57-110#  58-18    58-18#
M$HAPT   1-A39#   7-915#   7-969    7-969#
M$HNAP   1-B24#   7-915#   7-969    7-969#
M$INCR   1-D26#   7-915#   7-941    7-941#   9-10     9-10     9-10#    9-10#    10-10    10-10    10-10#   10-10#   11-51    11-51#
        15-9     15-9     15-9#    15-9#    15-9#    15-9#    15-10    15-10    15-10#   15-10#   15-10#   15-10#   15-11    15-11
        15-11#   15-11#   15-11#   15-11#   15-12    15-12    15-12#   15-12#   15-12#   15-12#   15-13    15-13    15-13#   15-13#
        15-13#   15-13#   15-14    15-14    15-14#   15-14#   15-14#   15-14#   15-15    15-15    15-15#   15-15#   15-15#   15-15#
        15-16    15-16    15-16#   15-16#   15-16#   15-16#   15-17    15-17    15-17#   15-17#   15-17#   15-17#   15-18    15-18
        15-18#   15-18#   15-18#   15-18#   15-19    15-19    15-19#   15-19#   15-19#   15-19#   15-20    15-20    15-20#   15-20#
        15-20#   15-20#   15-21    15-21    15-21#   15-21#   15-21#   15-21#   15-22    15-22    15-22#   15-22#   15-22#   15-22#
        15-23    15-23    15-23#   15-23#   15-23#   15-23#   15-24    15-24    15-24#   15-24#   15-24#   15-24#   15-25    15-25
        15-25#   15-25#   15-25#   15-25#   15-26    15-26    15-26#   15-26#   15-26#   15-26#   15-27    15-27    15-27#   15-27#
        15-27#   15-27#   15-28    15-28    15-28#   15-28#   15-28#   15-28#   15-29    15-29    15-29#   15-29#   15-29#   15-29#
        17-16#   17-35#   17-79#   17-87#   17-105   17-105   17-105#  17-105#  17-132#  17-137#  17-160#  17-162#  17-162#  17-171#
        17-172#  17-175#  17-180#  17-188#  17-190#  17-190#  17-199#  17-200#  17-203#  17-208#  18-21#   18-79#   18-80#   18-81#
        18-82#   18-83#   18-84#   18-87#   18-88#   19-42    19-42#   19-48    19-48    19-48#   19-48#   19-78#   20-8     20-8
        20-8#    20-8#    21-8     21-8     21-8#    21-8#    21-10#   21-12#   21-16#   21-20#   21-24#   21-36#   21-37#   21-46#
        21-59#   21-64#   21-67#   21-93#   21-108#  22-10    22-10    22-10#   22-10#   22-19#   23-8     23-8     23-8#    23-8#
        23-10#   23-18#   23-21#   23-33#   23-48#   24-8     24-8     24-8#    24-8#    24-35#   25-9     25-9     25-9#    25-9#
        25-36#   27-38    27-38#   27-62    27-62    27-62    27-62#   27-62#   27-62#   27-71#   27-93#   27-93#   27-93#   27-93#
        27-101#  27-101#  27-101#  27-101#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-110#  27-124#  27-125#
        27-127#  28-195   28-195   28-195   28-195#  28-195#  28-195#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-203#  29-18    29-18    29-18    29-18#   29-18#   29-18#   29-22#   29-22#   29-22#
```

CROSS REFERENCE TABLE (CREF V04.00)

29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-26#	30-112	30-112	30-112	30-112#	30-112#
30-112#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#
30-116#	30-116#	30-116#	30-116#	30-120#	31-14	31-14	31-14	31-14#	31-14#	31-14#	31-18#	31-18#	31-18#
31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#
31-22#	32-43	32-43	32-43	32-43#	32-43#	32-43#	32-47#	32-47#	32-47#	32-47#	32-47#	32-47#	32-47#
32-51#	33-8	33-8	33-8	33-8#	33-8#	33-8#	33-12#	33-12#	33-12#	33-12#	33-12#	33-12#	33-12#
33-16#	34-82	34-82	34-82	34-82#	34-82#	34-82#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#
34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-90#	35-19
35-19	35-19	35-19#	35-19#	35-19#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#
35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-27#	36-100	36-100	36-100
36-100#	36-100#	36-100#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-108#	37-20	37-20	37-20	37-20#	37-20#	37-20#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
37-24#	37-24#	37-28#	38-85	38-85	38-85	38-85#	38-85#	38-85#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-93#	39-19	39-19	39-19	39-19#	39-19#	39-19#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-27#	40-138
40-138	40-138	40-138#	40-138#	40-138#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-146#	41-53	41-53	41-53
41-53#	41-53#	41-53#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-61#
42-78	42-78	42-78	42-78#	42-78#	42-78#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
42-82#	42-82#	42-82#	42-82#	42-82#	42-86#	43-19	43-19	43-19	43-19#	43-19#	43-19#	43-23#	43-23#
43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-27#	44-100	44-100
44-100	44-100#	44-100#	44-100#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-108#	45-18	45-18	45-18	45-18#
45-18#	45-18#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-26#	46-97	46-97	46-97	46-97#	46-97#	46-97#
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
46-101#	46-101#	46-101#	46-101#	46-101#	46-105#	47-20	47-20	47-20	47-20#	47-20#	47-20#	47-24#	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
47-24#	47-24#	47-24#	47-28#	48-88	48-88	48-88	48-88#	48-88#	48-88#	48-92#	48-92#	48-92#	48-92#
48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-96#
49-99	49-99	49-99	49-99#	49-99#	49-99#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-107#	50-14	50-14	50-14	50-14#	50-14#	50-14#
50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
50-18#	50-22#	51-75	51-75	51-75	51-75#	51-75#	51-75#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-83#	52-16	52-16	52-16	52-16#	52-16#	52-16#
52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-24#
53-113	53-113	53-113	53-113#	53-113#	53-113#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-121#	54-14	54-14
54-14	54-14#	54-14#	54-14#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-22#	55-108	55-108	55-108	55-108#
55-108#	55-108#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
55-112#	55-116#	56-16	56-16	56-16	56-16#	56-16#	56-16#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-24#	57-110	57-110	57-110	57-110#	57-110#	57-110#
57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-118#	58-18
58-18	58-18	58-18#	58-18#	58-18#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#
58-22#	58-22#	58-22#	58-28#	60-43	60-43#	60-53	60-53	60-53#	60-53#	61-12	61-12	61-12#	61-12#
62-14	62-14#	62-15	62-15	62-15	62-15#								
M$IOSE 1-A00#	7-915#												
M$LDRO 1-C42#	7-915#	17-16	17-16#	17-35	17-35#	17-160	17-160#	17-175	17-175#	17-188	17-188#	17-203	17-203#
18-21	18-21#	21-12	21-12#	21-16	21-16#	21-20	21-20#	21-67	21-67#	23-10	23-10#	23-18	23-18#
23-21	23-21#	28-199	28-199	28-199	28-199#	28-199#	28-199#	29-22	29-22	29-22	29-22#	29-22#	29-22#

CROSS REFERENCE TABLE (CREF V04.00)

```
M$MASK   1-a71#  7-915#
M$MCHI   1-4#    7-915    7-915#   7-915#
M$MCLO   1-a24#  7-915    7-915#   7-915#
M$MSK1   1-a77#  7-915#
M$POP    1-B81#  7-915#   9-28     9-28#    10-20    10-20#   10-21    10-21#   15-9     15-9#    15-10    15-10#   15-11    15-11#
        15-12    15-12#   15-13    15-13#   15-14    15-14#   15-15    15-15#   15-16    15-16#   15-17    15-17#   15-18    15-18#
        15-19    15-19#   15-20    15-20#   15-21    15-21#   15-22    15-22#   15-23    15-23#   15-24    15-24#   15-25    15-25#
        15-26    15-26#   15-27    15-27#   15-28    15-28#   15-29    15-29#   17-115   17-115#  18-91    18-91#   19-78    19-78#
        20-12    20-12#   21-108   21-108#  22-19    22-19#   23-48    23-48#   24-35    24-35#   25-36    25-36#   25-37    25-37#
        27-127   27-127#  28-203   28-203#  29-26    29-26#   30-120   30-120#  31-22    31-22#   32-51    32-51#   33-16    33-16#
        34-90    34-90#   35-27    35-27#   36-108   36-108#  37-28    37-28#   38-93    38-93#   39-27    39-27#   40-146   40-146#
        41-61    41-61#   42-86    42-86#   43-27    43-27#   44-108   44-108#  45-26    45-26#   46-105   46-105#  47-28    47-28#
        48-96    48-96#   49-107   49-107#  50-22    50-22#   51-83    51-83#   52-24    52-24#   53-121   53-121#  54-22    54-22#
        55-116   55-116#  56-24    56-24#   57-118   57-118#  58-28    58-28#   59-1     59-1#    60-66    60-66#   61-25    61-25#
        61-44    61-44#
M$PRIN   1-a36#  7-915#   15-9     15-9#    15-10    15-10#   15-11    15-11#   15-12    15-12#   15-13    15-13#   15-14    15-14#
        15-15    15-15#   15-16    15-16#   15-17    15-17#   15-18    15-18#   15-19    15-19#   15-20    15-20#   15-21    15-21#
        15-22    15-22#   15-23    15-23#   15-24    15-24#   15-25    15-25#   15-26    15-26#   15-27    15-27#   15-28    15-28#
        15-29    15-29#   17-172   17-172#  17-200   17-200#  18-79    18-79#   18-80    18-80#   18-81    18-81#   18-82    18-82#
        18-83    18-83#   18-84    18-84#   18-87    18-87#   18-88    18-88#   21-24    21-24#   21-46    21-46#   21-59    21-59#
        21-64    21-64#   27-93    27-93    27-93#   27-93#   27-101   27-101   27-101#  27-101#  27-110   27-110   27-110   27-110
        27-110#  27-110#  27-110#  27-110#  27-125   27-125#  28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116   30-116#  30-116#
        30-116#  30-116#  30-116#  30-116#  30-116#  30-116#  31-18    31-18    31-18    31-18    31-18    31-18    31-18    31-18
        31-18#   31-18#   31-18#   31-18#   31-18#   31-18#   31-18#   31-18#   34-86    34-86    34-86    34-86    34-86    34-86
        34-86    34-86    34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   34-86#   35-23    35-23    35-23    35-23
        35-23    35-23    35-23    35-23    35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   35-23#   36-104   36-104
        36-104   36-104   36-104   36-104   36-104   36-104   36-104#  36-104#  36-104#  36-104#  36-104#  36-104#  36-104#  36-104#
        37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24    37-24#   37-24#   37-24#   37-24#   37-24#   37-24#
        37-24#   37-24#   38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89    38-89#   38-89#   38-89#   38-89#
        38-89#   38-89#   38-89#   38-89#   39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23    39-23#   39-23#
        39-23#   39-23#   39-23#   39-23#   39-23#   39-23#   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142
        40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142   40-142#  40-142#  40-142#  40-142#  40-142#  40-142#
        40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  40-142#  41-57    41-57    41-57    41-57
        41-57#   41-57#   41-57#   41-57#   42-82    42-82    42-82    42-82    42-82    42-82    42-82#   42-82#   42-82#   42-82#
        42-82#   42-82#   43-23    43-23    43-23    43-23    43-23    43-23    43-23#   43-23#   43-23#   43-23#   43-23#   43-23#
        44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104   44-104#  44-104#  44-104#  44-104#  44-104#  44-104#
        44-104#  44-104#  45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22#   45-22#   45-22#   45-22#
        45-22#   45-22#   45-22#   45-22#   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101#  46-101#
        46-101#  46-101#  46-101#  46-101#  46-101#  46-101#  47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   48-92    48-92    48-92    48-92    48-92    48-92
        48-92    48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103#  49-103#  49-103#  49-103#  49-103#  49-103#  49-103#  50-18    50-18    50-18    50-18
        50-18    50-18    50-18    50-18#   50-18#   50-18#   50-18#   50-18#   50-18#   50-18#   51-79    51-79    51-79    51-79
        51-79    51-79    51-79#   51-79#   51-79#   51-79#   51-79#   51-79#   52-20    52-20    52-20    52-20    52-20    52-20
        52-20#   52-20#   52-20#   52-20#   52-20#   52-20#   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117
        53-117   53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  54-18    54-18    54-18    54-18
        54-18    54-18    54-18    54-18    54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#
        55-112   55-112   55-112   55-112   55-112   55-112   55-112#  55-112#  55-112#  55-112#  55-112#  55-112#  56-20    56-20
        56-20    56-20    56-20    56-20    56-20#   56-20#   56-20#   56-20#   56-20#   56-20#   57-114   57-114   57-114   57-114
        57-114   57-114#  57-114#  57-114#  57-114#  57-114#  58-22    58-22    58-22    58-22    58-22    58-22#   58-22#   58-22#
        58-22#   58-22#
```

CROSS REFERENCE TABLE (CREF V04.00)

M$PUSH	1-831#	7-915#	7-941	7-941#	9-10	9-10#	10-10	10-10#	11-51	11-51#	15-9	15-9#	15-10	15-10#
	15-11	15-11#	15-12	15-12#	15-13	15-13#	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17	15-17#
	15-18	15-18#	15-19	15-19#	15-20	15-20#	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#
	15-25	15-25#	15-26	15-26#	15-27	15-27#	15-28	15-28#	15-29	15-29#	17-105	17-105#	19-42	19-42#
	19-48	19-48#	20-8	20-8#	21-8	21-8#	22-10	22-10#	23-8	23-8#	24-8	24-8#	25-9	25-9#
	27-38	27-38#	27-62	27-62#	28-195	28-195#	29-18	29-18#	30-112	30-112#	31-14	31-14#	32-43	32-43#
	33-8	33-8#	34-82	34-82#	35-19	35-19#	36-100	36-100#	37-20	37-20#	38-85	38-85#	39-19	39-19#
	40-138	40-138#	41-53	41-53#	42-78	42-78#	43-19	43-19#	44-100	44-100#	45-18	45-18#	46-97	46-97#
	47-20	47-20#	48-88	48-88#	49-99	49-99#	50-14	50-14#	51-75	51-75#	52-16	52-16#	53-113	53-113#
	54-14	54-14#	55-108	55-108#	56-16	56-16#	57-110	57-110#	58-18	58-18#	60-43	60-43#	60-53	60-53#
	61-12	61-12#												
M$PUT	1-872#	7-915#	15-9	15-9	15-9	15-9	15-9	15-9#	15-10	15-10	15-10	15-10	15-10	15-10#
	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11#	15-12	15-12	15-12	15-12	15-12	15-12
	15-12#	15-13	15-13	15-13	15-13	15-13	15-13	15-13#	15-14	15-14	15-14	15-14	15-14	15-14#
	15-15	15-15	15-15	15-15	15-15	15-15#	15-16	15-16	15-16	15-16#	15-17	15-17	15-17	15-17
	15-17#	15-18	15-18	15-18	15-18	15-18	15-18#	15-19	15-19	15-19	15-19#	15-20	15-20	15-20
	15-20	15-20#	15-21	15-21	15-21	15-21	15-21	15-21#	15-22	15-22	15-22	15-22	15-22#	15-23
	15-23	15-23	15-23	15-23#	15-24	15-24	15-24	15-24	15-24#	15-25	15-25	15-25	15-25	15-25#
	15-26	15-26	15-26	15-26#	15-27	15-27	15-27	15-27	15-27	15-27	15-27#	15-28	15-28	15-28
	15-28	15-28	15-28#	15-29	15-29	15-29	15-29	15-29	15-29#	17-79	17-79	17-79	17-79	17-79#
	17-87	17-87	17-87	17-87	17-87#	17-172	17-172	17-172#	17-200	17-200	17-200#	18-79	18-79	18-79#
	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80	18-80#	18-81	18-81	18-81#	18-82
	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82	18-82#	18-83	18-83	18-83#	18-84	18-84
	18-84	18-84	18-84	18-84	13-84	18-84	18-84	18-84#	18-87	18-87	18-87#	18-88	18-88	18-88
	18-88	18-88#	21-24	21-24	21-24#	21-46	21-46	21-46	21-46	21-46#	21-59	21-59	21-59	21-59#
	21-64	21-64	21-64#	27-93	27-93	27-93	27-93	27-93#	27-93#	27-101	27-101	27-101	27-101	27-101#
	27-101#	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110#	27-110#	27-110#	27-110#	27-125
	27-125	27-125#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#
	30-116#	30-116#	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
	31-18	31-18	31-18	31-18	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	34-86	34-86
	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	35-23	35-23	35-23	35-23	35-23	35-23
	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23#	35-23#	35-23#	35-23#
	35-23#	35-23#	35-23#	35-23#	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104
	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	38-89	38-89	38-89	38-89
	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89#	38-89#
	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
	39-23#	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	41-57	41-57	41-57	41-57	41-57	41-57
	41-57	41-57	41-57#	41-57#	41-57#	41-57#	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82
	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	43-23	43-23	43-23	43-23
	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104

CROSS REFERENCE TABLE (CREF V04.00)

```
        44-104   44-104   44-104#  44-104#  44-104#  44-104#  44-104#  44-104#  44-104#  44-104#  45-22    45-22    45-22    45-22
        45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22    45-22#   45-22#
        45-22#   45-22#   45-22#   45-22#   45-22#   45-22#   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101
        46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101   46-101#  46-101#  46-101#  46-101#  46-101#  46-101#
        46-101#  46-101#  47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24    47-24
        47-24    47-24    47-24    47-24    47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   47-24#   48-92    48-92
        48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92    48-92
        48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   48-92#   49-103   49-103   49-103   49-103   49-103   49-103
        49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103   49-103#  49-103#  49-103#  49-103#  49-103#  49-103#
        49-103#  50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18    50-18
        50-18    50-18#   50-18#   50-18#   50-18#   50-18#   50-18#   50-18#   51-79    51-79    51-79    51-79    51-79    51-79
        51-79    51-79    51-79    51-79    51-79    51-79#   51-79#   51-79#   51-79#   51-79#   51-79#   52-20    52-20
        52-20    52-20    52-20    52-20    52-20    52-20    52-20    52-20    52-20    52-20    52-20#   52-20#   52-20#   52-20#
        52-20#   52-20#   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117   53-117
        53-117   53-117   53-117   53-117   53-117   53-117   53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#  53-117#
        53-117#  54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18    54-18
        54-18    54-18    54-18    54-18    54-18    54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#   54-18#
        55-112   55-112   55-112   55-112   55-112   55-112   55-112   55-112   55-112   55-112   55-112   55-112   55-112#  55-112#
        55-112#  55-112#  55-112#  55-112#  56-20    56-20    56-20    56-20    56-20    56-20    56-20    56-20    56-20    56-20
        56-20    56-20    56-20#   56-20#   56-20#   56-20#   56-20#   56-20#   57-114   57-114   57-114   57-114   57-114   57-114
        57-114   57-114   57-114   57-114#  57-114#  57-114#  57-114#  57-114#  57-114#  58-22    58-22    58-22    58-22    58-22
        58-22    58-22    58-22    58-22    58-22    58-22#   58-22#   58-22#   58-22#   58-22#
MSPUT1   1-C81#   7-915#   15-9     15-9     15-9     15-9     15-9     15-9#    15-9#    15-9#    15-9#    15-9#    15-10    15-10
        15-10    15-10    15-10    15-10#   15-10#   15-10#   15-10#   15-10#   15-11    15-11    15-11    15-11    15-11    15-11
        15-11    15-11#   15-11#   15-11#   15-11#   15-11#   15-11#   15-11#   15-12    15-12    15-12    15-12    15-12    15-12
        15-12#   15-12#   15-12#   15-12#   15-12#   15-12#   15-13    15-13    15-13    15-13    15-13    15-13    15-13#   15-13#
        15-13#   15-13#   15-13#   15-13#   15-14    15-14    15-14    15-14    15-14    15-14#   15-14#   15-14#   15-14#   15-14#
        15-15    15-15    15-15    15-15    15-15    15-15#   15-15#   15-15#   15-15#   15-15#   15-16    15-16    15-16    15-16#
        15-16#   15-16#   15-17    15-17    15-17    15-17    15-17#   15-17#   15-17#   15-17#   15-18    15-18    15-18    15-18
        15-18    15-18#   15-18#   15-18#   15-18#   15-18#   15-19    15-19    15-19    15-19#   15-19#   15-19#   15-20    15-20
        15-20    15-20    15-20#   15-20#   15-20#   15-20#   15-21    15-21    15-21    15-21    15-21    15-21#   15-21#   15-21#
        15-21#   15-21#   15-22    15-22    15-22    15-22    15-22#   15-22#   15-22#   15-22#   15-23    15-23    15-23    15-23
        15-23#   15-23#   15-23#   15-23#   15-24    15-24    15-24    15-24    15-24#   15-24#   15-24#   15-24#   15-25    15-25
        15-25    15-25    15-25#   15-25#   15-25#   15-25#   15-26    15-26    15-26    15-26#   15-26#   15-26#   15-27    15-27
        15-27    15-27    15-27    15-27    15-27#   15-27#   15-27#   15-27#   15-27#   15-27#   15-28    15-28    15-28    15-28
        15-28    15-28#   15-28#   15-28#   15-28#   15-28#   15-29    15-29    15-29    15-29    15-29    15-29#   15-29#   15-29#
        15-29#   17-79    17-79    17-79    17-79    17-79    17-79#   17-79#   17-79#   17-79#   17-87    17-87    17-87    17-87
        17-87#   17-87#   17-87#   17-87#   17-172   17-172   17-172#  17-172#  17-200   17-200   17-200#  17-200#  18-79    18-79
        18-79#   18-79#   18-80    18-80    18-80    18-80    18-80    18-80    18-80    18-80    18-80    18-80#   18-80#   18-80#
        18-80#   18-80#   18-80#   18-80#   18-80#   18-80#   18-81    18-81    18-81#   18-81#   18-82    18-82    18-82    18-82
        18-82    18-82    18-82    18-82    18-82#   18-82#   18-82#   18-82#   18-82#   18-82#   18-82#   18-82#   18-82#   18-82#
        18-83    18-83    18-83#   18-83#   18-84    18-84    18-84    18-84    18-84    18-84    18-84    18-84    18-84    18-84#
        18-84#   18-84#   18-84#   18-84#   18-84#   18-84#   18-84#   18-84#   18-87    18-87    18-87#   18-87#   18-88    18-88
        18-88    18-88    18-88#   18-88#   18-88#   18-88#   21-24    21-24    21-24#   21-24#   21-46    21-46    21-46    21-46
        21-46#   21-46#   21-46#   21-46#   21-59    21-59    21-59    21-59#   21-59#   21-59#   21-64    21-64    21-64#   21-64#
        27-93    27-93    27-93    27-93    27-93#   27-93#   27-93#   27-93#   27-101   27-101   27-101   27-101   27-101#  27-101#
        27-101#  27-101#  27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110   27-110#  27-110#  27-110#  27-110#
        27-110#  27-110#  27-110#  27-110#  27-125   27-125   27-125#  27-125#  28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199   28-199
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  28-199#
        28-199#  28-199#  28-199#  28-199#  28-199#  28-199#  29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22
        29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22    29-22#   29-22#
        29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#   29-22#
```

29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22#
29-22# 29-22# 29-22# 29-22# 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116
30-116 30-116 30-116 30-116 30-116 30-116 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116#
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 31-18 31-18 31-18 31-18 31-18 31-18
31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18# 31-18# 31-18# 31-18#
31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 34-86 34-86
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23
35-23 35-23 35-23 35-23 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104
36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104# 36-104# 36-104# 36-104# 36-104# 36-104#
36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 37-24 37-24 37-24 37-24
37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24# 37-24#
37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-24#
38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89
38-89 38-89 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89#
38-89# 38-89# 38-89# 38-89# 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23
39-23 39-23 39-23 39-23 39-23 39-23 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23#
39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 40-142 40-142 40-142 40-142 40-142 40-142
40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142
40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142# 40-142#
40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142#
40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142#
40-142# 40-142# 41-57 41-57 41-57 41-57 41-57 41-57 41-57 41-57 41-57# 41-57# 41-57# 41-57#
41-57# 41-57# 41-57# 41-57# 42-82 42-82 42-82 42-82 42-82 42-82 42-82 42-82 42-82 42-82
42-82 42-82 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82#
43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23# 43-23#
43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 44-104 44-104 44-104 44-104
44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104# 44-104#
44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104#
45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22 45-22
45-22 45-22 45-22# 45-22# 45-22# 45-22# 45-22# 45-22# 45-22# 45-22# 45-22# 45-22# 45-22# 45-22#
45-22# 45-22# 45-22# 45-22# 46-101 46-101 46-101 46-101 46-101 46-101 46-101 46-101 46-101 46-101
46-101 46-101 46-101 46-101 46-101 46-101 46-101# 46-101# 46-101# 46-101# 46-101# 46-101# 46-101# 46-101#
46-101# 46-101# 46-101# 46-101# 46-101# 46-101# 46-101# 46-101# 47-24 47-24 47-24 47-24 47-24 47-24
47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24 47-24# 47-24# 47-24# 47-24#
47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 47-24# 48-92 48-92
48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92 48-92
48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92# 48-92#
48-92# 48-92# 49-103 49-103 49-103 49-103 49-103 49-103 49-103 49-103 49-103 49-103 49-103 49-103
49-103 49-103 49-103# 49-103# 49-103# 49-103# 49-103# 49-103# 49-103# 49-103# 49-103# 49-103# 49-103# 49-103#
49-103# 49-103# 50-18 50-18 50-18 50-18 50-18 50-18 50-18 50-18 50-18 50-18 50-18 50-18
50-18 50-18 50-18# 50-18# 50-18# 50-18# 50-18# 50-18# 50-18# 50-18# 50-18# 50-18# 50-18# 50-18#
50-18# 50-18# 51-79 51-79 51-79 51-79 51-79 51-79 51-79 51-79 51-79 51-79 51-79 51-79
51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 51-79# 52-20 52-20
52-20 52-20 52-20 52-20 52-20 52-20 52-20 52-20 52-20 52-20 52-20# 52-20# 52-20# 52-20#
52-20# 52-20# 52-20# 52-20# 52-20# 52-20# 52-20# 52-20# 53-117 53-117 53-117 53-117 53-117 53-117
53-117 53-117 53-117 53-117 53-117 53-117 53-117 53-117 53-117 53-117 53-117 53-117# 53-117# 53-117#
53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117# 53-117#
53-117# 53-117# 54-18 54-18 54-18 54-18 54-18 54-18 54-18 54-18 54-18 54-18 54-18 54-18
54-18 54-18 54-18 54-18 54-18 54-18 54-18# 54-18# 54-18# 54-18# 54-18# 54-18# 54-18# 54-18#
54-18# 54-18# 54-18# 54-18# 54-18# 54-18# 54-18# 54-18# 55-112 55-112 55-112 55-112 55-112 55-112
55-112 55-112 55-112 55-112 55-112 55-112 55-112 55-112 55-112# 55-112# 55-112# 55-112# 55-112# 55-112#
55-112# 55-112# 55-112# 55-112# 55-112# 55-112# 56-20 56-20 56-20 56-20 56-20 56-20 56-20 56-20
56-20 56-20 56-20 56-20 56-20# 56-20# 56-20# 56-20# 56-20# 56-20# 56-20# 56-20# 56-20# 56-20#

CROSS REFERENCE TABLE (CREF V04.00)

	56-20#	56-20#	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114#	57-114#
	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	58-22	58-22	58-22	58-22	58-22	58-22
	58-22	58-22	58-22	58-22	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#
M$RADI	1-D77#	7-915#	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#	60-65	60-65#
M$RBRO	1-C52#	7-915#												
M$RNRO	1-C62#	7-915#	17-16	17-16#	17-35	17-35#	18-21	18-21#						
M$SETS	1-D32#	7-915#	7-941	7-941#	9-10	9-10#	10-10	10-10#	11-51	11-51#	15-9	15-9#	15-10	15-10#
	15-11	15-11#	15-12	15-12#	15-13	15-13#	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17	15-17#
	15-18	15-18#	15-19	15-19#	15-20	15-20#	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#
	15-25	15-25#	15-26	15-26#	15-27	15-27#	15-28	15-28#	15-29	15-29#	17-105	17-105#	19-42	19-42#
	19-48	19-48#	20-8	20-8#	21-8	21-8#	22-10	22-10#	23-8	23-8#	24-8	24-8#	25-9	25-9#
	27-38	27-38#	27-62	27-62#	28-195	28-195#	29-18	29-18#	30-112	30-112#	31-14	31-14#	32-43	32-43#
	33-8	33-8#	34-82	34-82#	35-19	35-19#	36-100	36-100#	37-20	37-20#	38-85	38-85#	39-19	39-19#
	40-138	40-138#	41-53	41-53#	42-78	42-78#	43-19	43-19#	44-100	44-100#	45-18	45-18#	46-97	46-97#
	47-20	47-20#	48-88	48-88#	49-99	49-99#	50-14	50-14#	51-75	51-75#	52-16	52-16#	53-113	53-113#
	54-14	54-14#	55-108	55-108#	56-16	56-16#	57-110	57-110#	58-18	58-18#	60-43	60-43#	60-53	60-53#
	61-12	61-12#												
M$STAR	1-A33#	7-915#												
M$SVC	1-C33#	7-915#	15-9	15-9	15-9#	15-9#	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11#	15-11#
	15-12	15-12	15-12#	15-12#	15-13	15-13	15-13#	15-13#	15-14	15-14	15-14#	15-14#	15-15	15-15
	15-15#	15-15#	15-16	15-16	15-16#	15-16#	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18#	15-18#
	15-19	15-19	15-19#	15-19#	15-20	15-20	15-20#	15-20#	15-21	15-21	15-21#	15-21#	15-22	15-22
	15-22#	15-22#	15-23	15-23	15-23#	15-23#	15-24	15-24	15-24#	15-24#	15-25	15-25	15-25#	15-25#
	15-26	15-26	15-26#	15-26#	15-27	15-27	15-27#	15-27#	15-28	15-28	15-28#	15-28#	15-29	15-29
	15-29#	15-29#	17-16	17-16#	17-35	17-35#	17-79	17-79#	17-87	17-87#	17-132	17-137	17-160	17-160#
	17-162	17-162	17-171	17-172	17-172#	17-175	17-175#	17-180	17-188	17-188#	17-190	17-190	17-199	17-200
	17-200#	17-203	17-203#	17-208	18-21	18-21#	18-79	18-79#	18-80	18-80#	18-81	18-81#	18-82	18-82#
	18-83	18-83#	18-84	18-84#	18-87	18-87#	18-88	18-88#	19-62#	19-78	19-78#	21-10	21-10#	21-12
	21-12#	21-16	21-16#	21-20	21-20#	21-24	21-24#	21-36	21-37	21-37#	21-46	21-46#	21-59	21-59#
	21-64	21-64#	21-67	21-67#	21-93	21-93#	21-108	21-108#	22-19	22-19#	23-10	23-10#	23-18	23-18#
	23-21	23-21#	23-33	23-33#	23-48	23-48#	24-19#	24-35	24-35#	25-20#	25-36	25-36#	27-71	27-71#
	27-93	27-93	27-93	27-93	27-93#	27-93#	27-101	27-101	27-101	27-101	27-101#	27-101#	27-110	27-110
	27-110	27-110	27-110	27-110	27-110	27-110	27-110#	27-110#	27-110#	27-110#	27-124	27-125	27-125#	27-127
	27-127#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-203	28-203#	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-26	29-26#	30-116
	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
	30-116	30-116	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-120	30-120#	31-18
	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
	31-18	31-18	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-22	31-22#	32-47
	32-47	32-47	32-47	32-47	32-47	32-47	32-47#	32-51	32-51#	33-12	33-12	33-12	33-12	33-12
	33-12	33-12	33-12#	33-16	33-16#	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86#	34-86#	34-86#	34-86#
	34-86#	34-86#	34-86#	34-86#	34-86#	34-90	34-90#	35-23	35-23	35-23	35-23	35-23	35-23	35-23
	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23#	35-23#
	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-27	35-27#	36-104	36-104	36-104	36-104	36-104
	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#
	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-108	36-108#	37-24	37-24	37-24	37-24	37-24
	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#
	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-28	37-28#	38-89	38-89	38-89	38-89	38-89

	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-93	38-93#	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-27	39-27#	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-146	40-146#	41-57	41-57	41-57	41-57	41-57
	41-57	41-57	41-57	41-57	41-57	41-57#	41-57#	41-57#	41-57#	41-57#	41-61	41-61#	42-82	42-82
	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#
	42-82#	42-82#	42-82#	42-82#	42-86	42-86#	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-27	43-27#
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
	44-108	44-108#	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
	45-22#	45-22#	45-26	45-26#	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	46-101#	46-101#	46-101#	46-105	46-105#	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-28	47-28#	48-92	48-92	48-92	48-92	48-92	48-92
	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92#	48-92#	48-92#
	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-96	48-96#	49-103	49-103	49-103	49-103	49-103	49-103
	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#
	49-103#	49-103#	49-103#	49-107	49-107#	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18
	50-18	50-18	50-18	50-18	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
	50-22	50-22#	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-83	51-83#	52-20	52-20	52-20	52-20
	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20#	52-20#	52-20#	52-20#	52-20#
	52-20#	52-20#	52-24	52-24#	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117#	53-117#	53-117#	53-117#	53-117#
	53-117#	53-117#	53-117#	53-117#	53-117#	53-121	53-121#	54-18	54-18	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18#	54-18#
	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-22	54-22#	55-112	55-112	55-112	55-112
	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#
	55-112#	55-112#	55-116	55-116#	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20
	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-24	56-24#	57-114	57-114
	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114#	57-114#	57-114#	57-114#
	57-114#	57-114#	57-118	57-118#	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22
	58-22	58-22	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-28	58-28#				
MSTLAB	1-C29#	7-915#	15-9#	15-9#	15-10#	15-10#	15-11#	15-11#	15-12#	15-12#	15-13#	15-13#	15-14#	15-14#
	15-15#	15-15#	15-16#	15-16#	15-17#	15-17#	15-18#	15-18#	15-19#	15-19#	15-20#	15-20#	15-21#	15-21#
	15-22#	15-22#	15-23#	15-23#	15-24#	15-24#	15-25#	15-25#	15-26#	15-26#	15-27#	15-27#	15-28#	15-28#
	15-29#	15-29#	17-16#	17-35#	17-79#	17-87#	17-132#	17-137#	17-160#	17-162#	17-162#	17-171#	17-172#	17-175#
	17-180#	17-188#	17-190#	17-190#	17-199#	17-200#	17-203#	17-208#	18-21#	18-79#	18-80#	18-81#	18-82#	18-83#
	18-84#	18-87#	18-88#	19-78#	21-10#	21-12#	21-16#	21-20#	21-24#	21-36#	21-37#	21-46#	21-59#	21-64#
	21-67#	21-93#	21-108#	22-19#	23-10#	23-18#	23-21#	23-33#	23-48#	24-35#	25-36#	27-71#	27-93#	27-93#
	27-93#	27-93#	27-101#	27-101#	27-101#	27-101#	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#
	27-124#	27-125#	27-127#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-203#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-26#	30-116#
	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#
	30-116#	30-116#	30-120#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#

PARAMETER CODING MACRO V04.00 1-JAN-83 15:44:57 PAGE M-22 SEQ 0277
CROSS REFERENCE TABLE (CREF V04.00)

	31-18#	31-18#	31-18#	31-18#	31-18#	31-18#	31-22#	32-47#	32-47#	32-47#	32-47#	32-47#	32-47#	32-47#
	32-51#	33-12#	33-12#	33-12#	33-12#	33-12#	33-12#	33-12#	33-16#	34-86#	34-86#	34-86#	34-86#	34-86#
	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#
	34-90#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#
	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-27#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-108#	37-24#	37-24#	37-24#
	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#
	37-28#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-93#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-27#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
	40-142#	40-142#	40-142#	40-142#	40-146#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#
	41-57#	41-61#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
	42-82#	42-86#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
	43-23#	43-27#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-108#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-26#
	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	46-101#	46-101#	46-101#	46-101#	46-105#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-28#	48-92#	48-92#
	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
	48-92#	48-96#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
	49-103#	49-103#	49-103#	49-107#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
	50-18#	50-18#	50-18#	50-18#	50-18#	50-22#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
	51-79#	51-79#	51-79#	51-79#	51-79#	51-83#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
	52-20#	52-20#	52-20#	52-20#	52-20#	52-24#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-121#	54-18#	54-18#
	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	54-18#	54-18#	54-18#	54-22#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
	55-112#	55-112#	55-112#	55-116#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
	56-20#	56-20#	56-20#	56-24#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#
	57-114#	57-114#	57-118#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#
	58-22#	58-28#												
MSTSTL	1-C21#	7-915#	15-9	15-9	15-9#	15-9#	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11#	15-11#
	15-12	15-12	15-12#	15-12#	15-13	15-13	15-13#	15-13#	15-14	15-14	15-14#	15-14#	15-15	15-15
	15-15#	15-15#	15-16	15-16	15-16#	15-16#	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18#	15-18#
	15-19	15-19	15-19#	15-19#	15-20	15-20	15-20#	15-20#	15-21	15-21	15-21#	15-21#	15-22	15-22
	15-22#	15-22#	15-23	15-23	15-23#	15-23#	15-24	15-24	15-24#	15-24#	15-25	15-25	15-25#	15-25#
	15-26	15-26	15-26#	15-26#	15-27	15-27	15-27#	15-27#	15-28	15-28	15-28#	15-28#	15-29	15-29
	15-29#	15-29#	17-16	17-16#	17-35	17-35#	17-79	17-79#	17-87	17-87#	17-132	17-132#	17-132#	17-137
	17-137#	17-137#	17-160	17-160#	17-162	17-162	17-162#	17-162#	17-162#	17-162#	17-171	17-171#	17-171#	17-172
	17-172#	17-175	17-175#	17-180	17-180#	17-180#	17-188	17-188#	17-190	17-190	17-190#	17-190#	17-190#	17-190#
	17-199	17-199#	17-199#	17-200	17-200#	17-203	17-203#	17-208	17-208#	17-208#	18-21	18-21#	18-79	18-79#
	18-80	18-80#	18-81	18-81#	18-82	18-82#	18-83	18-83#	18-84	18-84#	18-87	18-87#	18-88	18-88#
	19-78	19-78#	21-10	21-10#	21-12	21-12#	21-16	21-16#	21-20	21-20#	21-24	21-24#	21-36	21-36#
	21-36#	21-37	21-37#	21-46	21-46#	21-59	21-59#	21-64	21-64#	21-67	21-67#	21-93	21-93#	21-108
	21-108#	22-19	22-19#	23-10	23-10#	23-18	23-18#	23-21	23-21#	23-33	23-33#	23-48	23-48#	24-35
	24-35#	25-36	25-36#	27-71	27-71#	27-93	27-93	27-93	27-93	27-93#	27-93#	27-93#	27-93#	27-93#
	27-93#	27-101	27-101	27-101	27-101	27-101#	27-101#	27-101#	27-101#	27-101#	27-101#	27-110	27-110	27-110
	27-110	27-110	27-110	27-110	27-110	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#	27-110#
	27-110#	27-110#	27-110#	27-124	27-124#	27-124#	27-125	27-125#	27-127	27-127#	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#

28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199#
28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199#
28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-199# 28-203 28-203# 29-22 29-22 29-22 29-22
29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22
29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22
29-22 29-22 29-22 29-22 29-22 29-22 29-22 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22#
29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22#
29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22#
29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22# 29-22#
30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116 30-116
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116#
30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-116# 30-120 30-120# 31-18 31-18
31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18 31-18
31-18 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18#
31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-18# 31-22 31-22#
32-47 32-47 32-47 32-47 32-47 32-47 32-47 32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-47#
32-47# 32-47# 32-47# 32-47# 32-47# 32-47# 32-51 32-51# 33-12 33-12 33-12 33-12 33-12 33-12
33-12 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12# 33-12#
33-16 33-16# 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86
34-86 34-86 34-86 34-86 34-86 34-86 34-86 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86#
34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-86# 34-90 34-90# 35-23 35-23 35-23 35-23
35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23 35-23
35-23 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23# 35-23#
35-23# 35-23# 35-27 35-27# 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104
36-104 36-104 36-104 36-104 36-104 36-104 36-104 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104#
36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104# 36-104#
36-104# 36-104# 36-104# 36-104# 36-108 36-108# 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24
37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24 37-24# 37-24# 37-24# 37-24# 37-24#
37-24# 37-24# 37-24# 37-24# 37-24# 37-24# 37-28 37-28# 38-89 38-89 38-89 38-89 38-89 38-89#
38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89 38-89#
38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89# 38-89#
38-93 38-93# 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23
39-23 39-23 39-23 39-23 39-23 39-23 39-23 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23#
39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-23# 39-27 39-27# 40-142 40-142
40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142
40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142 40-142
40-142 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142#
40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142#
40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142#
40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-142# 40-146 40-146# 41-57 41-57 41-57 41-57
41-57 41-57 41-57 41-57 41-57 41-57 41-57# 41-57# 41-57# 41-57# 41-57# 41-57# 41-57# 41-57#
41-57# 41-57# 41-57# 41-57# 41-57# 41-57# 41-57# 41-61 41-61# 42-82 42-82 42-82 42-82 42-82
42-82 42-82 42-82 42-82 42-82 42-82 42-82 42-82 42-82# 42-82# 42-82# 42-82# 42-82# 42-82#
42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-82# 42-86
42-86# 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23 43-23
43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23# 43-23#
43-23# 43-23# 43-23# 43-23# 43-23# 43-27 43-27# 44-104 44-104 44-104 44-104 44-104 44-104 44-104
44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104 44-104# 44-104#
44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104#
44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-104# 44-108

	44-108#	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22	45-22	45-22	45-22	45-22	45-22	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-26	45-26#	46-101	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	46-105	46-105#	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-28	47-28#	48-92	48-92	48-92
	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-96	48-96#	49-103
	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-107	49-107#	50-18	50-18	50-18	50-18
	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18#	50-18#	50-18#
	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
	50-18#	50-18#	50-18#	50-18#	50-18#	50-22	50-22#	51-79	51-79	51-79	51-79	51-79	51-79	51-79
	51-79	51-79	51-79	51-79	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-83	51-83#	52-20
	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20#	52-20#
	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
	52-20#	52-20#	52-20#	52-24	52-24#	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117#	53-117#	53-117#	53-117#
	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-121	53-121#	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	54-18#	54-18#	54-18#	54-22	54-22#	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-116	55-116#	56-20	56-20	56-20
	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#
	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
	56-20#	56-24	56-24#	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114
	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#
	57-114#	57-114#	57-114#	57-114#	57-114#	57-118	57-118#	58-22	58-22	58-22	58-22	58-22	58-22	58-22
	58-22	58-22	58-22	58-22	58-22	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#
	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-28	58-28#			
MSWORD	1-C94#	7-915#	7-969	7-969#	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8
	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8	8-8#	17-132	17-132	17-132	17-132#
	17-137	17-137	17-137	17-137#	17-162	17-162	17-162	17-162	17-162	17-162	17-162#	17-162#	17-171	17-171
	17-171	17-171#	17-180	17-180	17-180	17-180#	17-190	17-190	17-190	17-190	17-190	17-190	17-190#	17-190#
	17-199	17-199	17-199	17-199#	17-208	17-208	17-208	17-208#	19-62	19-62#	21-36	21-36	21-36	21-36#
	21-37#	21-93#	23-33#	24-19	24-19#	25-20	25-20#	27-71#	27-93	27-93	27-93	27-93	27-93	27-93
	27-93#	27-93#	27-101	27-101	27-101	27-101	27-101	27-101	27-101#	27-101#	27-110	27-110	27-110	27-110
	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110#	27-110#	27-110#	27-110#	27-124	27-124
	27-124	27-124#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#	28-199#
	28-199#	28-199#	28-199#	28-199#	28-199#	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22

29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
29-22	29-22	29-22	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#
29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	29-22#	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116	30-116
30-116	30-116	30-116	30-116	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18#	31-18#	31-18#	31-18#	31-18#
31-18#	31-18#	31-18#	31-18#	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47
32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47#	32-47#	32-47#	32-47#	32-47#	32-47#
32-47#	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12
33-12	33-12	33-12	33-12	33-12	33-12#	33-12#	33-12#	33-12#	33-12#	33-12#	33-12#	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	34-86#	35-23	35-23	35-23
35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23
35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23	35-23#
35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	35-23#	36-104	36-104	36-104	36-104
36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104
36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
36-104#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#
37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
38-89#	38-89#	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23
39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
39-23#	39-23#	39-23#	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-14[illegible]	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
40-142	40-142	40-142	40-142	40-142	40-1[illegible]	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#
40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	41-57
41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57	41-57
41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82
42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#
42-82#	42-82#	42-82#	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23
43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104
44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
45-22	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101
46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24#
47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	48-92	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92
48-92	48-92	48-92	48-92	48-92	48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
48-92#	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103
49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
49-103#	49-103#	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18

	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#
	50-18#	50-18#	50-18#	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20	52-20
	52-20	52-20	52-20	52-20	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	53-117	53-117	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117#	53-117#	53-117#	53-117#
	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	54-18#	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112	55-112
	55-112	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	56-20	56-20
	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20	56-20
	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	57-114	57-114	57-114	57-114	57-114
	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114#
	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22
	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22	58-22#	58-22#	58-22#	58-22#
	58-22#	58-22#	58-22#	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#	60-65
	60-65#	62-15	62-15#											
M$XFER	1-@82#	7-915#												
MANUAL	1-;62#	7-915#												
MEMORY	1-;66#	7-915#												
MM	51-17#	51-79	52-20											
MM0	48-15#	48-92												
MM1	44-23#	44-104	45-22											
NEUTRA	7-499#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	41-57
	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18	55-112
	56-20	57-114	58-22											
NN	57-22#	57-114	58-22											
ONLYRL	7-368#	32-47	32-47	32-47	33-12	33-12	33-12	42-82	43-23					
OO	38-20#	38-89	39-23											
OPEN	1-;71#	7-915#												
POINTE	1-;76#	7-915#	7-947											
POP	7-111#	18-54	18-76											
PRINTB	1-<39#	7-915#	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18	15-19	15-20
	15-21	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29	17-172	17-200	27-93	27-93	27-101
	27-101	27-110	27-110	27-110	27-110	27-125	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	30-116	30-116
	30-116	30-116	30-116	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	35-23	35-23	35-23	35-23	35-23	35-23
	35-23	35-23	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	37-24	37-24	37-24	37-24
	37-24	37-24	37-24	37-24	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	41-57	41-57	42-82	42-82
	42-82	42-82	42-82	42-82	43-23	43-23	43-23	43-23	43-23	43-23	44-104	44-104	44-104	44-104
	44-104	44-104	44-104	44-104	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	49-103	49-103	49-103	49-103
	49-103	50-18	50-18	50-18	50-18	50-18	50-18	50-18	51-79	51-79	51-79	51-79	51-79	51-79
	52-20	52-20	52-20	52-20	52-20	52-20	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	54-18	55-112	55-112	55-112	55-112
	55-112	55-112	56-20	56-20	56-20	56-20	56-20	56-20	57-114	57-114	57-114	57-114	57-114	58-22
	58-22	58-22	58-22	58-22										
PRINTF	1-<79#	7-915#	21-24	21-46	21-59	21-64								
PRINTS	1-=19#	7-915#												

CROSS REFERENCE TABLE (CREF V04.00)

```
PRINTX   1-=59#   7-915#  18-79   18-80   18-81   18-82   18-83   18-84   18-87   18-88
PUSH     7-100#  18-17    18-65
READBU   1-=99#   7-915#
READEF   1->03#   7-915#  21-12   21-16   21-20
RELDLY   7-815#  30-116   31-18   32-47   32-47   32-47   33-12   33-12   33-12   34-86   34-86   35-23   35-23   36-104
        36-104   37-24    37-24   38-89   39-23   40-142  40-142  40-142  40-142  42-82   42-82   43-23   43-23   44-104
        45-22    46-101   47-24   51-79   52-20   57-114  58-22
RELEAS   7-411#  30-116   31-18   34-86   34-86   35-23   35-23   36-104  37-24   38-89   39-23   40-142  40-142  40-142
        40-142   42-82    43-23   44-104  45-22   46-101  47-24   51-79   52-20
RFLAGS   1->08#   7-915#
SEIZE    7-172#  17-162   17-190  28-199  29-22   30-116  31-18   32-47   32-47   32-47   33-12   33-12   33-12   34-86
        35-23    36-104   37-24   38-89   39-23   42-82   43-23   44-104  45-22   46-101  47-24   53-117  54-18   55-112
        56-20    57-114   58-22
SELECT   7-465#  17-162   17-162  17-163  17-190  17-190  17-191  27-93   27-93   27-101  27-101  27-110  27-110  28-199
        28-199   28-199   29-22   29-22   29-22   30-116  30-116  30-116  30-116  31-18   31-18   31-18   31-18   32-47
        32-47    32-47    32-47   32-47   32-47   32-47   32-47   32-47   33-12   33-12   33-12   33-12   33-12   33-12
        33-12    33-12    33-12   34-86   34-86   34-86   34-86   34-86   34-86   34-86   35-23   35-23   35-23   35-23
        35-23    35-23    35-23   36-104  36-104  36-104  36-104  37-24   37-24   37-24   37-24   38-89   38-89   38-89
        38-89    38-89    38-89   38-89   39-23   39-23   39-23   39-23   39-23   39-23   39-23   40-142  40-142  40-142
        40-142   40-142   40-142  40-142  40-142  40-142  40-142  40-142  40-142  42-82   42-82   42-82   42-82   42-82
        43-23    43-23    43-23   43-23   43-23   44-104  44-104  44-104  44-104  44-104  44-104  45-22   45-22   45-22
        45-22    45-22    45-22   46-101  46-101  46-101  46-101  46-101  46-101  47-24   47-24   47-24   47-24   47-24
        47-24    48-92    48-92   48-92   48-92   49-103  49-103  49-103  50-18   50-18   50-18   51-79   51-79   51-79
        52-20    52-20    52-20   53-117  53-117  53-117  54-18   54-18   54-18   55-112  56-20   57-114  57-114  58-22
        58-22
SETATA   7-777#  44-104   45-22   46-101  47-24   48-92   49-103  50-18
SETPRI   1->13#   7-915#  17-160  17-175  17-188  17-203  21-67   23-10   28-199  28-199  28-199  29-22   29-22   29-22
SETVEC   1->18#   7-915#  17-79   17-87
SLASH    1->24#   7-915#
STARS    1->38#   7-32#    7-915#  18-2    18-15   18-58   18-63   27-77   27-95   27-103  27-112  28-199  28-199  28-199
        28-199   28-199   28-199  29-22   29-22   29-22   29-22   29-22   29-22   30-116  30-116  30-116  31-18   31-18
        31-18    34-86    34-86   34-86   34-86   35-23   35-23   35-23   35-23   36-104  36-104  36-104  36-104  36-104
        37-24    37-24    37-24   37-24   37-24   38-89   38-89   38-89   38-89   38-89   39-23   39-23   39-23   39-23
        39-23    40-142   40-142  40-142  40-142  40-142  41-57   41-57   42-82   42-82   42-82   42-82   43-23   43-23
        43-23    43-23    44-104  44-104  44-104  44-104  44-104  44-104  44-104  45-22   45-22   45-22   45-22   45-22
        45-22    45-22    46-101  46-101  46-101  46-101  46-101  46-101  46-101  47-24   47-24   47-24   47-24   47-24
        47-24    47-24    48-92   48-92   48-92   48-92   48-92   49-103  49-103  50-18   50-18   51-79   51-79   51-79
        51-79    52-20    52-20   52-20   52-20   53-117  53-117  53-117  53-117  53-117  53-117  53-117  53-117  54-18
        54-18    54-18    54-18   54-18   54-18   54-18   54-18   55-112  55-112  55-112  55-112  55-112  56-20   56-20
        56-20    56-20    56-20   57-114  57-114  57-114  57-114  57-114  57-114  58-22   58-22   58-22   58-22   58-22
        58-22
SVC      1->52#   7-914#   7-915
SWITCH   7-641#  34-86    35-23   40-142  40-142
TESTAG   7-835#
TIMER    7-877#  17-161   17-189  21-38   28-199  29-22   30-116  30-116  31-18   31-18   32-47   32-47   32-47   33-12
        33-12    33-12    34-86   34-86   34-86   34-86   35-23   35-23   35-23   35-23   36-104  36-104  36-104  36-104
        37-24    37-24    37-24   37-24   38-89   39-23   40-142  40-142  40-142  40-142  40-142  40-142  41-57   41-57
        42-82    42-82    42-82   42-82   43-23   43-23   43-23   43-23   44-104  45-22   46-101  47-24   49-103  49-103
        50-18    50-18    51-79   51-79   51-79   52-20   52-20   52-20   53-117  53-117  53-117  53-117  54-18   54-18
        54-18    54-18    55-112  55-112  55-112  55-112  56-20   56-20   56-20   56-20   57-114  57-114  57-114  58-22
        58-22    58-22
XFER     1-@12#   7-915#  19-62#  21-37#  21-93#  23-33#  24-19#  25-20#  27-71#  28-199#  29-22#  30-116#  31-18#  32-47#
        33-12#   34-86#   35-23#  36-104#  37-24#  38-89#  39-23#  40-142#  41-57#  42-82#  43-23#  44-104#  45-22#  46-101#
        47-24#   48-92#   49-103#  50-18#  51-79#  52-20#  53-117#  54-18#  55-112#  56-20#  57-114#  58-22#
XFERF    1-@16#   7-915#
XFERT    1-@20#   7-915#
```