DPV-11 DPV 11 FUNC DIAG AH-S035A-MC SEP 1980
CVDPVAO FICHE 1 OF 2 MADE IN USA

DPV-11 DPV-11 FUNC DIAG. AH-S035A-MC
CVDPVAO FICHE 2 OF 2

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.NLIST  TOC
.REM @
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IDENTIFICATION

PRODUCT CODE: AC-S033A-MC

PRODUCT NAME: CVDPVA0 DPV11 FUNC DIAG

PRODUCT DATE: JUNE 1980

MAINTAINER: DIAGNOSTIC ENGINEERING

AUTHOR: MIKE O'CONNOR

CONTENTS

1.0 INTRODUCTION

THIS PROGRAM WILL BE IMPLEMENTED USING THE DIAGNOSTIC SUPERVISOR AND A STRUCTURED PROGRAMMING APPROACH. BECAUSE THE DESIGN WILL CONFORM TO THE SUPERVISOR (STANDALONE VERSION) THE PROGRAM WILL BE COMPATIBLE WITH ACT, APT, XXDP+, AND SLIDE.

THROUGH DIALOGUE WITH THE OPERATOR, THE PROGRAM WILL ALLOW MODIFICATION OF DEVICE PARAMETERS, SUCH AS LSI-BUS ADDRESS, VECTOR ADDRESSES AND DEVICE PRIORITY. IN ADDITION, THE OPERATOR CAN SPECIFY PARTICULAR TESTS TO BE RUN AND A VARIETY OF LOOPING, RUNNING, AND REPORTING MODES.

DEVICE ERRORS WILL BE REPORTED AS THEY OCCUR. THE REPORT WILL INCLUDE A TEST NUMBER AND DESCRIPTION OF THE ERROR, GOOD AND BAD TEST DATA, AND APPLICABLE DEVICE REGISTER CONTENTS.

2.0 HARDWARE REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE DPV11 FUNCTIONAL DIAGNOSTIC TESTS:

A LSI11 OR PDP11/03
16K MEMORY
CONSOLE TERMINAL
DPV11

3.0 PRELIMINARY PROGRAM REQUIREMENTS

IT IS ASSUMED THAT THE PROCESSOR IS IN PROPER WORKING CONDITION.

THE DEVICE ADDRESS AND THE INTERRUPT VECTOR MUST BE KNOWN BEFORE ANSWERING THE USER DIALOGUE. THE USER SHOULD ALSO KNOW WHETHER THE CPU IS A LSI11 (M7264), A LSI11/2 (M7270), OR A LSI11/23 (M8186). FINALLY THE USER MUST DECIDE THE TYPE OF TURNAROUND IN ORDER TO DETERMINE THE CONNECTOR (IF ANY) IS NECESSARY.

4.0 GENERAL PROGRAM CONSIDERATIONS

4.1 DIAGNOSTIC SUPERVISOR

THIS PROGRAM IS COMPATIBLE WITH THE STANDALONE DIAGNOSTIC SUPERVISOR, AND MUST BE LOADED TO BE CO-RESIDENT WITH THE SUPERVISOR, OR BE PREVIOUSLY COMBINED WITH THE SUPERVISOR AND LOADED AS A SINGLE FILE. IN EITHER CASE, THE COMBINED PROGRAM WILL NOT EXCEED 16K OF MEMORY.

4.2 EXECUTION TIME

EXECUTION TIME IS DEPENDENT ON THE PROCESSOR SPEED AND THE TYPE OF LOOPBACK
THE FOLLOWING ARE THE TIMES TO COMPLETE THE 1ST PASS:

		RS423 (OR INTERNAL)	RS422
LSI11 (KD11-F	M7264 MODULE):	10 SECONDS	30 SEC.
LSI11/2 (KD11-HA	M7270 MODULE):	10 SECONDS	30 SEC.
LSI11/23(KDF11-AA	M8186 MODULE):	7 SECONDS	5 SEC.

4.3 XXDP+

THIS PROGRAM MAY BE LOADED UNDER XXDP+, AND MAY BE RUN IN DUMP MODE OR CHAIN MODE.

4.4 ACT/SLIDE

THIS PROGRAM MAY BE LOADED UNDER ACT OR SLIDE AND MAY BE RUN IN DUMP MODE OR CHAIN MODE.

4.5 APT

THIS PROGRAM MAY BE LOADED BY THE APT SYSTEM (INCLUDING APT-RD) AND RUN IN PROGRAM MODE OR SCRIPT MODE.

4.6 MEMORY MANAGEMENT

THERE IS NO MEMORY MANAGEMENT USE IN THIS DIAGNOSTIC.

4.7 MEMORY PARITY OPTION

IF PARITY MEMORY IS INSTALLED, MEMORY PARITY TRAPS ARE DISABLED BY THE PROGRAM.

4.8 ERROR LOGGING

AT THE END OF EACH PASS ON ALL UNITS, THE PROGRAM PRINTS OUT THE CUMULATIVE TOTAL NUMBER OF ERRORS SINCE THE LAST START OR RESTART COMMAND.

5.0 PROGRAM LOAD MEDIA

THIS PROGRAM CAN BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER OR FROM ACT, SLIDE, OR APT SYSTEMS, OR FROM ANY MEDIA SUPPORTED BY XXDP+. WHEN USING THE PAPER TAPE ABSOLUTE LOADER, THE PROGRAM SHOULD BE LOADED FIRST, FOLLOWED BY THE DIAGNOSTIC SUPERVISOR. WHEN USING XXDP+, THE DIAGNOSTIC SUPERVISOR SHOULD BE LOADED FIRST, FOLLOWED BY THE DIAGNOSTIC PROGRAM.

6.0 OPERATING INSTRUCTIONS

6.1 LOADING AND STARTING PROCEDURES

6.1.1 LOADING PROCEDURES

THIS PROGRAM MAY BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER. IT MAY ALSO BE LOADED FROM ANY XXDP+ LOAD MEDIA. WHEN LOADED UNDER XXDP+, THE DIAGNOSTIC SUPERVISOR WILL BE LOADED AUTOMATICALLY.

6.1.2 STARTING PROCEDURES

THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES TO START THE PROGRAM.

6.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION

THE DIAGNOSTIC CAN BE EXECUTED STANDALONE UNDER XXDP+, WITHOUT READING THE REMAINDER OF THIS DOCUMENT, AS FOLLOWS:

A) LOAD AND START DIAGNOSTIC USING RUN COMMAND
B) RECEIVE DIAGNOSTIC SUPERVISOR IDENTIFICATION AND PROMPT (DRS-C>)
C) ENTER STA<CR>
D) ANSWER HARDWARE AND SOFTWARE QUESTIONS
E) GET END OF PASS MESSAGES OR ERROR MESSAGES
F) TO END EXECUTION, ENTER CONTROL/C

6.2 INITIAL DIALOGUE

AFTER THE PROGRAM AND THE SUPERVISOR ARE LOADED AND THE PROGRAM IS STARTED, THE FOLLOWING IDENTIFICATION IS TYPED :

```
DRS LOADED
DIAG. RUN-TIME SERVICES

DR>
```

THE OPERATOR THEN PROCEEDS BY TYPING ONE OR MORE OF THE COMMANDS DESCRIBED IN THE FOLLOWING SECTION 6.3. (FOR MORE DETAILED INFORMATION, REFER TO THE DIAGNOSTIC SUPERVISOR FUNCTIONAL SPECIFICATION).

6.3 PROGRAM OPTIONS

6.3.1 START COMMAND

```
*************************************************************
STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
   <FLAG-LIST>/EOP:<INCR>
*************************************************************
```

6.3.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>)

<TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS. ON THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.2 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DEFAULT IS NON-ENDING EXECUTION. IN THIS CASE EXIT FROM THE PROGRAM IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY OCCURANCE OF AN ERROR WITH THE HALT ON ERROR FLAG BEING SET. THE EXIT IS A RETURN TO COMMAND MODE. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE	HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED
LOE	LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAINING THE ERROR
IER	INHIBIT ERROR REPORTING
IBE	INHIBIT BASIC ERROR REPORTS
IXE	INHIBIT EXTENDED ERROR REPORTS
PRI	DIRECT ALL MESSAGES TO A LINE PRINTER
PNT	PRINT NUMBER OF TEST BEING EXECUTED
BOE	BELL ON ERROR
UAM	RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TESTS
ISR	INHIBIT STATISTICAL REPORTS
IDU	INHIBIT DROPPING OF UNITS BY DIAGNOSTIC
LOT	LOOP ON TEST

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.4 END OF PASS SWITCH (/EOP:<INCR>)

<INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.5 EFFECT OF START COMMAND

THE EFFECT OF THE START COMMAND IS TO INITIATE THE HARDWARE PARAMETER DIALOGUE, THE SOFTWARE PARAMETER DIALOGUE, AND THEN THE DIAGNOSTIC TESTS THEMSELVES.

THE HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE QUESTION "# UNITS?" TO WHICH THE OPERATOR REPLIES WITH A DECIMAL NUMBER N FROM 1 TO 16. THE TERM "UNIT" REFERS TO THE DEVICE TO WHICH THIS SERIES OF DIAGNOSTICS IS DEDICATED. FOLLOWING THIS ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES WILL BE BUILT. EACH P-TABLE IS A CORE-RESIDENT TABLE CONTAINING ALL THE HARDWARE INFORMATION FOR ONE UNIT. THE OPERATOR MUST SUPPLY N (NUMBER OF UNITS) VALUES FOR EACH QUESTION. HE MAY DO THIS BY GIVING ONE ANSWER TO EACH QUESTION (IN WHICH CASE THE SERIES OF QUESTIONS WILL BE POSED N TIMES) OR BY GIVING N VALUES, SEPARATED BY COMMAS, TO EACH QUESTION (SERIES WILL BE POSED ONCE). EACH QUESTION IS FOLLOWED BY THE RESPONSE RADIX (D FOR DECIMAL, B FOR BINARY, O FOR OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE THE MODE (QUICK VERIFY ETC.) THAT THE DIAGNOSTIC WILL EXECUTE IN.

WHEN THE QUESTION "# UNITS?" IS ANSWERED, MEMORY STORAGE IS ALLOCATED FOR THE P-TABLES, AND IF THERE IS NOT ENOUGH TO ACCOMMODATE THEM THE MESSAGE "TOO MANY UNITS" IS ISSUED. IN THIS CASE THE DIAGNOSTIC MUST BE EXECUTED MORE THAN ONCE TO TEST ALL UNITS.

EXAMPLE:

STA/TESTS:1:2-4:6:8-10/PASS:3/FLAGS:IER:HOE=1:UAM:LOE

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, EACH PASS CONSISTING OF TESTS 1,2,3,4,6,8,9, AND 10 EXECUTED AGAINST ALL UNITS. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

6.3.2 RESTART COMMAND

****
RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:

<FLAG-LIST>/UNITS:<UNIT-LIST>
****

6.3.2.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND.

6.3.2.2 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (0,1 ETC.) OR RANGES OF DECIMAL NUMBERS (0-5, 8-10 ETC.) THAT SPECIFY THE UNITS TO BE TESTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS MAY RANGE FROM 0 THRU N-1 (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND). THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIAGLOGUE. THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND. SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW. DEFAULT IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND.

6.3.2.3 EFFECT OF RESTART COMMAND

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT. THE UNITS SWITCH GIVES THE ABILITY TO SELECT A SUBSET OF THESE. THE SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED (OPERATOR WILL BE ASKED). THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS: A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C) A CONTROL/C WAS ENTERED BY THE OPERATOR.

6.3.3 CONTINUE COMMAND

****
CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>
****

6.3.3.1 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS SAME AS IN START COMMAND, BUT THE DEFAULT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART. IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION.

6.3.3.2 FLAG SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS SAME AS IN START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

6.3.3.3 EFFECT OF CONTINUE COMMAND

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

6.3.4 PROCEED COMMAND

****
PRO(CEED)/FLAGS:<FLAG-LIST>
****

6.3.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

6.3.4.2 EFFECT OF PROCEED COMMAND

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE. COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

6.3.5 ADD COMMAND

****
ADD/UNITS:<UNIT-LIST>
****

6.3.5.1 UNITS SWITCH (/UNITS:<UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.5.2 EFFECT OF ADD COMMAND

THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE. EACH UNIT MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER HARDWARE DIALOGUE. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE. THE UNITS SWITCH MUST BE SPECIFIED. THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS THAT WERE PREVIOUSLY DROPPED.

6.3.6 DROP COMMAND

```
*************************************************************
DRO(P)/UNITS:<UNIT-LIST>
*************************************************************
```

6.3.6.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.6.2 EFFECT OF DROP COMMAND

THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING. THE UNITS WILL BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND. THE UNITS SWITCH MUST BE ENTERED. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR A CONTINUE COMMAND.

6.3.7 PRINT COMMAND

```
*************************************************************
PRI(NT)
*************************************************************
```

6.3.7.1 EFFECT OF PRINT COMMAND

THE TOTAL NUMBER OF ERRORS FOR EACH UNIT SINCE THE LAST START OR RESTART COMMAND ARE PRINTED. THE ISR (INHIBIT STATISTICAL REPORTING) FLAG IS CLEARED.

6.3.8 DISPLAY COMMAND

```
*************************************************************
DIS(PLAY)/UNITS:<UNIT-LIST>
*************************************************************
```

6.3.8.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.8.2 EFFECT OF DISPLAY COMMAND

THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED OUT IN THE FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS THAT WERE DROPPED BY THE OPERATOR 'DROP'' COMMAND ARE SO DESIGNATED.

6.3.9 FLAGS COMMAND

```
*************************************************************
```

FLA(GS)
****

6.3.9.1 EFFECT OF FLAGS COMMAND

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

6.3.10 ZFLAGS COMMAND

****
ZFL(AGS)
****

6.3.10.1 EFFECT OF ZFLAGS COMMAND

ALL FLAGS ARE CLEARED.

6.3.11 CONTROL CHARACTERS

A CONTROL C (C) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES A RETURN TO COMMAND MODE.

A CONTROL Z (Z) ENTERED DURING ONE OF THE OPERATOR DIALOGUES- HARD CORE QUESTIONS (SEE 6.2),HARDWARE DIALOGUE (SEE 6.3.1.5), OR SOFTWARE DIALOGUE (SEE 6.3.1.5) CAUSES THE DEFAULTS TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

A CONTROL O (O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES ALL TELETYPE OUTPUT TO BE SURPRESSED FOR THE REMAINDER OF THE DIAGNOSTIC OR UNTIL ANOTHER O IS TYPED, WHICH RESTORES NORMAL TELETYPE OUTPUT.

6.3.12 HARDWARE PARAMETERS

THE FOLLOWING 4 QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

1. ADDRESS : (O) 160010?

THIS IS THE ADDRESS AT WHICH THE DPV CSR REGISTERS RESIDE ON THE LSI-BUS. THE ALLOWABLE RANGE IS 160000-177776 (OCTAL), AND THE DEFAULT VALUE IS 160010.

2. VECTOR : (O) 300 ?

THIS IS THE ADDRESS OF THE INPUT INTERRUPT VECTOR FOR THIS DEVICE. THE ALLOWABLE RANGE IS 000-674 (OCTAL), AND THE DEFAULT VALUE IS 300.

3. LOOPBACK -

```
                    0 = INTERNAL, 1 = RS423, 2 = RS422
                    3 = LOCAL MODEM LOOP, 4 = REMOTE MODEM LOOP (0)  1?

THIS IS THE USER SELECTED LOOPBACK. THE DEFAULT IS RS423.
THE FOLLOWING SHOULD BE CONSIDERED:
        A. INTERNAL LOOPBACK RUNS THE DIAGNOSTIC THROUGH THE
           USYNRT MAINTENANCE MODE LOOPBACK.  THE DRIVERS WILL
           NOT BE TESTED.  NO CONNECTOR IS REQUIRED.
        B. RS423 REQUIRES A H3260 ONBOARD CONNECTOR OR THE
           BC05C CABLE AND THE H3259 CONNECTOR.  THIS TURNAROUND
           WILL PROVIDE A 2K CLOCK FOR DIAGNOSTICS.  ALL TESTS
           SHOULD BE ABLE TO BE RUN ON ALL PROCESSORS.
        C. R2422 REQUIRES A MODIFIED H3260 ONBOARD CONNECTOR.
           THIS TURNAROUND WILL PROVIDE A 50K CLOCK FOR DIAGNOSTICS.
           THE TESTS RUN WILL DEPEND ON THE PROCESSOR.
           1. THE LSI11/23 SHOULD RUN ALL TESTS.
           2. THE LSI11/2  SHOULD RUN ALL TESTS EXCEPT TESTS 29-41.
           3. THE LSI11 WITHOUT PROCESSOR MEMORY REFRESH SHOULD
              RUN ALL TESTS EXCEPT TESTS 29-41.
           4. THE LSI11 WITH PROCESSOR MEMORY REFRESH SHOULD
              RUN ALL TESTS EXCEPT TESTS 29-43.
        D. LOOPBACK THROUGH THE MODEM SHOULD ONLY BE ATTEMPTED IF THE
           MODEM SUPPORTS THAT TYPE OF LOOBACK.


4.   IS THE PROCESSOR A LSI11/23 (M8186) (L) Y ?

THIS QUESTION WILL ALLOW THE DIAGNOSTIC TO SET UP A TIMING LOOP AND DETERMINE
IF A TEST CAN BE RUN IF A RS422 TURNAROUND IS SELECTED BY THE USER (SEE
QUESTION 3 ABOVE).  THE LOGICAL QUESTION REQUIRES A 'Y' OR 'N'. THE DEFAULT
IS 'Y'.


6.3.13 SOFTWARE PARAMETERS

NO SOFTWARE PARAMETER QUESTIONS ARE ASKED BY TIS DIAGNOSTIC


6.3.14 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

THE  FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY
THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY.

AS SOON AS THE QUESTION '# UNITS?' IS ANSWERED (WITH THE
NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES.
ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A
ONE-TO ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER
QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT.

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN
ALL OF THE P-TABLES ARE FILLED. IF THE OPERATOR TYPES IN
LESS THAN N EXPLICIT VALUES IN RESPONSE TO A PARTICULAR
QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES (ONE VALUE
GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH
THE FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED.
THE LAST VALUE IN THE STRING BECOMES THE NEW DEFAULT AND IS
```

USED TO FILL THAT SLOT IN THE REMAINING P-TABLES.

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT, EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED IN THE FIRST TRIP.

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED N EXPLICIT VALUES FROM THE OPERATOR.

IN GIVING A STRING OF VALUES, COMMAS WITHOUT INTERVENING VALUES MAY BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE.

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE). IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1). IF THE VALUES ARE ADDRESSES, THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2).

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF P-TABLES. ASSUME THAT WE HAVE 16 UNITS, AND THAT THERE ARE THREE HARDWARE PARAMETERS FOR EACH (THREE SLOTS IN THE P-TABLE, THREE HARDWARE QUESTIONS IN THE DIALOGUE). LET THE DESIRED VALUE FOR THE FIRST PARAMETER BE THE NUMBER 75 FOR ALL 16 TABLES. LET THE DESIRED VALUE FOR THE SECOND PARAMETER BE EQUAL TO THE UNIT NUMBER (0,1,2,...,15) EXCEPT FOR UNIT 12, WHICH SHOULD RECEIVE THE VALUE 11. LET THE DESIRED VALUE FOR THE THIRD PARAMETER BE THE NUMBER 76 FOR THE FIRST 7 UNITS AND THE NUMBER 77 FOR THE LAST 9 UNITS.

THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL:

```
# UNITS (D) ? 16
UNIT 0
<QUESTION 1> ? 75
<QUESTION 2> ? 0-6
<QUESTION 3> ? 76

UNIT 7
<QUESTION 1> ?
<QUESTION 2> ? 7-11,,13-15
<QUESTION 3> ? 77
```

THE FIRST TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75 IN ALL 16 TABLES. SLOT TWO RECEIVES THE VALUES 0,1,2,...,6 IN TABLES 0 THRU 6 AND A CONSTANT 6 IN TABLES 7 THRU 15. SLOT THREE RECEIVES A CONSTANT 76 IN ALL 16 TABLES.

THE SECOND TIME THRU THE SERIES, TABLES 7 THRU THE END ARE GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS PRINTED OUT FOR THE THE OPERATOR IN THE FORM 'UNIT XX' AT THE BEGINNING OF EACH SERIES). QUESTION 1 IS RESPONDED TO BY A <CR>, SO SLOT ONE STAYS AT CONSTANT 75 IN TABLES 7 THRU 15, SINCE NO NEW EXPLICIT VALUES ARE TYPED IN. SLOT TWO GETS THE VALUES 7,8,9,10,11 IN TABLES 7 THRU 11, AND

GETS AN 11 IN SLOT 12, AND GETS THE VALUES 13,14,15 IN TABLES 13 THRU 15. SLOT THREE GETS THE VALUE 77 IN TABLES 7 THRU 15.

THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT 16 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION (NAMELY QUESTION 2).

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                                7.0 DEVICE INFORMATION TABLES

                                SEE THE GLOBAL EQUATES SECTION FOR DEFINITIONS OF REGISTERS IN THE DPV
                                AND BIT DEFINITIONS WITHIN THOSE REGISTERS.



                                8.0 TEST DESCRIPTIONS


                                ;*******************************************************************
                                ;*                TEST 1 - DPV-11
                                ;* VERIFY THAT ADDRESSING THE 4 LSI-BUS CSRS DOES NOT CAUSE A NON-
                                ;* EXISTENT MEMORY TRAP.
                                ;*
                                ;* THE DPV IS AN COMMUNICATION DEVICE RESIDING ON A LSI-BUS.
                                ;* COMMUNICATION BETWEEN THE MAIN CPU AND THE DPV IS ACCOMPLISHED
                                ;* THROUGH A SET OF FOUR 16-BIT LSI-BUS CONTROL AND STATUS REGISTERS
                                ;* (CSRS).  THE FOUR REGISTERS ARE ASSIGNED ADDRESSES IN THE I/O PAGE
                                ;* FLOATING ADDRESS SPACE: 76XXX0 - 76XXX6
                                ;*
                                ;* AN ERROR IN THIS TEST COULD MEAN THAT THE DEVICE IS INCORRECTLY
                                ;* CONFIGURED, THAT THE ADDRESS IS WRONG OR THAT THE CRYSTAL CLOCK
                                ;* ON THE DPV IS NOT WORKING.  THE SHIFT REGISTER CLOCK IS NEEDED
                                ;* FOR THE LS164 (E15) IN ORDER TO PROVIDE THE BUS REPLY (BRFLY/L ON
                                ;* PIN AF2).
                                ;*******************************************************************



                                ;*******************************************************************
                                ;*                TEST 2 - DPV-11
                                ;* DPV RESET
                                ;* RESET THE DPV AND ENSURE THAT ALL REGISTERS ARE IN THEIR
                                ;* PROPER INITIALIZATION STATE.  THE RESET IS ASYNCHRONOUS TO ALL
                                ;* DATA SET TIMING AND ANY DATA PORT ACCESSES. THE FOLLOWING
                                ;* WILL BE CHECKED BY THE $RESET SUBROUTINE:
                                ;*      1. ALL BITS IN THE DATA PORT REGISTERS ARE CLEARED.
                                ;*      2. ALL OUTPUT INDICATORS ARE CLEARED.
                                ;*      3. TRANSMIT BUFFER EMPTY (TBE) IS SET
                                ;*
                                ;* SUBTEST 1 - AFTER RESET, CHECK THAT MAINTENANCE MODE AND
                                ;*             TRANSMITTER CAN BE SET. ALSO CHECK THAT TRANSMITTER
                                ;*             BUFFER EMPTY (TBE) IS CLEARED WHEN TDSR IS ACCESSED
                                ;*             WITHOUT SETTING TRANSMITTER ENABLE.
                                ;* SUBTEST 2 - ON THE FIRST PASS ONLY, CHECK THAT A BUS RESET, DOES
                                ;*             A DPV11 RESET.
                                ;*
                                ;* NOTE: DATA MODE, CTS, RR (RECEIVER READY) AND IC (INCOMING CALL)
                                ;*       ARE UNAFFECTED BY A RESET.
                                ;*
                                ;*******************************************************************
```

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```
;*****************************************************************
;*                TEST 3 - DPV-11
;* WRITE/READ DATA PATTERNS
;* THIS TEST IS INTENDED TO TEST THE READ/WRITE BITS IN THE CSRS. THERE
;* IS NO INTENTION TO CHECK THE USYNR/T; IT IS DESIRED TO ONLY CHECK THE
;* READING AND WRITING OF THE CSRS.  IN ALL THE SUBTESTS THE BITS ARE
;* CHECKED TOGETHER AND INDIVIDUALLY.
;* SUBTEST 1 - RXCSR (LOW BYTE CSR0)
;*             CHECK BITS 0-6
;* SUBTEST 2 - PCR (HIGH BYTE CSR4)
;*             CHECK BITS 0-7
;* SUBTEST 3 - TDSR (LOW BYTE OF CSR6) - TRANSMIT DATA BUFFER
;*             BITS 0-7
;* SUBTEST 4 - TDSR (HIGH BYTE OF CSR6) - TRANSMIT STATUS REGISTER.
;*             BITS 0-3
;* SUBTEST 5 - TDSR  - CHECK BYTE OP SIGNAL FOR USYNRT
;*
;*****************************************************************


;*****************************************************************
;*                TEST 4 - DMR-11
;* TRANSMIT ENABLE/ TRANSMIT ACTIVE
;* AFTER A DEVICE RESET, SET TRANSMIT START OF MESSAGE (TSOM).  ENSURE
;* THAT TRANSMIT ACTIVE (TXACT) IS SET.
;*
;* TXACT IS USED TO INDICATE THE CURRENT STATE OF THE TRANSMITTER
;* DATA PATH.  THIS BIT WILL BE ASSERTED WHEN BOTH THE TRANSMITTER IS
;* ENABLED AND TSOM ARE INTERNALLY SYNCHRONIZED.  TXACT WILL BE CLEARED
;* UPON RESET OR WHEN THE TRANSMITTER ENTERS THE IDLE STATE.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 5 - DPV-11
;* TRANSMIT BUFFER EMPTY
;* VERIFY THAT TBE (TRANSMIT BUFFER EMPTY) IS ASSERTED WHENEVER
;* THE DEVICE IS RESET OR WHENEVER THE TDSR IS AVAILABLE FOR DATA.
;* TBE IS CLEARED AFTER WRITING TO THE TDSR.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 6 - DPV-11
;* TRANSMIT INTERRUPT
;* VERIFY THAT A TRANSMIT INTERRUPT IS RECEIVED WHEN TRANSMIT
;* BUFFER EMPTY (TBE) IS ASSERTED.
;*
;*****************************************************************



;*****************************************************************
;*                TEST 7 - DPV-11
;* RECEIVER ENABLE, RECEIVER ACTIVE AND RECEIVER DATA READY
;*                MODE: BCP, 8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK
;* ENABLE THE RECEIVER. AFTER TRANSMITTING A CHARACTER WAIT FOR
;* RECEIVER DATA AVAILABLE AND CHECK THAT THE RECEIVER IS ACTIVE.
;* AFTER CLEARING RECEIVER ENABLE. ENSURE THAT THE RECEIVER IS INACTIVE.
;*
;* RECEIVER ENABLE - CONTROLS THE OPERATION OF THE RECEIVER DATA PATH (RDP)
;* RECEIVER ACTIVE - THIS OUTPUT IS ASSERTED WHEN THE RDP PRESENTS THE 1ST
;*                   DATA CHARACTER OF A MESSAGE TO THE USYNRT.  IT REMAINS
;*                   ASSERTED UNTIL THE RDP ENTERS THE IDLE STATE..
;* RECEIVE DATA    - THIS OUTPUT IS SET WHEN THE RDP HAS ASSEMBLED A DATA
;*                   CHARACTER THAT IS READY TO BE PRESENTED.
;*****************************************************************



;*****************************************************************
;*                TEST 8 - DPV-11
;* RECEIVE DATA INTERRUPT
;*                MODE: BCP, 8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK
;* ENABLE THE RECEIVER AND SET RECEIVER INTERRUPT. TRANSMIT DATA.
;* CHECK THAT THE RECEIVE INTERUPT WAS GENERATED. AFTER THE INTERUPT
;* WAS GENERATED DISABLE THE RECEIVER. CHECK THAT THE RECEIVER BECOMES
;* INACTIVE.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 9 - DPV-11
;* THERE ARE 3 SUBTESTS IN THIS TEST WHICH ARE INTENDED TO CHECK
;* RECEIVER STATUS.
;* SUBTEST 1 -  REOM (RECEIVE END OF MESSAGE)
;*              THIS SUBTEST WILL TRANSMIT A DATA MESSAGE THAT IS
;*              ENDED WITH A TEOM (TRANSMIT END OF MESSAGE).  A
;*              CHECK WILL BE MADE THAT THE RECEIVER GETS THE DATA
;*              AND THAT THE REOM IS RECEIVED WHEN RECEIVE
;*              STATUS IS AVAILABLE.
;*
;* SUBTEST 2 -  RECEIVER OVERRUN
;*              THIS SUBTEST WILL TRANSMIT DATA CORRECTLY.  THE
;*              RECEIVER AFTER BECOMING ACTIVE WILL NOT SERVICE
;*              THE RECEIVE BUFFER CORRECTLY.  THIS SHOULD RESULT IN
;*              A RECEIVE OVERRUN.  THIS SUBTEST WILL ENSURE THAT
;*              WHEN RECEIVE STATUS IS AVAILABLE, THE RECEIVER OVERRUN
;*              IS SET.
;*
;* SUBTEST 3 -  RECEIVER ABORT
;*              THIS SUBTEST WILL TRANSMIT A DATA MESSAGE THAT IS ENDED
;*              WITH A TRANSMIT ABORT.  THE SUBTEST WILL ENSURE THAT
;*              RECEIVE STATUS AVAILABLE IS RECEIVED AND THAT THE
;*              ABORT IS RECEIVED.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 10 - DPV-11
;* THIS TEST WILL ENSURE THAT INTERRUPTS MAY BE GENERATED WHEN
;* RECEIVE STATUS IS AVAILABLE. EACH OF THE FOLLOWING SUBTESTS
;* WILL GENERATE THE STATUS AS FOLLOWS:
;* SUBTEST 1 -  REOM
;* SUBTEST 2 -  RECEIVER OVERRUN
;* SUBTEST 3 -  RECEIVER ABORT
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 11 - DPV-11
;* RECEIVE AND TRANSMIT INTERRUPT
;* TRANSMIT AND RECEIVE DATA USING INTERRUPT ROUTINES. THIS TEST
;* WILL TRANSMIT 4 DATA CHARACTERS. AFTER ENSURING THAT A TRANSMIT
;* INTERRUPT WAS COMPLETED, THE TEST WILL CHECK TO MAKE SURE THAT AT
;* LEAST 1 RECEIVE INTERRUPT WAS GENERATED.
;*
;*****************************************************************



;*****************************************************************
;*                TEST 12 - DPV-11
;* MODEM STATUS
;* IF A PROPER TURNAROUND (H3259 OR H3260) IS ON, THIS TEST WILL
;* CHECK THAT THE FOLLOWING MODEM SIGNALS ARE TURNED AROUND
;* 1. RTS (REQUEST TO SEND)     TURNED AROUND TO CTS (CLEAR TO SEND)
;*                                            & RR  (RECEIVER READY)
;* 2. DTR (DATA TERMINAL READY) TURNED AROUND TO IC  (INCOMING CALL OR RING)
;* 3. SF  (SELECT FREQUENCY)    TURNED AROUND TO SQ  (SIGNAL QUALITY)
;* 4. LL  (LOCAL LOOPBACK)      TURNED AROUND TO DM  (DATA MODE)
;*
;*****************************************************************



;*****************************************************************
;*                TEST 13 - DPV-11
;* MODEM STATUS INTERRUPT
;* IF A PROPER TURNAROUND (H3259 OR H3260) IS ON, THIS TEST WILL CHECK
;* THAT THE FOLLOWING SUBTESTS WORK CORRECTLY.
;* SUBTEST 1 -  SET DTR (DATA TERMINAL READY), LOCAL LOOP (LL), RTS (REQUEST
;*              TO SEND) WITH ONLY RECEIVE INTERRUPT ENABLED. ENSURE THAT AN
;*              INTERRUPT IS NOT RECEIVED.
;* SUBTEST 2 -  SET DTR, LL AND RTS WITH ONLY DATA SET INTERRUPT ENABLED.
;*              ENSURE THAT AN INTERRUPT IS NOT RECEIVED.
;* SUBTEST 3 -  SET DTR, LL AND RTS WITHOUT ANY INTERRUPTS ENABLED.  ENSURE
;*              THAT AN INTERRUPT IS NOT RECEIVED.
;* SUBTEST 4 -  SET RTS WITH RECEIVE AND DATA SET INTERRUPT ENABLED.  ENSURE
;*              THAT AN INTERRUPT IS RECEIVED.
;* SUBTEST 5 -  SET DTR WITH RECEIVE AND DATA SET INTERRUPT ENABLED.  ENSURE
;*              THAT AN INTERRUPT IS RECEIVED.
;* SUBTEST 6 -  SET LL WITH RECEIVE AND DATA SET INTERRUPT ENABLED.  ENSURE
;*              THAT AN INTERRUPT IS RECEIVED.
;*
;*****************************************************************
```

```
;*****************************************************************
;*              TEST 14 - DPV-11
;* RECEIVE AND MODEM STATUS INTERRUPTS
;* CHANGE THE MODEM STATUS WHILE HANDLING A RECEIVE INTERRUPT.
;* ENSURE THAT THE MODEM STATUS INTERRUPT IS RECEIVED.
;* SUBTEST 1 -  CHANGE RTS DURING THE RECEIVE INTERRUPT.  ENSURE THAT
;*              THE DATA SET INTERRUPT WAS RECEIVED.
;* SUBTEST 2 -  CHANGE DTR DURING THE RECEIVE INTERRUPT.  ENSURE THAT
;*              THE DATA SET INTERRUPT WAS RECEIVED.
;* SUBTEST 3 -  CHANGE LL DURING THE RECEIVE INTERRUPT.  ENSURE THAT
;*              THE DATA SET INTERRUPT WAS RECEIVED.
;*
;*****************************************************************



;*****************************************************************
;*              TEST 15 - DPV-11
;* SUBTEST 1 - SECONDARY ADDRESS
;*      SEGMENT 1 -     SELECT SECONDARY ADDRESS AND SEND THE CORRECT
;*                      ADDRESS.  CHECK THE DATA IS PROPERLY RECEIVED.
;*      SEGMENT 2 -     SELECT SECONDARY ADDRESS AND SEND A MESSAGE WITHOUT
;*                      SENDING USING THE SECONDARY ADDRESS.  CHECK THAT A
;*                      TIME OUT IS RECEIVED.
;*
;* SUBTEST 2 - ALL PARTIES ADDRESSING
;*      SEGMENT 1 -     SELECT ALL PARTIES AND SECONDARY ADDRESS.  SEND A
;*                      MESSAGE USING THE ALL PARTIES ADDRESS.  ENSURE THAT
;*                      THE MESSAGE IS CORRECTLY RECEIVED.
;*      SEGMENT 2 -     SELECT ALL PARTIES AND SECONDARY ADDRESS.  SEND A
;*                      MESSAGE WITHOUT ALL PARTIES OR SECONDARY ADDRESS.
;*                      CHECK THAT A TIME OUT IS RECEIVED.
;*      SEGMENT 3 -     SELECT ALL PARTIES AND SECONDARY ADDRESS.  SEND A
;*                      MESSAGE WITH A SECONDARY ADDRESS.  CHECK THAT A
;*                      TIME OUT IS RECEIVED.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 16 - DPV-11
;* ABORT TEST
;* SUBTEST 1 -  ABORT WITH IDLE CLEAR. ABORT CHARACTERS TRANSMITTED WHEN
;*              THE ABORT BIT IS ASSERTED.
;*              SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1,
;*                                5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;* SUBTEST 2 -  ABORT WITH IDLE SET. FLAGS TRANSMITTED WHEN THE ABORT BIT
;*              IS ASSERTED.
;*              SELECTED OPTIONS: BOP MODE, NO ERROR CHECKING, IDLE SET,
;*                                5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 17 - DPV-11
;* EXTENDED CONTROL AND ADDRESSING TEST
;* CHECK THAT THE RECEIVER CAN RECOGNIZE EXTENDED ADDRESSING AND CONTROL
;* CHARACTERS.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1,
;*                        3 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK,
;*                        EXTENDED CONTROL AND ADDRESSING SELECTED
;*
;*****************************************************************


;*****************************************************************
;*                TEST 18 - DPV-11
;* TRANSMIT GO AHEAD
;* TERMINATE A MESSAGE USING TRANSMIT GO AHEAD.  CHECK THAT THE RECEIVE
;* ABORT BIT IS SET WHEN THE END OF MESSAGE IS RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1, LOOP SET,
;*                        5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 19 - DPV-11
;* ASSEMBLED BIT COUNT
;* TRANSMIT VARIOUS BIT LENGTHS WHILE RECEIVING AN 8 BIT CHARACTER.
;* ENSURE THAT THE ASSEMBLED BIT COUNT (ABC) IS CORRECT UPON THE END
;* OF MESSAGE.
;*      SELECTED OPTIONS: BOP MODE, NO ERROR CHECKING, VARIOUS BIT
;*                        LENGTH CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 20 - DPV-11
;* SPECIAL SPACE SEQUENCE
;* START A MESSAGE USING A SPECIAL SPACE SEQUENCE.  CHECK THAT THE
;* MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
;* NOTE: CERTAIN USYNRTS ONLY TRANSMIT A SPECIAL START SEQUENCE WHEN
;*       TRANSMIT START AND END OF MESSAGE ARE SET BY A BYTE OPERATION.
;*
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1,
;*                        5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 21 - DPV-11
;* SYNCH CHARACTER
;* CHECK THAT A SYNCH CHARACTER OF 271 CAN BE USED TO COMMENCE A MESSAGE.
;* VERIFY THAT THE MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, VRC-EVEN PARITY,
;*                        7 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 22 - DPV-11
;* SYNCH FROM TRANSMIT DATA PATH
;* TRANSMIT A MESSAGE USING THE SYNCH FROM THE TRANSMIT DATA PATH.
;* VERIFY THAT THE MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, IDLE SET
;*                        5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 23 - DPV-11
;* STRIP SYNCHS
;* SEND MORE THAN 2 SYNCHS WITH THE STRIP SYNCH BIT SET. CHECK THAT
;* THE MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, STRIP SYNCH SET
;*                        6 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 24 - DPV-11
;* CRC-CCITT PRESET TO ONES.
;* CHECK TO ENSURE THAT THE ERROR CHECK BIT (BIT 15 OF RDSR) IS
;* SET WHEN AN ABORT IS RECEIVED.  IN BOP MODE THIS BIT IS SET WHEN THE
;* CRC IS IN ERROR.  THE ERROR CHECK BIT SHOULD BE ZERO WHEN REOM=1,
;* IF THE CRC WERE CORRECTLY RECEIVED. BY FORCING AN ABORT WE INTENTIONALLY
;* LOOK AT THE ERROR BIT WHEN IT SHOULD BE IN AN ERROR STATE.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1, LOOP SET,
;*                        4 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 25 - DPV-11
;* CRC-CCITT PRESET TO ZERO.
;* CHECK TO ENSURE THAT THE ERROR CHECK BIT (BIT 15 OF RDSR) IS
;* SET WHEN AN ABORT IS RECEIVED.  IN BOP MODE THIS BIT IS SET WHEN THE
;* CRC IS IN ERROR.  THE ERROR CHECK BIT SHOULD BE ZERO WHEN REOM=1,
;* IF THE CRC WERE CORRECTLY RECEIVED. BY FORCING AN ABORT WE INTENTIONALLY
;* LOOK AT THE ERROR BIT WHEN IT SHOULD BE IN AN ERROR STATE.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 0, LOOP SET,
;*                        8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************


;*****************************************************************
;*                TEST 26 - DPV-11
;* CRC-16 PRESET TO 0
;*
;* SUBTEST 1 - CRC-16 ERROR
;* CHECK TO ENSURE THAT THE ERROR CHECK BIT (BIT 15 OF RDSR) IS
;* CLEAR IF THE RECEIVER IS SHUTDOWN BEFORE THE CRC IS RECEIVED.
;* IN BCP MODE THIS BIT IS CLEAR WHEN THE CRC IS IN ERROR.
;* THE ERROR CHECK BIT SHOULD BE SET WHEN THE LAST CHARACTER IS RECEIVED,
;* IF THE CRC WERE GOOD.
;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO 0, LOOP SET,
;*                        8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;* SUBTEST 2 -  CRC-16 CHECK
;* CHECK THAT THE CORRECT CRC-16 IS RECEIVED FOR THE DATA MESSAGE.
;* THE CRC FOR THIS DATA MESSAGE WAS PREDETERMINED.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 27 - DPV-11
;* VRC ODD PARITY ERROR
;* BY SELECTING DIFFERENT CHARACTER LENGTHS IN THE RECEIVER AND
;* TRANSMITTER, CAUSE A PARITY ERROR TO OCCUR.
;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, XMIT=7 &
;*                        RCV=6 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 28 - DPV-11
;* VRC EVEN PARITY ERROR
;* BY SELECTING DIFFERENT CHARACTER LENGTHS IN THE RECEIVER AND
;* TRANSMITTER, CAUSE A PARITY ERROR TO OCCUR.
;*      SELECTED OPTIONS: BCP MODE, VRC-EVEN PARITY, XMIT=5 &
;*                        RCV=4 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 29 - DPV-11
;* DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE WITHOUT THE USE OF INTERRUPT
;* SERVICE ROUTINES. CHECK THAT THE DATA IS  CORRECT.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
;*                        8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 30 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZERO,
;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 31 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 32 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZERO,
;*                        7 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 33 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 34 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;* NOTE: CERTAIN USYNRTS ONLY TRANSMIT A SPECIAL START SEQUENCE WHEN
;*       TRANSMIT START AND END OF MESSAGE ARE SET BY A BYTE OPERATION.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 35 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZEROS,
;*                        7 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 36 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZERO, LOOP SET,
;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************
```

```
;*****************************************************************
;*                TEST 37 - DPV-11
;* BCP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, IDLE BIT SET
;*                        5 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 38 - DPV-11
;* BCP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, VRC-EVEN PARITY,
;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 39 - DPV-11
;* BCP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES, STRIP SYNCHS,
;*                        7 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*                TEST 40 - DPV-11
;* BCP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES,
;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************
```

```
;*****************************************************************
;*              TEST 41 - DPV-11
;* DDCMP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE USING THE
;* DDCMP MESSAGE FORMAT.  CHECK THAT THE DATA IS CORRECTLY RECEIVED
;* AND THAT THE CRC CHARACTERS ARE RECEIVED IN THE PROPER DDCMP
;* ORDER.
;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES, STRIP SYNCHS
;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*              TEST 42 - DPV-11
;* BCP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES,
;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************

;*****************************************************************
;*              TEST 43 - DPV-11
;* BOP DATA TEST
;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
;* DATA IS CORRECTLY RECEIVED.
;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
;*
;*****************************************************************
```

9.0 ERROR INFORMATION

9.1 ERROR REPORTING

ERRORS ARE REPORTED BY THE PROGRAM AS THEY OCCUR (IF NOT INHIBITED). THE REPORT CONFORMS TO THE DIAGNOSTIC SUPERVISOR ERROR REPORT FORMAT, AND CONSISTS OF A DESCRIPTION OF THE ERROR, THE TEST NUMBER, SUBTEST NUMBER, PC OF THE ERROR CALL, DEVICE ADDRESS, AND BASIC AND EXTENDED ERROR INFORMATION.

THE FOLLOWING EXAMPLE PROVIDES A TYPICAL ERROR REPORT, WHICH DESCRIBES AN "TIME OUT" ERROR, AND PROVIDES THE PC OF THE ERROR CALL AND THE PC OF THE CALL TO THE SUBROUTINE REPORTING IT, THE FAILING REGISTER NAME, AND DEVICE REGISTER CONTENTS :

```
DPV DVC FTL ERR 00002 ON UNIT 00 TST 020 SUB 000 PC:  004756
TIME OUT - DURING INTERRUPT EXERCISE
ERROR IN SUBROUTINE CALLED AT PC:  031706
RXCSR:  000160
RDSR :  000000
```

```
                                TXCSR:  122432
                                TDSR :  001402

                                DPV  EOP        1
                                     1 CUMULATIVE ERRORS

                                @
```

```
        002000                          .=2000
                                        .MCALL  SVC
002000                                  SVC                                     ; INITIALIZE SUPERVISOR MACROS

002000                          BGNMOD

        000001                  $LSTIN=  1      ;   LIST INSTRUCTIONS
        000001                  $LSTTAG= 1
        000001                  SVCINS=  1      ;   LIST INSTRUCTIONS, SHIFTED RIGHT
        000001                  SVCTST=  1      ;   LIST TEST TAGS, SHIFTED RIGHT
        000001                  SVCSUB=  1      ;   LIST SUBTEST TAGS, SHIFTED RIGHT
        000001                  SVCGBL=  1      ;   LIST GLOBAL TAGS, SHIFTED RIGHT
        000001                  SVCTAG=  1      ;   LIST OTHER TAGS, SHIFTED RIGHT

                                ;       CHANGE THE VALUES OF THE SVC... SYMBOLS TO BE ZERO IF YOU WISH
                                ;       TO ALIGN THE MACRO CALLS AND THEIR EXPANSIONS.  CHANGE THE
                                ;       SYMBOLS TO BE MINUS-ONE TO NOT LIST THE EXPANSIONS.  YOU MAY
                                ;       CHANGE THE SYMBOLS AT ANY POINT IN YOUR PROGRAM.

002000                                  POINTER BGNDU
```

```
                                .SBTTL  PROGRAM HEADER
                                ;++
                                ;       THE PROGRAM HEADER MACRO CHARACTERIZES THIS DIAGNOSTIC. THE
                                ;       HEADER MACRO'S ARGUMENTS ARE FILE NAME, RELEASE LEVEL, PATCH
                                ;       DISPOSITION OF THE MOST RECENT PATCH, MAXIMUM TEST TIME IN SEC.,
                                ;       AND THE TYPE OF DIAGNOSTIC (0-SEQUENTIAL, 1-EXERCISER).  THESE
                                ;       ARGUMENTS ARE IN RESPECTIVE ORDER.
                                ;--

 002000                         HEADER CVDPV,A,0,200.,0
 002000                                                                                  L$NAME::
 002000     103                                                                                  .ASCII /C/
 002001     126                                                                                  .ASCII /V/
 002002     104                                                                                  .ASCII /D/
 002003     120                                                                                  .ASCII /P/
 002004     126                                                                                  .ASCII /V/
 002005     000                                                                                  .BYTE   0
 002006     000                                                                                  .BYTE   0
 002007     000                                                                                  .BYTE   0
 002010                                                                                  L$REV::
 002010     101                                                                                  .ASCII  /A/
 002011                                                                                  L$DEPO::
 002011     060                                                                                  .ASCII  /0/
 002012                                                                                  L$UNIT::
 002012  000000                                                                                  .WORD   0
 002014                                                                                  L$TIML::
 002014  000310                                                                                  .WORD   200.
 002016                                                                                  L$HPCP::
 002016  040204                                                                                  .WORD   L$HARD
 002020                                                                                  L$SPCP::
 002020  000000                                                                                  .WORD   0
 002022                                                                                  L$HPTP::
 002022  002254                                                                                  .WORD   L$HW
 002024                                                                                  L$SPTP::
 002024  000000                                                                                  .WORD   0
 002026                                                                                  L$LADP::
 002026  040546                                                                                  .WORD   L$LAST
 002030                                                                                  L$STA::
 002030  000000                                                                                  .WORD   0
 002032                                                                                  L$CO::
 002032  000000                                                                                  .WORD   0
 002034                                                                                  L$DTYP::
 002034  000000                                                                                  .WORD   0
 002036                                                                                  L$APT::
 002036  000000                                                                                  .WORD   0
 002040                                                                                  L$DTP::
 002040  002124                                                                                  .WORD   L$DISPATCH
 002042                                                                                  L$PRIO::
 002042  000000                                                                                  .WORD   0
 002044                                                                                  L$ENVI::
 002044  000000                                                                                  .WORD   0
 002046                                                                                  L$EXP1::
 002046  000000                                                                                  .WORD   0
 002050                                                                                  L$MREV::
 002050     003                                                                                  .BYTE   C$REVISION
 002051     003                                                                                  .BYTE   C$EDIT
```

```
002052
002052  000000                                  L$EF::
                                                        .WORD   0
002054  000000                                          .WORD   0
002056
002056  000000                                  L$SPC::
                                                        .WORD   0
002060
002060  003674                                  L$DEVP::
                                                        .WORD   L$DVTYP
002062
002062  000000                                  L$REPP::
                                                        .WORD   0
002064
002064  000000                                  L$EXP4::
                                                        .WORD   0
002066
002066  000000                                  L$EXP5::
                                                        .WORD   0
002070
002070  000000                                  L$AUT::
                                                        .WORD   0
002072
002072  017544                                  L$DUT::
                                                        .WORD   L$DU
002074
002074  000000                                  L$LUN::
                                                        .WORD   0
002076
002076  003702                                  L$DESP::
                                                        .WORD   L$DESC
002100
002100  104035                                  L$LOAD::
                                                        EMT     E$LOAD
002102
002102  000000                                  L$ETP::
                                                        .WORD   0
002104
002104  015246                                  L$ICP::
                                                        .WORD   L$INIT
002106
002106  016376                                  L$CCP::
                                                        .WORD   L$CLEAN
002110
002110  016312                                  L$ACP::
                                                        .WORD   L$AUTO
002112
002112  015240                                  L$PRT::
                                                        .WORD   L$PROT
002114
002114  000000                                  L$TEST::
                                                        .WORD   0
002116
002116  000000                                  L$DLY::
                                                        .WORD   0
002120
002120  000000                                  L$HIME::
                                                        .WORD   0
12
18
19
20
21
22                              .EVEN
23
24
25
26
27
28
```

```
                                .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                                 DISPATCH 43
 002122  000053                                                                                .WORD   43
 002124                                                                                L$DISPATCH::
 002124  017624                                                                                .WORD   T1
 002126  020234                                                                                .WORD   T2
 002130  020460                                                                                .WORD   T3
 002132  021210                                                                                .WORD   T4
 002134  021552                                                                                .WORD   T5
 002136  022004                                                                                .WORD   T6
 002140  022162                                                                                .WORD   T7
 002142  022414                                                                                .WORD   T8
 002144  022712                                                                                .WORD   T9
 002146  023720                                                                                .WORD   T10
 002150  025034                                                                                .WORD   T11
 002152  025300                                                                                .WORD   T12
 002154  025570                                                                                .WORD   T13
 002156  026500                                                                                .WORD   T14
 002160  027604                                                                                .WORD   T15
 002162  030514                                                                                .WORD   T16
 002164  031040                                                                                .WORD   T17
 002166  031212                                                                                .WORD   T18
 002170  031422                                                                                .WORD   T19
 002172  031672                                                                                .WORD   T20
 002174  032040                                                                                .WORD   T21
 002176  032224                                                                                .WORD   T22
 002200  032410                                                                                .WORD   T23
 002202  032574                                                                                .WORD   T24
 002204  032764                                                                                .WORD   T25
 002206  033152                                                                                .WORD   T26
 002210  033570                                                                                .WORD   T27
 002212  033760                                                                                .WORD   T28
 002214  034150                                                                                .WORD   T29
 002216  034546                                                                                .WORD   T30
 002220  034722                                                                                .WORD   T31
 002222  035076                                                                                .WORD   T32
 002224  035266                                                                                .WORD   T33
 002226  035440                                                                                .WORD   T34
 002230  035614                                                                                .WORD   T35
 002232  035776                                                                                .WORD   T36
 002234  036160                                                                                .WORD   T37
 002236  036362                                                                                .WORD   T38
 002240  036556                                                                                .WORD   T39
 002242  036760                                                                                .WORD   T40
 002244  037136                                                                                .WORD   T41
 002246  037410                                                                                .WORD   T42
 002250  037704                                                                                .WORD   T43
```

DISPATCH TABLE

19
20

```
                                .SBTTL  DEFAULT HARDWARE P-TABLE

                                ;////////////////////////////////////////////////////////////////////////////////
                                ;/ THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES FOR
                                ;/ THE TEST-DEVICE PARAMETERS.
                                ;////////////////////////////////////////////////////////////////////////////////

 002252                                 BGNHW   DFPTBL
 002252  000004                                                                         .WORD   L10000-L$HW/2
 002254                                                                         L$HW::
 002254                                                                         DFPTBL::

 002254  160010                         .WORD   160010          ;DPV11 CSR UNIBUS ADDRESS
 002256  000300                         .WORD      300          ;DPV11 INTERRUPT VECTOR
 002260  000001                         .WORD        1          ;TURNAROUND (DEFAULT = RS423)
 002262  000001                         .WORD        1          ;PROCESSOR TYPE (DEFAULT = LSI/23)

 002264                                 ENDHW
 002264                                                                         L10000:
```

```
                                .SBTTL  GLOBAL EQUATES SECTION

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

 002264                                 EQUALS
                                ;
                                ; 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
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;SWITCH REGISTER OPTIONS

                100000          SW15=  100000
                040000          SW14=  40000
                020000          SW13=  20000
                010000          SW12=  10000
                004000          SW11=  4000
                002000          SW10=  2000
                001000          SW09=  1000
                000400          SW08=  400
                000200          SW07=  200
                000100          SW06=  100
                000040          SW05=  40
                000020          SW04=  20
                000010          SW03=  10
                000004          SW02=  4
                000002          SW01=  2
                000001          SW00=  1

                                ;;*****************************************************************
                                ;;CSR AND STATUS WORD DEFINITIONS

                                ;;RXCSR - CSR0   (EXTERNAL REGISTER)  READ/WRITE BITS 0 - 6

                000001          SF=     BIT0            ;SELECT FREQUENCY.
                000001          RL=     BIT0            ;REMOTE LOOPBACK - IF WIRE WRAPPED
                                                        ;SELECTED.
                000002          DTR=    BIT1            ;DATA TERMINAL READY  R/W
                000004          RTS=    BIT2            ;REQUEST TO SEND  R/W
                000010          LL=     BIT3            ;LOCAL LOOPBACK
                000020          RXENA=  BIT4            ;RECEIVER ENALBLE  R/W
                000040          DSITEN= BIT5            ;DATA SET INTERRUPT ENABLE  R/W
                000100          RXITEN= BIT6            ;RECEIVER INTERRUPT ENABLE  R/W
                                                        ;** BITS 7 - 15   READ ONLY **
                000200          RDATRY= BIT7            ;RECEIVE DATA READY  READ ONLY
```

```
000400                  SFR=     BIT8            ;SYNCH OR FLAG DETECT  READ ONLY
001000                  DM=      BIT9            ;DATA MODE  READ ONLY
002000                  RSTARY=  BIT10           ;RECEIVER STATUS READY  READ ONLY
004000                  RXACT=   BIT11           ;RECEIVER ACTIVE  READ ONLY
010000                  RR=      BIT12           ;RECEIVER READY  READ ONLY
020000                  CTS=     BIT13           ;CLEAR TO SEND  READ ONLY
040000                  IC=      BIT14           ;INCOMING CALL  READ ONLY
100000                  DSCNG=   BIT15           ;DATA SET CHANGE  READ ONLY


                        ;;PCSAR - CSR2   (INTERNAL USNYR/T REGISTERS 4 AND 5)  WRITE ONLY

                                                 ;BITS 0-7 SYNCH CHARACTER OR SECONDARY STATION
                                                 ;ADDRESS.  LOWER BYTE OF THE PCSAR IS THE
                                                 ;SYNCH CHARACTER USED WITH IN BCP MODE   OR
                                                 ;THE SECONDARY ADDRESS USED IN BOP MODE.

                                                 ;BITS 8-10 ERROR DETECTION SELECTION
000000                  CCITT1=  0               ;CRC CCITT INITIALIZED TO ONES
000400                  CCITT0=  BIT8            ;CRC CCITT INITIALIZED TO ZEROS
001400                  CRC16=   BIT8!BIT9       ;CRC 16
002000                  VRCO=    BIT10           ;VRC ODD PARITY
002400                  VRCE=    BIT8!BIT10      ;VRC EVEN PARITY
003400                  NOERR=   BIT8!BIT9!BIT10 ;ALL ERROR DETECTION INHIBITED.
001000                  NONE1=   BIT9            ;NOT USED
003000                  NONE2=   BIT9!BIT10      ;NOT USED

004000                  IDLE=    BIT11           ;IDLE MODE SELECT
010000                  SECADR=  BIT12           ;SECONDARY ADDRESS SELECT
020000                  SSYNCH=  BIT13           ;STRIP SYNCH - BCP
020000                  LOOP=    BIT13           ;LOOP MODE - BOP
040000                  PROTO=   BIT14           ;PROTOCOL SELECT.
100000                  APA=     BIT15           ;ALL PARTIES ADDRESSED.


                        ;;RDSR  - CSR2   (INTERNAL USNYR/Y REGISTERS 0 AND 1)  READ ONLY

                                                 ;BITS 0-7 RECEIVE DATA BUFFER
000400                  RSOM=    BIT8            ;RECEIVED START OF MESSAGE.
001000                  REOM=    BIT9            ;RECEIVED END OF MESSAGE.
002000                  RABORT=  BIT10           ;RECEIVER ABORT OR GO AHEAD
004000                  ROVER=   BIT11           ;RECEIVER OVERRUN.
                                                 ;BITS 12-14 ASSEMBLED BIT COUNT (ABC)
000000                  ALL=     0               ;ALL BITS VALID
010000                  ONE=     BIT12           ;ONE BIT VALID
020000                  TWO=     BIT13           ;TWO BITS VALID
030000                  THREE=   BIT12!BIT13     ;THREE BITS VALID
040000                  FOUR=    BIT14           ;FOUR BITS VALID
050000                  FIVE=    BIT12!BIT14     ;FIVE BITS VALID
060000                  SIX=     BIT13!BIT14     ;SIX BITS VALID
070000                  SEVEN=   BIT12!BIT13!BIT14 ;SEVEN BITS VALID

100000                  ERR=     BIT15           ;ERROR CHECK


                        ;;TXCSR - CSR4   (EXTERNAL LO BYTE  -  INTERNAL 7 HI BYTE) READ/WRITE
```

```
000001                  RESET=  BIT0            ;DEVICE RESET  - WRITE ONLY
000002                  TXACT=  BIT1            ;TRANSMITTER ACTIVE - READ ONLY
000004                  TBE=    BIT2            ;TRANSMITTER BUFFER EMPTY - READ ONLY
000010                  MM=     BIT3            ;MAINTENANCE MODE - R/W
000020                  TXENA=  BIT4            ;TRANSMITTER ENABLE - R/W
000040                  SQ=     BIT5            ;SIGNAL QUALITY -READ ONLY
000040                  TM=     BIT5            ;TEST MODE - READ ONLY  WIRE WRAPPED FOR
                                                ;TEST MODE
000100                  TXIE=   BIT6            ;TRANSMIT INTERRUPT ENABLE - R/W

                        ;;PCR   - HI BYTE CSR4 (INTERNAL USNYR/T REGISTER 7)

000010                  EXCON=  BIT3            ;EXTENDED CONTROL FIELD
000020                  EXADD=  BIT4            ;EXTENDED ADDRESS FIELD.

                        ;;TDCSR - CSR6   (INTERNAL USNYR/T REGISTERS 7 AND 7) READ/WRITE

                                                ;BITS 0-7 TRANSMITTER DATA
000400                  TSOM=   BIT8            ;TRANSMIT START OF MESSAGE - R/W
001000                  TEOM=   BIT9            ;TRANSMIT END OF MESSAGE - R/W
002000                  TXABO=  BIT10           ;TRANSMIT ABORT - R/W
004000                  TGA=    BIT11           ;TRANSMIT GO AHEAD - R/W
                                                ;BITS 12 - 14 RESERVED
100000                  TERR=   BIT15           ;TRANSMIT DATA LATE ERROR. - READ ONLY



                        ;;*******************************************************************
                        ;;*******************************************************************
                        ; MISC. EQUATES

000226                  SYN=    226             ;DDCMP SYNCH CHARACTER
000207                  RETURN= 207             ;RETURN FROM SUB.     [=  JSR PC]
100000                  BOP=    BIT15           ;BIT SET IN MODE WHEN IN BOP MODE
000015                  CR=     15              ;ASCII CARRIAGE RETURN
000012                  LF=     12              ;ASCII LINE FEED
000332                  CRCLO=  332             ;LOW BYTE OF CRC IN TEST 26.
000266                  CRCHI=  266             ;HIGH BYTE OF CRC IN TEST 26.
```

```
                                .SBTTL  GLOBAL DATA SECTION

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



                                ;;*************************************************************************
                                ;DPV11 VECTOR AND REGISTER INDIRECT POINTERS
002264  000000                  RCVEC:  .WORD   0               ;DPV11 RECEIVER INTERRUPT VECTOR
002266  000000                  XMTVEC: .WORD   0               ;DPV11 TRANSMITTER INT. VECTOR
002270  000000                  CSR0:   .WORD   0               ;POINTER TO DPV11 CSR0
002272  000000                  CSR2:   .WORD   0               ;POINTER TO DPV11 CSR2
002274  000000                  CSR4:   .WORD   0               ;POINTER TO DPV11 CSR4
002276  000000                  CSR6:   .WORD   0               ;POINTER TO DPV11 CSR6
002300  000000                  CSR1:   .WORD   0               ;POINTER TO HIGH BYTE OF CSR0
002302  000000                  CSR3:   .WORD   0               ;POINTER TO HIGH BYTE OF CSR2
002304  000000                  CSR5:   .WORD   0               ;POINTER TO HIGH BYTE OF CSR4
002306  000000                  CSR7:   .WORD   0               ;POINTER TO HIGH BYTE OF CSR6

        002270                  RXCSR=  CSR0                    ;RECEIVER CSR (READ/WRITE)
        002272                  PCSAR=  CSR2                    ;PARAMETER CONTROL SYNCH/ADDRESS REG.
                                                                ;(WRITE ONLY)
        002272                  RDSR=   CSR2                    ;RECEIVE DATA/STATUS REGISTER (READ ONLY)
        002274                  TXCSR=  CSR4                    ;TRANSMITTER CSR (READ/WRITE)
        002276                  TDSR=   CSR6                    ;TRANSMIT DATA/STATUS REGISTER (READ ONLY)
        002304                  PCR=    CSR5                    ;PCR = PARAMETER CONTROL REGISTER

                                ;;OTHER HARDWARE PARAMETERS

002310  000000                  TURN:   .WORD   0               ;TURN AROUND TYPE (0-7)
002312  000000                  CPU:    .WORD   0               ;PROCESSOR TYPE (0 = LSI 11, 1 = LSI11/2,
                                                                ;                3 = LSI 11/23)

                                ;;*************************************************************************
                                ;PROGRAM CONTROL PARAMETERS



002314  000000                  FRSTIM: .WORD   0               ;FLAG=0 IF PROGRAM JUST LOADED
002316  000000                  FRSPAS: .WORD   0               ;FLAG=0 IF FIRST PASS AFTER LOAD
002320  000000                  STARES: .WORD   0               ;FLAG=0 IF 1ST TIME THRU AFTER STA OR RES



                                ;;*************************************************************************
                                ;PROGRAM VARIABLES

                                ;* MISCELLANEOUS STORAGE
002322  000000                  ABORT:  .WORD   0               ;FLAG TO ALLOW AN ABORT TO BE ISSUED.
002324  000000                  BITS:   .WORD   0               ;BITS TO BET SET IN THE CSR REGISTER
002326  000000                  COUNTER:.WORD   0               ;COUNTER FOR # OF CHARACTERS TO RCV. (RDATA2)
002330  000000                  DATA:   .WORD   0               ;COUNTER FOR # OF DATA CHARATERS TRANSMITTED.
002332  000000                  ERROR:  .WORD   0               ;ERROR STORAGE
002334  000000                  EXERR:  .WORD   0               ;FLAG THAT AN ERROR IS EXPECTED IN DATA
```

```
002336  000000          FLAG:    .WORD   0          ;SCRATCH WORD USED FOR MISC. FLAG IN SUB.
002340  000000          HEADER:  .WORD   0          ;FLAG USED TO MARK DDCMP HEADER.
002342  000000          IPCR:    .WORD   0          ;IMAGE OF PCR
002344  000000          IPCSAR:  .WORD   0          ;IMAGE OF PCSAR
002346  000000          IRXCSR:  .WORD   0          ;IMAGE OF RXCSR
002350  000000          IRDSR:   .WORD   0          ;IMAGE OF RDSR.
002352  000000          LENGTH:  .WORD   0          ;CHARACTER LENGTH.
002354  000000          LOGDEV:  .WORD   0          ;LOGICAL DEVICE NUMBER
002356  000000          MAINT:   .WORD   0          ;MAINTENANCE MODE LOOPBACK FLAG
002360  000000          MCFLAG:  .WORD   0          ;WORD USED IN TO TRACK MODEM CONTROL INT.
002362  000000          MODE:    .WORD   0          ;PROTOCOL TYPE
002364  000000          NESTPC:  .WORD   0          ;FLAG TO NOTIFY WHEN A SUBR IS NESTED
002366  000000          NXMFLG:  .WORD   0          ;WORD USED WHEN ADDRESS IS NXM.
002370  000000          OVER:    .WORD   0          ;FLAG TO ALLOW RECEIVE OVERRUN.
002372  000000          PSTACK:  .WORD   0          ;CONTAINS BASE LEVEL PROGRAM SP
002374  000000          REG:     .WORD   0          ;STORAGE OF A CSR ADDRESS
002376  000000          RFLAG:   .WORD   0          ;WORD USED IN RECEIVE ROUTINE.
002400  000000          RSAVE:   .WORD   0          ;TEMPORARY LOCATION TO SAVE RDSR ON INTERRUPT
002402  000000          RXINI:   .WORD   0          ;RECEIVER INITIALIZATION
002404  000000          RXINIT:  .WORD   0          ;RECEIVER INITIALIZATION WITH INT ENABLED.
002406  000000          RXMINI:  .WORD   0          ;RECEIVER INIT WITH MAINTENANCE LOOPBACK.
002410  000000          SAVE:    .WORD   0          ;SCRATCH WORD USED FOR MISC. STORAGE IN SUB.
002412  000000          SAVTIM:  .WORD   0          ;STORAGE TO SAVE TIMER VALUE
002414  000000          START:   .WORD   0          ;CONTER FOR # OF START CHARACTERS TO XMIT.
002416  000000          SUBRPC:  .WORD   0          ;PC OF SUBR CALL FOR ERROR REPORTS
002420  000000          TEMP:    .WORD   0          ;SCRATCH WORD USED FOR MISC. STORAGE IN SUB.
002422  000000          TEND:    .WORD   0          ;TRANSMIT END
002424  000000          TFLAG:   .WORD   0          ;WORD USED IN TRANSMIT INTERRUPT ROUTINE
002426  000000          TIMEO:   .WORD   0          ;FLAG TO MARK TIME OUT IN $DATA SUBROUTINE.
002430  000000          TIMER:   .WORD   0          ;TIMER VALUE
002432  000000          TOGGLE:  .WORD   0          ;FLAG TO ALLOW TOGGLE OF RTS IN TEST.
002434  000000          TSTART:  .WORD   0          ;TRANSMIT START
002436  000000          TXINI:   .WORD   0          ;TRANSMITTER INITIALIZATION
002440  000000          TXINIT:  .WORD   0          ;TRANSMITTER INITIALIZATION WITH INT ENABLED.
002442  000000          TXMINI:  .WORD   0          ;TRANSMITTER INIT WITH MAINTENANCE LOOPBACK
                                 .EVEN
                        ;;*******************************************************************
                        ;;*******************************************************************
                        ;;MODEM CONTROL
002444                  MODEM:   .BLKW   10.        ;BUFFER AREA FOR MODEM STATUS
                        ;;*******************************************************************
                        ;;*******************************************************************
                        ;;BUFFER AREA
002470  000000          XTYPE:   .WORD   0          ;POINTER TO DATA TYPE TO LOAD INTO XMIT BUFFER
002472  000000          XCOUNT:  .WORD   0          ;# OF CHARACTERS TO TRANSMIT.
002474  000000          ECOUNT:  .WORD   0          ;# OF CHARACTERS FOR END OF MSG. IN BCP MODE.
```

```
002476  000000                  XMITD:  .WORD   0               ;# OF CHARACTERS TRANSMITTED.
002500  000000                  RCOUNT: .WORD   0               ;# OF CHARACTERS RECEIVED.


                                ;;*******************************************************************
                                        ;       ** CCITT PSUEDO-RANDOM TEST PATTERN **
                                        ; THE FOLLOWING 32 WORDS TRANSLATE INTO A 512 BIT PATTERN
                                        ; THAT WAS GENERATED ACCORDING TO CCITT RECOMMENDATION V.52.  THIS
                                        ; PATTERN WAS GENERATED BY A 9 BIT SHIFT REGISTER (INITIALIZED
                                        ; AS 1S) WHOSE 5TH AND 9TH BITS ARE XORED.  THIS XOR RESULT IS SHIFTED
                                        ; INTO THE 1ST BIT OF THE REGISTER AS THE REGISTER IS SHIFTED RIGHT.
                                        ; THE 9TH BIT (OR BIT SHIFTED OUT) IS SHIFTED INTO THE BIT PATTERN.
                                        ; NOTE: CCITT RECOMMENDED 511 BITS, I'VE EXTENDED THIS BY 1 BIT TO END
                                        ; ON A WORD BOUNDARY.
002502                          $CCITT:
002502  177603  157427  031011          .WORD   177603,157427,031011
002510  047321  163715  105221          .WORD   047321,163715,105221
002516  143325  142304  040041          .WORD   143325,142304,040041
002524  014116  052606  172334          .WORD   014116,052606,172334
002532  105025  123754  111337          .WORD   105025,123754,111337
002540  111523  030030  145064          .WORD   111523,030030,145064
002546  137642  143531  063617          .WORD   137642,143531,063617
002554  135015  066730  026575          .WORD   135015,066730,026575
002562  052012  053627  070071          .WORD   052012,053627,070071
002570  151172  165044  031605          .WORD   151172,165044,031605
002576  166632  016741                  .WORD   166632,016741


                                ;;*******************************************************************
                                ;; ALPHANUMERIC DATA

002602     101     102     103  ALPHA:  .ASCIZ  /ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789/
002605     104     105     106
002610     107     110     111
002613     112     113     114
002616     115     116     117
002621     120     121     122
002624     123     124     125
002627     126     127     130
002632     131     132     060
002635     061     062     063
002640     064     065     066
002643     067     070     071
002646     000
        000045                  ACOUNT= .-ALPHA                 ;CHARACTER COUNT
                                        .EVEN


                                ;;*******************************************************************
                                ;; DDCMP BUFFER

002650     201                  DDCMP:  .BYTE   201             ;SOH (START OF HEADER)
002651     064     000                  .BYTE   64,0            ;COUNT AND FLAGS (BITS 0 AND 1 FLAGS)
002653     000                          .BYTE   0               ;RESPONSE NUMBER
002654     000                          .BYTE   0               ;TRANSMIT NUMBER
002655     001                          .BYTE   1               ;STATION ADDRESS
        000006                  DDCMP1= .-DDCMP
                                                                ;2 BYTES OF CRC16
002656     104     104     103  DDMSG:  .ASCII  /DDCMP MESSAGE/
```

```
        002661     115     120     040
        002664     115     105     123
        002667     123     101     107
        002672     105
    160                                                     ;2 BYTES OF CRC16
    161         000015                  DDCMP2= .-DDMSG
    162
    163                                 ;;*****************************************************************
    164                                 ;; TRANSMIT BUFFER
    165
    166 002673                          XMTBUF: .BLKB   256.
    167
    168                                 ;;*****************************************************************
    169                                 ;; RECEIVE BUFFER
    170
    171 003273                          RCVBUF: .BLKB   256.            ;256. BYTE BUFFER
    172         000400                  RSIZE=  .-RCVBUF
    173                                         .EVEN
    174
    175
```

```
                                                .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
                                                ;;***********************************************************************
   003674                                               DEVTYP  <DPV11>
   003674                                                                                  L$DVTYP::
   003674     104     120     126                                                                  .ASCIZ  /DPV11/
   003677     061     061     000
                                                                                                   .EVEN

                                                ;;*************************************************************************
                                                ;* TITLE OF PROGRAM
                                                ;;*************************************************************************
   003702                                               DESCRIPT   <DIAGNOSTIC TESTS>
   003702                                                                                  L$DESC::
   003702     104     111     101                                                                  .ASCIZ  /DIAGNOSTIC TESTS/
   003705     107     116     117
   003710     123     124     111
   003713     103     040     124
   003716     105     123     124
   003721     123     000
                                                                                                   .EVEN




                                                ;
                                                ; FORMAT STATEMENTS USED IN PRINT CALLS
                                                ;
```

```
                        .SBTTL  GLOBAL SUBROUTINES

                        ;////////////////////////////////////////////////////////////////////////////////
                        ;/       THE GLOBAL SUBROUTINES ARE CALLED BY MORE THAN ONE TEST
                        ;////////////////////////////////////////////////////////////////////////////////


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

                        ;;*********************************************************************
                        ; CALL MACRO - CALL ROUTINE = JSR PC, ROUTINE
                        ;              (NOTE: RETURN IS  EQUATED TO A RTS PC)
                        ;;*********************************************************************
                                .MACRO  CALL    ROUTIN
                                .IF     B, ROUTIN
                                .ERROR  ROUTINE; ## MISSING ROUTINE-EXPANSION ABORT ##
                                .MEXIT
                                .ENDC
                                JSR     PC,ROUTIN
                                .ENDM


                        ;;*********************************************************************
                        ; PUSH REGS MACRO
                        ;
                        ;;*********************************************************************
                                .MACRO  PUSH REGS
                                .IRP    X,<REGS>
                                MOV     X,-(SP)         ;PUSH REG ON STACK.
                                .ENDR
                                .ENDM   PUSH

                        ;;*********************************************************************
                        ; POP REGS MACRO
                        ;
                        ;;*********************************************************************
                                .MACRO  POP REGS
                                .IRP    X,<REGS>
                                MOV     (SP)+,X         ;POP REG OFF STACK.
                                .ENDR
                                .ENDM   POP


                        ;;*********************************************************************
                        ; WAIT MACRO
                        ;
                        ;;*********************************************************************

                                .MACRO  WAIT    $BIT,ADDRESS
                                .IF     B, $BIT
                                .ERROR ROUTINE;  ## MISSING ROUTINE-EXAPNSION ABORT ##
                                .MEXIT
                                .ENDC
```

```
                                .NLIST
                                .LIST ME
                                .LIST

                                                        ;******** MACRO EXPANSION ********
                                .IF     B, ADDRESS
                                .IF     IDN $BIT, TBE
                                JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
                                        .WORD   TBE     ;WAIT FOR TBE TO BE SET
                                        .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                .IFF
                                JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
                                        .WORD   $BIT    ;WAIT FOR BIT TO BE SET
                                        .WORD   RXCSR   ;IN RECEIVER  CSR.
                                .ENDC
                                .IFF
                                JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
                                        .WORD   $BIT    ;WAIT FOR BIT TO BE SET
                                        .WORD   ADDRESS ;IN THE GIVEN ADDRESS.
                                .ENDC
                                                        ;*********************************

                                .NLIST ME
                                .ENDM


                        ;;*************************************************************************
                        ; DELAY MACRO
                        ;
                        ;;*************************************************************************

                                .MACRO  $DELAY  $TIME
                                .IF     B, $TIME
                                .ERROR ROUTINE;  ## MISSING ROUTINE-EXAPNSION ABORT ##
                                .MEXIT
                                .ENDC

                                .NLIST
                                .LIST ME
                                .LIST

                                                        ;******** MACRO EXPANSION ********
                                JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
                                        .WORD   $TIME   ;NUMBER OF DELAY LOOPS
                                                        ;*********************************

                                .NLIST ME
                                .ENDM
```

```
                                        ;;*******************************************************************
                                        ;;*******************************************************************
                                        ;
                                        ;                    SUBROUTINE $WAIT
                                        ;
                                        ;          FUNCTION -  TO WAIT FOR A BIT TO BE SET IN A GIVEN
                                        ;                      ADDRESS (USUALLY A DPV REGISTER).
                                        ;
                                        ;     CALLING FORMAT:        JSR     PC,$WAIT
                                        ;                                    .WORD           ;BIT
                                        ;                                    .WORD           ;ADDRESS
                                        ;
                                        ;
                                        ;     ENTRY CONDITIONS -
                                        ;
                                        ;
                                        ;     EXIT CONDITIONS  - EXIT WHEN BIT SET OR UPON TIME OUT.
                                        ;                        IF TIME OUT, PRINT TIME OUT ERROR.
                                        ;
                                        ;     CALLED BY        - TESTS 4,5,7
                                        ;
                                        ;  REGISTERS DESTROYED - R0-R2 SAVED AND RESTORED
                                        ;
                                        ;;*******************************************************************
                                        ;;*******************************************************************
003724                                  $WAIT:
003724  011637  002416                          MOV     (SP),SUBRPC     ;SAVE THE PC THAT CALLED THE ROUTINE.
003730  162737  000004  002416                  SUB     #4,SUBRPC       ;CORRECT THE PC.
003736  017637  000000  002324                  MOV     @(SP),BITS      ;SAVE THE BITS THAT WE ARE CHECKING.
003744  062716  000002                          ADD     #2,(SP)         ;UPDATE THE ADDRESS ON THE STACK.
003750  017637  000000  002374                  MOV     @(SP),REG       ;SAVE THE ADDRESS OF THE CSR POINTER
003756  017737  176412  002374                  MOV     @REG,REG        ;SAVE THE ACTUAL CSR ADDRESS.
003764  062716  000002                          ADD     #2,(SP)         ;UPDATE THE ADDRESS ON THE STACK.
003770                                          PUSH    <R2,R1,R0>      ;PUSH REGS ON THE STACK
003776  005000                                  CLR     R0              ;USE R0 AS A LOOP TIMER.

004000                                  10$:
004000  017701  176370                          MOV     @REG,R1         ;SAVE THE CONTENTS OF THE CSR.
004004  033701  002324                          BIT     BITS,R1         ;IS THE BIT SET ?
004010  001026                                  BNE     20$             ;BRANCH IF SET
004012                                          BREAK                   ;BREAK FOR SUPERVISOR.
004012  104422                                                                          TRAP    C$BRK
004014  005300                                  DEC     R0              ;DECREMENT TIMER
004016  001370                                  BNE     10$             ;CONTINUE IF TIMER NOT EXPIRED.
004020  010102                                  MOV     R1,R2           ;SAVE EXPECTED RESULTS FOR ERROR MESSAGE.
004022  053702  002324                          BIS     BITS,R2         ;SET THE EXPECTED BITS.
004026                                          ERRDF   0,EMG1,ERRG12   ;PRINT TIME OUT ERROR.
004026  104455                                                                          TRAP    C$ERDF
004030  000000                                                                          .WORD   0
004032  013336                                                                          .WORD   EMG1
004034  010074                                                                          .WORD   ERRG12
004036  032737  000004  002324                  BIT     #TBE,BITS       ;WERE WE WAITING FOR TBE?
004044  001410                                  BEQ     20$             ;IF NOT, EXIT.
004046                                          PRINTB  #FMS1           ;SUGGEST THAT THE XMIT CLOCK IS INOP.
004046  012746  004102                                                                  MOV     #FMS1,-(SP)
004052  012746  000001                                                                  MOV     #1,-(SP)
004056  010600                                                                          MOV     SP,R0
```

```
        004060  104414                                                          TRAP    C$PNTB
        004062  062706  000004                                                  ADD     #4,SP
    50  004066                          20$:
    51  004066                                  POP     <R0,R1,R2>      ;POP REGISTERS OFF STACK.
    52  004074  005037  002416                  CLR     SUBRPC
    53
    54  004100  000207                          RETURN
    55
    56  004102     045     101     050  FMS1:   .ASCIZ  /%A(CHECK THE XMIT CLOCK)%N/
        004105     103     110     105
        004110     103     113     040
        004113     124     110     105
        004116     040     130     115
        004121     111     124     040
        004124     103     114     117
        004127     103     113     051
        004132     045     116     000
    57                                          .EVEN
    58
```

```
                                ;;*******************************************************************
                                ;;*******************************************************************
                                ;
                                ;                    SUBROUTINE $RESET
                                ;
                                ;            FUNCTION -  TO PERFORM A MASTER RESET AND TO CHECK THAT
                                ;                        THE DPV IS IN THE PROPER INIT STATE.
                                ;
                                ;       CALLING FORMAT:         JSR     PC,$RESET
                                ;
                                ;
                                ;       ENTRY CONDITIONS -
                                ;
                                ;       EXIT CONDITIONS  - DEVICE IS RESET CORRECTLY OR AN ERROR IS REPORTED
                                ;
                                ;       CALLED BY        - TESTS 2-43
                                ;
                                ;    REGISTERS NOT AFFECTED
                                ;
                                ;;*******************************************************************
                                ;;*******************************************************************
004136                          $RESET:
004136  012777  000001  176130          MOV     #RESET,@TXCSR   ;RESET THE DPV.
004144  105777  176120                  TSTB    @RXCSR          ;IS THE RECEIVE CSR = 0?
004150  001015                          BNE     10$             ;IF NOT ERROR.
004152  005777  176114                  TST     @RDSR           ;IS THE RECEIVE STATUS AND DATA REG = 0?
004156  001012                          BNE     10$             ;IF NOT, ERROR.
004160  032777  000004  176106          BIT     #4,@TXCSR       ;IS TBE SET?
004166  001406                          BEQ     10$             ;IF NOT, ERROR.
004170  105777  176110                  TSTB    @PCR            ;IS THE PARAMETER CONTROL REG = 0?
004174  001003                          BNE     10$             ;IF NOT, ERROR.
004176  005777  176074                  TST     @TDSR           ;IS THE XMIT STATUS AND DATA REG = 0?
004202  001413                          BEQ     20$             ;IF YES - RESET OK.
004204                          10$:
004204  011637  002416                  MOV     (SP),SUBRPC     ;FLAG WHERE THIS SUBR. WAS CALLED.
004210  162737  000004  002416          SUB     #4,SUBRPC       ;ADJUST THE PC
004216                                  ERRDF   1,EMG3,ERRG11   ;PRINT ERROR MESSAGE
004216  104455                                                                  TRAP    C$ERDF
004220  000001                                                                  .WORD   1
004222  013414                                                                  .WORD   EMG3
004224  007452                                                                  .WORD   ERRG11
004226  005037  002416                  CLR     SUBRPC          ;CLEAR THE FLAG
004232                          20$:
004232  017737  176032  002444          MOV     @RXCSR,MODEM    ;SAVE THE MODEM STATUS.
004240  042737  006760  002444          BIC     #6760,MODEM     ;CLEAR ALL BUT MODEM
004246  032777  000040  176020          BIT     #TM,@TXCSR      ;IS TEST MODE SET?
004254  001417                          BEQ     30$             ;IF NOT OK
004256  052737  000040  002444          BIS     #TM,MODEM       ;OTHERWISE SET TM IN MODEM
                                                                ;ALSO CHECK FOR -12V
004264  122777  000162  176006          CMPB    #162,@CSR1      ;ARE RING, CTS, CD AND DM ALSO SET?
004272  001010                          BNE     30$             ;IF NOT, PROBABLY HAVE -12V
004274                                  PRINTB  #FMG9           ;PROMPT USER TO CHECK -12V.
004274  012746  011402                                                          MOV     #FMG9,-(SP)
004300  012746  000001                                                          MOV     #1,-(SP)
004304  010600                                                                  MOV     SP,R0
004306  104414                                                                  TRAP    C$PNTB
004310  062706  000004                                                          ADD     #4,SP
```

```
004314                          30$:
004314  000207                          RETURN
```

```
                                        ;;*******************************************************************
                                        ;;*******************************************************************
                                        ;
                                        ;                    SUBROUTINE $BUFRS
                                        ;
                                        ;            FUNCTION -  TO SET UP THE TRANSMIT BUFFER WITH A DATA
                                        ;                        PATTERN AND TO CLEAR THE RECEIVE BUFFER
                                        ;
                                        ;       CALLING FORMAT:         JSR     PC,$BUFRS
                                        ;
                                        ;
                                        ;       ENTRY CONDITIONS - IPCSAR  = IMAGE OF THE PCSAR (CSR 2 OF THE DPV)
                                        ;                          IPCR    = IMAGE OF THE PCR (CSR 5 OF THE DPV)
                                        ;                          XTYPE   = ADDRESS OF THE XMIT TYPE
                                        ;                          XCOUNT  = # OF CHARACTERS TO TRANSMIT
                                        ;                          LENGTH  = CHARACTER LENGTH
                                        ;                          MODE    = PROTOCOL TYPE (BCP OR BOP)
                                        ;
                                        ;
                                        ;       EXIT CONDITIONS  - ECOUNT  = # OF CHARACTERS TO TRANSMIT (MODIFIED
                                        ;                                    XCOUNT)
                                        ;                          XMTBUF  = CONTAINS XMIT DATA TYPE PATTERN
                                        ;                          RCVBUF  = RECEIVE BUFFER CLEARED
                                        ;
                                        ;       CALLED BY        - TESTS 15-40
                                        ;
                                        ;    REGISTERS R1-R4 DESTROYED
                                        ;
                                        ;;*******************************************************************
                                        ;;*******************************************************************
004316                                  $BUFRS:
004316  013701  002352                          MOV     LENGTH,R1       ;GET THE CHARACTER LENGTH
004322  013702  002470                          MOV     XTYPE,R2        ;ADDRESS OF DATA TYPE
004326  012703  002673                          MOV     #XMTBUF,R3      ;ADDRESS OF TRANSMIT BUFFER.
004332  013704  002472                          MOV     XCOUNT,R4       ;CHARACTER COUNT.
004336  005737  002362                          TST     MODE            ;WHAT MODE?
004342  001444                                  BEQ     10$             ;IF BCP, SKIP ADDRESS CHECK.

004344  032737  100000  002344                  BIT     #APA,IPCSAR     ;IS APA DESIRED?
004352  001403                                  BEQ     5$              ;IF NOT CHECK SECONDARY ADDRESS.
004354  112723  000377                          MOVB    #377,(R3)+      ;PUT APA IN THE XMIT BUFFER
004360  000422                                  BR      7$
004362                                  5$:
004362  032737  010000  002344                  BIT     #SECADR,IPCSAR  ;IS THE SECONDARY ADDRESS DESIRED?
004370  001403                                  BEQ     6$              ;IF NOT  - JUST LOAD DATA
004372  113723  002344                          MOVB    IPCSAR,(R3)+    ;PUT SECONDARY ADDRESS IN THE XMIT BUFFER.
004376  000413                                  BR      7$
004400                                  6$:
004400  112223                                  MOVB    (R2)+,(R3)+     ;LOAD ADDRESS CHARACTER
004402  032737  000020  002342                  BIT     #EXADD,IPCR     ;IS EXTENDED ADDRESS REQUESTED?
004410  001406                                  BEQ     7$              ;BR IF NOT
004412  142763  000001  177777                  BICB    #BIT0,-1(R3)    ;MAKE SURE THE LSB OF THE ADDRESS IS 0
004420  112223                                  MOVB    (R2)+,(R3)+     ;GET THE EXTENDED ADDRESS BYTE.
004422  005237  002472                          INC     XCOUNT          ;COMPENSATE TRANSMIT COUNT.
004426                                  7$:
004426  112223                                  MOVB    (R2)+,(R3)+     ;LOAD CONTROL CHARACTER
004430  032737  000010  002342                  BIT     #EXCON,IPCR     ;IS EXTENDED CONTROL DESIRED?
```

```
004436  001403                          BEQ     8$                  ;BR IF NOT
004440  112223                          MOVB    (R2)+,(R3)+         ;LOAD EXTENDED CONTROL
004442  005237  002472                  INC     XCOUNT              ;COMPENSATE TRANSMIT COUNT
004446                          8$:
004446  062737  000002  002472          ADD     #2,XCOUNT           ;COMPENSATE TRANSMIT COUNT
004454                          10$:
004454  013737  002472  002474          MOV     XCOUNT,ECOUNT       ;TRANSMIT COUNT IS THE END COUNT IN BCP MODE.
004462                          11$:
004462  112213                          MOVB    (R2)+,(R3)          ;SAVE THE DATA IN THE TRANSMIT BUFFER
004464  146123  004514                  BICB    MASK(R1),(R3)+      ;CLEAR UNUSED BITS (DEPENDS ON CHAR LENGTH)
004470  005304                          DEC     R4                  ;DECREMENT COUNTER.
004472  001373                          BNE     11$                 ;LOOP UNTIL THE TRANSMIT BUFFER IS LOADED.

004474  012701  003273                  MOV     #RCVBUF,R1          ;GET THE ADDRESS OF THE RECEIVE BUFFER
004500  012702  000400                  MOV     #RSIZE,R2           ;GET THE LENGTH OF THE BUFFER.
004504                          20$:
004504  105021                          CLRB    (R1)+               ;CLEAR THE ENTIRE BUFFER
004506  005302                          DEC     R2                  ;DECREMENT THE COUNTER
004510  001375                          BNE     20$                 ;LOOP UNTIL THE ENTIRE RECEIVE BUFFER IS CLEAR

004512  000207                          RETURN

004514     000     376     374  MASK:  .BYTE   0,376,374,370,360,340,300,200,0
004517     370     360     340
004522     300     200     000
                                        .EVEN
```

```
                        ;;*******************************************************************
                        ;;*******************************************************************
                        ;
                        ;                    SUBROUTINE $DATA
                        ;
                        ;            FUNCTION -
                        ;
                        ;      CALLING FORMAT:          JSR     PC,$DATA
                        ;                               JSR     PC,$DATA1
                        ;
                        ;
                        ;      ENTRY CONDITIONS - RCVBUF  = CLEARED RECEIVE BUFFER
                        ;                         XMTBUF  = XMIT BUFFER
                        ;                         MAINT   = MAINTENANCE MODE FLAG
                        ;                                   IF SET, MAINT. MODE DESIRED
                        ;                         RXMINI  = RECEIVER INIT WITH MAINTENANCE MODE SET.
                        ;                         RXINIT  = USER SELECTED RECEIVER INIT WORD.
                        ;                         TXMINI  = XMIT INIT WORD WITH MAINTENANCE MODE SET.
                        ;                         TXINIT  = USER SELECTED XMIT INIT WORD
                        ;                         TIMER   = TIME OUT VALUE (DETERMINED IN INIT -
                        ;                                   DEPENDENT ON PROCESSOR TYPE)
                        ;                         EXERR   = FLAG FOR EXPECTED ERROR.
                        ;                                     0 = NO ERROR EXPECTED.
                        ;                                  NON0 = ERROR EXPECTED.
                        ;
                        ;
                        ;
                        ;      EXIT CONDITIONS  - IF A CORRECT DATA TRANSMISSION - CARRY CLEAR
                        ;                         IF ERROR IN TRANSMISSION - CARRY SET AND ERROR
                        ;                         FLAG SET. IF ERROR WAS NOT EXPECTED, A MESSAGE
                        ;                         WILL BE OUTPUT.
                        ;
                        ;      CALLED BY        - $DATA  - TESTS 15-28 & 30 - 40
                        ;                         $DATA1 - TESTS 41 -43
                        ;
                        ;
                        ;    REGISTERS R1-R5 DESTROYED
                        ;
                        ;;*******************************************************************
                        ;;*******************************************************************
004526                  $DATA:

004526  005037  002376          CLR     RFLAG           ;CLEAR THE RECEIVE FLAG
004532  005037  002424          CLR     TFLAG           ;CLEAR THE TRANSMIT FLAG
004536  005037  002360          CLR     MCFLAG          ;CLEAR THE MODEM CONTROL FLAG
004542  005037  002332          CLR     ERROR           ;ERROR CONDITION FLAG
004546  005037  002426          CLR     TIMEO           ;CLEAR TIMEOUT FLAG

004552  012701  003273          MOV     #RCVBUF,R1      ;RECEIVE BUFFER
004556  012702  002673          MOV     #XMTBUF,R2      ;TRANSMIT BUFFER
004562  013703  002472          MOV     XCOUNT,R3       ;TRANSMIT COUNTER
004566  005037  002500          CLR     RCOUNT          ;CLEAR RECEIVE COUNTER.
                                                        ;SET UP THE VECTORS.
004572                          SETVEC  XMTVEC,#XDATA,#PRI04
004572  012746  000200                                                  MOV     #PRI04,-(SP)
004576  012746  017156                                                  MOV     #XDATA,-(SP)
004602  013746  002266                                                  MOV     XMTVEC,-(SP)
```

```
        004606  012746  000003                                                          MOV     #3,-(SP)
        004612  104437                                                                  TRAP    C$SVEC
        004614  062706  000010                                                          ADD     #10,SP
     55 004620                          SETVEC  RCVEC,#RDATA,#PRI04
        004620  012746  000200                                                          MOV     #PRI04,-(SP)
        004624  012746  016544                                                          MOV     #RDATA,-(SP)
        004630  013746  002264                                                          MOV     RCVEC,-(SP)
        004634  012746  000003                                                          MOV     #3,-(SP)
        004640  104437                                                                  TRAP    C$SVEC
        004642  062706  000010                                                          ADD     #10,SP
     56 004646                          SETPRI  #PRI00          ;ENABLE INTERRUPTS
        004646  012700  000000                                                          MOV     #PRI00,R0
        004652  104441                                                                  TRAP    C$SPRI
     57 004654  005737  002356          TST     MAINT           ;SET MAINTENANCE MODE?
     58 004660  001407                  BEQ     $DATA1          ;BR IF NOT
     59 004662  053777  002406  175400  BIS     RXMINI,@RXCSR   ;INIT RECEIVER WITH MAINTENANCE MODE
     60 004670  053777  002442  175376  BIS     TXMINI,@TXCSR   ;INIT TRANSMITTER WITH MAINT. MODE.
     61 004676  000406                  BR      $GO
     62
     63 004700                  $DATA1:
     64 004700  053777  002404  175362  BIS     RXINIT,@RXCSR   ;ISSUE RECEIVER INIT (DETERMINED IN INIT CODE)
     65 004706  053777  002440  175360  BIS     TXINIT,@TXCSR   ;ISSUE XMIT INIT (DETERMINED IN INIT CODE)
     66 004714                  $GO:
     67 004714  011637  002416          MOV     (SP),SUBRPC     ;FLAG WHERE THIS SUBR. WAS CALLED.
     68 004720  162737  000004  002416  SUB     #4,SUBRPC       ;ADJUST THE PC
     69 004726  013704  002430          MOV     TIMER,R4        ;SET UP TIMER
     70 004732                  8$:
     71 004732  012705  001000          MOV     #1000,R5        ;INNER LOOP COUNTER
     72 004736                  10$:
     73 004736  005777  175334          TST     @TDSR           ;IS THERE A TRANSMITTER ERROR?
     74 004742  100426                  BMI     20$             ;BR IF YES
     75 004744  005737  002376          TST     RFLAG           ;IS THE RECEIVER DONE?
     76 004750  001033                  BNE     22$             ;EXIT LOOP IF YES
     77 004752  005305                  DEC     R5              ;DECREMENT INNER LOOP COUNTER
     78 004754  001370                  BNE     10$             ;LOOP UNTIL DONE
     79 004756  022737  000002  002310  CMP     #2,TURN         ;IS THIS RS422?
     80 004764  001401                  BEQ     11$             ;IF YES - DON'T ALLOW A SUPERVISOR BREAK.
     81 004766                          BREAK                   ;BREAK FOR SUPERVISOR INTERRUPT
        004766  104422                                                                  TRAP    C$BRK
     82 004770                  11$:
     83 004770  005304                  DEC     R4              ;DECREMENT OUTSIDE LOOP COUNTER
     84 004772  001357                  BNE     8$              ;LOOP UNTIL DONE
     85 004774  005237  002426          INC     TIMEO           ;SET TIME OUT FLAG.
     86
     87 005000  005737  002334          TST     EXERR           ;WAS AN ERROR EXPECTED?
     88 005004  001036                  BNE     25$             ;IF YES - EXIT WITHOUT ERROR MESSAGE.
     89 005006                          ERRDF   2,EMG2,ERRG2    ;TIME OUT
        005006  104455                                                                  TRAP    C$ERDF
        005010  000002                                                                  .WORD   2
        005012  013347                                                                  .WORD   EMG2
        005014  006560                                                                  .WORD   ERRG2
     90 005016  000422                  BR      24$
     91 005020                  20$:
     92 005020  042777  000020  175246  BIC     #TXENA,@TXCSR   ;DISABLE THE TRANSMITTER.
     93 005026                          ERRDF   3,EMG30,ERRG2   ;TRANSMIT UNDERRUN
        005026  104455                                                                  TRAP    C$ERDF
        005030  000003                                                                  .WORD   3
```

```
        005032  014642                                                                  .WORD   EMG30
        005034  006560                                                                  .WORD   ERRG2
     94 005036  000412                          BR      24$
     95 005040                          22$:
     96 005040  005737  002376                  TST     RFLAG           ;WAS THIS THE END OF MESSAGE?
     97 005044  100016                          BPL     25$             ;OK - IF YES
     98 005046  005737  002334                  TST     EXERR           ;WAS AN ERROR EXPECTED?
     99 005052  001013                          BNE     25$             ;IF YES - EXIT WITHOUT ERROR MESSAGE.
    100 005054                                  ERRDF   4,EMG31,ERRG2   ;RECEIVER ERROR
        005054  104455                                                                  TRAP    C$ERDF
        005056  000004                                                                  .WORD   4
        005060  014660                                                                  .WORD   EMG31
        005062  006560                                                                  .WORD   ERRG2
    101 005064                          24$:
    102 005064  012737  000001  002332          MOV     #1,ERROR        ;FLAG ERROR
    103 005072  005037  002416                  CLR     SUBRPC          ;CLEAR THE SUBR PC FLAG
    104 005076  000261                          SEC                     ;SET CARRY - ERROR
    105 005100  000403                          BR      30$
    106
    107 005102                          25$:
    108 005102  000241                          CLC                     ;CLEAR CARRY - NO ERROR
    109 005104  005037  002416                  CLR     SUBRPC          ;CLEAR THE SUBR PC FLAG
    110 005110                          30$:
    111 005110  052777  000001  175156          BIS     #RESET,@TXCSR   ;RESET THE DPV
    112 005116                                  CLRVEC  XMTVEC          ;RESTORE VECTORS
        005116  013700  002266                                                          MOV     XMTVEC,R0
        005122  104436                                                                  TRAP    C$CVEC
    113 005124                                  CLRVEC  RCVEC           ;
        005124  013700  002264                                                          MOV     RCVEC,R0
        005130  104436                                                                  TRAP    C$CVEC
    114 005132  000207                          RETURN
    115
```

```
                                        ;;*****************************************************************
                                        ;;*****************************************************************
                                        ;
                                        ;                    SUBROUTINE  $CHECK
                                        ;
                                        ;            FUNCTION - AFTER A DATA TRANSMISSION CHECK
                                        ;                       1. THE ERROR CHECK BIT 2. THAT THE XMIT AND RCV
                                        ;                       CHARACTER COUNTS ARE EQUAL 3. THAT THE XMIT AND
                                        ;                       RCV BUFFERS ARE IDENTICAL
                                        ;
                                        ;       CALLING FORMAT:         JSR     PC,$CHECK
                                        ;                               JSR     PC,$CHK1
                                        ;
                                        ;
                                        ;       ENTRY CONDITIONS - IRDSR  = IMAGE OF THE LAST RECEIVED RDSR
                                        ;                          XCOUNT = TRANSMIT CHARACTER COUNT.
                                        ;                          RCOUNT = RECEIVER CHARACTER COUNT.
                                        ;                          XMTBUF = THE TRANSMIT BUFFER STARTING ADDRESS.
                                        ;                          RCVBUF = THE RECEIVE BUFFER STARTING ADDRESS.
                                        ;                          MODE   = PROTOCOL MODE: 0 = BCP,  NON0 = BOP
                                        ;
                                        ;
                                        ;       EXIT CONDITIONS  - IF ERROR DETECTED, A MESSAGE WILL BE OUTPUT.
                                        ;
                                        ;       CALLED BY        - $CHECK - TESTS 15, 17-23, 29-40
                                        ;                          $CHK1  - TESTS 41-43
                                        ;
                                        ;    REGISTERS R1 - R3 DESTROYED
                                        ;
                                        ;;*****************************************************************
                                        ;;*****************************************************************
005134                                  $CHECK:
                                                .ENABL  LSB             ;ENABLE LOCAL SYMBOL BLOCK.

005134  005737  002362                          TST     MODE            ;IS THIS BCP MODE?
005140  001404                                  BEQ     1$              ;BR IF YES
005142  005737  002350                          TST     IRDSR           ;IS THE ERROR BIT SET (BIT 15)
005146  100410                                  BMI     3$              ;IF YES - CRC ERROR.
005150  000421                                  BR      4$
005152                                  1$:
005152  032737  002000  002344                  BIT     #BIT10,IPCSAR   ;WAS CRC16 USED? (ONLY TIME BIT 10 IS SET)
005160  001015                                  BNE     4$              ;IF NOT DON'T CHECK BIT.
005162  005737  002350                          TST     IRDSR           ;IS THE ERROR BIT SET (BIT 15)?
005166  100412                                  BMI     4$              ;IF YES - OK
005170                                  3$:
005170  011637  002416                          MOV     (SP),SUBRPC     ;FLAG WHERE THIS SUBR. WAS CALLED.
005174  162737  000004  002416                  SUB     #4,SUBRPC       ;ADJUST THE PC
005202                                          ERRDF   5,EMG37,ERRG1   ;CRC ERROR
005202  104455                                                                          TRAP    C$ERDF
005204  000005                                                                          .WORD   5
005206  015102                                                                          .WORD   EMG37
005210  006532                                                                          .WORD   ERRG1
005212  000444                                  BR      30$
005214                                  4$:
005214  023737  002472  002500                  CMP     XCOUNT,RCOUNT   ;ARE THE CHARACTER COUNTS THE SAME.
005222  001412                                  BEQ     5$              ;IF YES - CONTINUE
005224  011637  002416                          MOV     (SP),SUBRPC     ;FLAG WHERE THIS SUBR. WAS CALLED.
```

```
005230  162737  000004  002416          SUB     #4,SUBRPC          ;ADJUST THE PC
005236                                  ERRDF   6,EMG25,ERRG14     ;CHARACTER COUNTS DIFFERENT
005236  104455                                                                          TRAP    C$ERDF
005240  000006                                                                          .WORD   6
005242  014601                                                                          .WORD   EMG25
005244  010640                                                                          .WORD   ERRG14
005246  000426                          BR      30$
005250                          5$:
005250  012701  002673                  MOV     #XMTBUF,R1         ;GET THE ADDRESS OF THE XMIT BUFFER.
005254  012702  003273                  MOV     #RCVBUF,R2         ;GET THE ADDRESS OF THE RECV BUFFER.
005260  013703  002472                  MOV     XCOUNT,R3          ;GET THE CHARACTER COUNT
005264                          $CHK1:
005264  122122                          CMPB    (R1)+,(R2)+        ;ARE THE CHARACTERS THE SAME
005266  001003                          BNE     20$                ;IF NOT, REPORT THE ERROR
005270  005303                          DEC     R3                 ;DECREMENT THE COUNT.
005272  001414                          BEQ     30$                ;LOOP UNTIL DONE
005274  000773                          BR      $CHK1
005276                          20$:
005276  011637  002416                  MOV     (SP),SUBRPC        ;FLAG WHERE THIS SUBR. WAS CALLED.
005302  162737  000004  002416          SUB     #4,SUBRPC          ;ADJUST THE PC
005310  005301                          DEC     R1                 ;POINT TO DATA IN ERROR
005312  005302                          DEC     R2                 ;POINT TO DATA IN ERROR.
005314                                  ERRDF   7,EMG26,ERRG3      ;CHARACTERS DON'T MATCH
005314  104455                                                                          TRAP    C$ERDF
005316  000007                                                                          .WORD   7
005320  014627                                                                          .WORD   EMG26
005322  006674                                                                          .WORD   ERRG3
005324                          30$:
005324  005037  002416                  CLR     SUBRPC             ;CLEAR THE SUBR PC FLAG
                                        .DSABL  LSB                ;DISABLE LOCAL SYMBOL BLOCK.
005330  000207                          RETURN
```

```
                                        ;;*******************************************************************
                                        ;;*******************************************************************
                                        ;
                                        ;                    SUBROUTINE $MODEM
                                        ;
                                        ;            FUNCTION - TO PRINT OUT THE MODEM STATUS FROM A TEST
                                        ;
                                        ;       CALLING FORMAT:         JSR     PC,$MODEM
                                        ;
                                        ;
                                        ;       ENTRY CONDITIONS - ERROR  = FLAG SET IF THERE WAS AN ERROR IN $DATA
                                        ;                          MCFLAG = # OF MODEM CONTROL INTERRUPTS RECEIVED.
                                        ;                                   ALSO USED AS THE INDEX INTO THE MODEM
                                        ;                                   STATUS TABLE.
                                        ;                          MODEM  = ADDRESS OF MODEM STATUS TABLE
                                        ;
                                        ;
                                        ;       EXIT CONDITIONS  - IF THERE IS AN ERROR OR MORE THAT 1 MODEM
                                        ;                          CONTROL INTERRUPT, PRINT OUT MODED STATUS.
                                        ;                          OTHERWISE, UNEVENTFUL EXIT.
                                        ;
                                        ;       CALLED BY        - TESTS 30-40
                                        ;
                                        ;    REGISTERS R1-R3 DESTROYED
                                        ;
                                        ;;*******************************************************************
                                        ;;*******************************************************************
 005332                                 $MODEM:
 005332  011637  002416                         MOV     (SP),SUBRPC     ;FLAG WHERE THIS SUBR. WAS CALLED.
 005336  162737  000004  002416                 SUB     #4,SUBRPC       ;ADJUST THE PC
 005344  005737  002332                         TST     ERROR           ;WAS THERE AN ERROR IN THE $DATA ROUTINE
 005350  001041                                 BNE     1$              ;IF YES PRINT OUT STATUS
 005352  022737  000001  002360                 CMP     #1,MCFLAG       ;WAS THERE MORE THAN 1 MODEM CONTROL INT?
 005360  002152                                 BGE     35$             ;IF NOT - SKIP PRINT OUT
 005362                                         ERRDF   8,EMG40,ERRG1   ;MULTIPLE INTERRUPTS RECEIVED
 005362  104455                                                                                  TRAP    C$ERDF
 005364  000010                                                                                  .WORD   8
 005366  015175                                                                                  .WORD   EMG40
 005370  006532                                                                                  .WORD   ERRG1
 005372                                         PRINTB  #FMODEM,MCFLAG  ;PRINT THE NUMBER OF INTERRUPTS.
 005372  013746  002360                                                                          MOV     MCFLAG,-(SP)
 005376  012746  005710                                                                          MOV     #FMODEM,-(SP)
 005402  012746  000002                                                                          MOV     #2,-(SP)
 005406  010600                                                                                  MOV     SP,R0
 005410  104414                                                                                  TRAP    C$PNTB
 005412  062706  000006                                                                          ADD     #6,SP
 005416  022737  000011  002360                 CMP     #9.,MCFLAG      ;WERE MORE THAN NINE INTERRUPTS RECEIVED?
 005424  002013                                 BGE     1$              ;IF NOT, SKIP THE NEXT MESSAGE.
 005426  012737  000011  002360                 MOV     #9.,MCFLAG      ;ONLY PRINT OUT 9 INTERRUPTS
 005434                                         PRINTB  #FMODE6         ;INFORM THE USER INTERRUPTS DISABLED.
 005434  012746  006205                                                                          MOV     #FMODE6,-(SP)
 005440  012746  000001                                                                          MOV     #1,-(SP)
 005444  010600                                                                                  MOV     SP,R0
 005446  104414                                                                                  TRAP    C$PNTB
 005450  062706  000004                                                                          ADD     #4,SP
 005454                                 1$:
```

```
 43 005454  012701  002444                MOV     #MODEM,R1       ;ADDRESS OF MODEM STATUS
 44 005460                                PRINTB  #FMODE0
    005460  012746  005775                                                   MOV     #FMODE0,-(SP)
    005464  012746  000001                                                   MOV     #1,-(SP)
    005470  010600                                                           MOV     SP,R0
    005472  104414                                                           TRAP    C$PNTB
    005474  062706  000004                                                   ADD     #4,SP
 45 005500                                PRINTB  #FMODE1         ;PRINT INITIAL MODEM STATUS
    005500  012746  006024                                                   MOV     #FMODE1,-(SP)
    005504  012746  000001                                                   MOV     #1,-(SP)
    005510  010600                                                           MOV     SP,R0
    005512  104414                                                           TRAP    C$PNTB
    005514  062706  000004                                                   ADD     #4,SP
 46 005520                                PRINTB  #FMODE2
    005520  012746  006113                                                   MOV     #FMODE2,-(SP)
    005524  012746  000001                                                   MOV     #1,-(SP)
    005530  010600                                                           MOV     SP,R0
    005532  104414                                                           TRAP    C$PNTB
    005534  062706  000004                                                   ADD     #4,SP
 47 005540  005002                        CLR     R2              ;CLEAR COUNTER
 48 005542                        5$:
 49 005542  012703  006300                MOV     #MMASK,R3
 50 005546  012704  000012                MOV     #10.,R4         ;# OF BITS TO CHECK IN THE MODEM STATUS
 51
 52 005552                        10$:
 53 005552  032311                        BIT     (R3)+,(R1)      ;CHECK THE BIT
 54 005554  001011                        BNE     12$             ;IS IT SET?
 55 005556                                PRINTB  #FMODE3         ;IF NOT, PRINT A 0
    005556  012746  006137                                                   MOV     #FMODE3,-(SP)
    005562  012746  000001                                                   MOV     #1,-(SP)
    005566  010600                                                           MOV     SP,R0
    005570  104414                                                           TRAP    C$PNTB
    005572  062706  000004                                                   ADD     #4,SP
 56 005576  000410                        BR      15$
 57 005600                        12$:
 58 005600                                PRINTB  #FMODE4         ;PRINT A 1
    005600  012746  006146                                                   MOV     #FMODE4,-(SP)
    005604  012746  000001                                                   MOV     #1,-(SP)
    005610  010600                                                           MOV     SP,R0
    005612  104414                                                           TRAP    C$PNTB
    005614  062706  000004                                                   ADD     #4,SP
 59 005620                        15$:
 60 005620  005304                        DEC     R4              ;DECREMENT BIT COUNTER
 61 005622  001353                        BNE     10$             ;LOOP UNTIL DONE.
 62
 63
 64 005624  005737  002360                TST     MCFLAG          ;IS THIS THE LAST STATUS
 65 005630  001416                        BEQ     30$             ;IF YES, EXIT
 66 005632  005721                        TST     (R1)+           ;INCREMENT MODEM STATUS POINTER.
 67 005634  005337  002360                DEC     MCFLAG          ;DECREMENT MC FLAG
 68 005640  005202                        INC     R2              ;INCREMENT COUNTER.
 69
 70 005642                                PRINTB  #FMODE5,R2      ;PRINT NEXT MODEM
    005642  010246                                                           MOV     R2,-(SP)
    005644  012746  006155                                                   MOV     #FMODE5,-(SP)
    005650  012746  000002                                                   MOV     #2,-(SP)
    005654  010600                                                           MOV     SP,R0
```

```
        005656  104414                                                                  TRAP    C$PNTB
        005660  062706  000006                                                          ADD     #6,SP
     71 005664  000726                          BR      5$
     72 005666                          30$:
     73 005666                                  PRINTB  #FMG6           ;PRINT CARRIAGE RETURN.
        005666  012746  011270                                                          MOV     #FMG6,-(SP)
        005672  012746  000001                                                          MOV     #1,-(SP)
        005676  010600                                                                  MOV     SP,R0
        005700  104414                                                                  TRAP    C$PNTB
        005702  062706  000004                                                          ADD     #4,SP
     74 005706                          35$:
     75 005706  000207                          RETURN
     76
     77 005710     045     101     116  FMODEM: .ASCIZ  /%ANUMBER OF MODEM CONTROL INTERRUPTS RECEIVED: %D2%N/
        005713     125     115     102
        005716     105     122     040
        005721     117     106     040
        005724     115     117     104
        005727     105     115     040
        005732     103     117     116
        005735     124     122     117
        005740     114     040     111
        005743     116     124     105
        005746     122     122     125
        005751     120     124     123
        005754     040     122     105
        005757     103     105     111
        005762     126     105     104
        005765     072     040     045
        005770     104     062     045
        005773     116     000
     78 005775     045     116     045  FMODE0: .ASCIZ  /%N%AMODEM STATUS%N%S14/
        006000     101     115     117
        006003     104     105     115
        006006     040     123     124
        006011     101     124     125
        006014     123     045     116
        006017     045     123     061
        006022     064     000
     79 006024     045     101     040  FMODE1: .ASCIZ  /%A     RL  DTR  RTS   LL   TM  DSR   CD  CTS  RING CNG/
        006027     040     040     040
        006032     040     122     114
        006035     040     040     104
        006040     124     122     040
        006043     040     122     124
        006046     123     040     040
        006051     040     114     114
        006054     040     040     040
        006057     124     115     040
        006062     040     104     123
        006065     122     040     040
        006070     040     103     104
        006073     040     040     103
        006076     124     123     040
        006101     040     122     111
        006104     116     107     040
        006107     103     116     107
```

```
        006112  000
     80 006113  045  116  045  FMODE2: .ASCIZ  /%N%AMODEM ON RESET:/
        006116  101  115  117
        006121  104  105  115
        006124  040  117  116
        006127  040  122  105
        006132  123  105  124
        006135  072  000
     81 006137  045  123  064  FMODE3: .ASCIZ  /%S4%A0/
        006142  045  101  060
        006145  000
     82 006146  045  123  064  FMODE4: .ASCIZ  /%S4%A1/
        006151  045  101  061
        006154  000
     83 006155  045  116  045  FMODE5: .ASCIZ  /%N%AMODEM CHANGE %D1%A:/
        006160  101  115  117
        006163  104  105  115
        006166  040  103  110
        006171  101  116  107
        006174  105  040  045
        006177  104  061  045
        006202  101  072  000
     84 006205  045  101  052  FMODE6: .ASCIZ  /%A** MODEM CONTROL INTERRUPT DISABLED AFTER 9 CHANGES **%N/
        006210  052  040  115
        006213  117  104  105
        006216  115  040  103
        006221  117  116  124
        006224  122  117  114
        006227  040  111  116
        006232  124  105  122
        006235  122  125  120
        006240  124  040  104
        006243  111  123  101
        006246  102  114  105
        006251  104  040  101
        006254  106  124  105
        006257  122  040  071
        006262  040  103  110
        006265  101  116  107
        006270  105  123  040
        006273  052  052  045
        006276  116  000
     85                                  .EVEN
     86                                          ;MASKS OF EACH BIT
     87 006300  000001  000002  000004  MMASK:  .WORD   SF,DTR,RTS,LL,TM,DM,RR,CTS,IC,DSCNG
        006306  000010  000040  001000
        006314  010000  020000  040000
        006322  100000
     88
     89
     90
```

```
                                        ;;*******************************************************************
                                        ;;*******************************************************************
                                        ;
                                        ;                    SUBROUTINE $TURN
                                        ;
                                        ;            FUNCTION - DETERMINE IF TURNAROUND IS AVAILABLE
                                        ;
                                        ;       CALLING FORMAT:         JSR     PC,$TURN
                                        ;
                                        ;
                                        ;       ENTRY CONDITIONS -      TURN - 0 = TURNAROUND OFF
                                        ;                               STARES   = START RESTART COUNT
                                        ;
                                        ;
                                        ;
                                        ;       EXIT CONDITIONS  -      TURNAROUND ON  - CARRY CLEAR (DO THE TEST)
                                        ;                               TURNAROUND OFF - CARRY SET (DON'T DO THE TEST)
                                        ;                               IF TURNAROUND OFF AND IF ON FIRST PASS, OUTPUT
                                        ;                               A MESSAGE TO THE  USER.
                                        ;
                                        ;
                                        ;       CALLED BY        - TESTS 12 - 14
                                        ;
                                        ;    REGISTERS NOT EFFECTED
                                        ;
                                        ;;*******************************************************************
                                        ;;*******************************************************************
006324                                  $TURN:
006324  005737  002310                          TST     TURN            ;IS THERE A TURNAROUND
006330  001022                                  BNE     5$              ;IF YES - CLEAR CARRY TO DO THE TEST.
006332  022737  000001  002320                  CMP     #1,STARES       ;IS THIS THE FIRST PASS
006340  001014                                  BNE     1$              ;IF NOT, DON'T OUTPUT MESSAGE JUST SET FLAG.
006342                                          PRINTX  #FMG0,L$TEST,LOGDEV ;INFORM THE USER THAT TEST CAN'T BE RUN
006342  013746  002354                                                                  MOV     LOGDEV,-(SP)
006346  013746  002114                                                                  MOV     L$TEST,-(SP)
006352  012746  010750                                                                  MOV     #FMG0,-(SP)
006356  012746  000003                                                                  MOV     #3,-(SP)
006362  010600                                                                          MOV     SP,R0
006364  104415                                                                          TRAP    C$PNTX
006366  062706  000010                                                                  ADD     #10,SP
                                                                        ;WITHOUT THE TURNAROUND.
006372                                  1$:
006372  000261                                  SEC                     ;FLAG NOT TO DO THE TEST.
006374  000401                                  BR      10$             ;BR TO RETURN
006376                                  5$:
006376  000241                                  CLC                     ;FLAG TO DO THE TEST.
006400                                  10$:
006400  000207                                  RETURN
```

```
                                ;;*******************************************************************
                                ;;*******************************************************************
                                ;
                                ;                    SUBROUTINE $SPEED
                                ;
                                ;            FUNCTION - DETERMINE IF THE TEST CAN BE RUN WITH
                                ;                       WITH THE SELECTED TURNAROUND AND/OR PROCESSOR.
                                ;
                                ;       CALLING FORMAT:         JSR     PC,$SPEED
                                ;
                                ;       ENTRY CONDITIONS -      TURN = 1 - RS423
                                ;                               TURN = 2 - RS422
                                ;                               CPU  = 0 - LSI 11
                                ;                               CPU  = 1 - LSI 11/2
                                ;                               CPU  = 2 - LSI 11/23
                                ;
                                ;
                                ;
                                ;       EXIT CONDITIONS  -      OK TO RUN TEST - CARRY CLEAR
                                ;                               DON'T RUN TEST - CARRY SET
                                ;                               IF TEST CAN'T BE RUN, THE USER WILL BE
                                ;                               INFORMED ON THE FIRST PASS.
                                ;
                                ;       CALLED BY        - $SPEED CALLED BY TESTS 29 - 41
                                ;
                                ;    REGISTERS NOT EFFECTED
                                ;
                                ;;*******************************************************************
                                ;;*******************************************************************
006402                          $SPEED:
006402  005737  002312                  TST     CPU             ;IS THIS A LSI 11/23?
006406  001024                          BNE     5$              ;IF YES - CLEAR CARRY TO DO THE TEST.
006410  022737  000002  002310          CMP     #2,TURN         ;IS THIS RS422?
006416  001020                          BNE     5$              ;IF NOT - CLEAR CARRY AND DO THE TEST.
006420  022737  000001  002320          CMP     #1,STARES       ;IS THIS THE FIRST PASS?
006426  001012                          BNE     1$              ;IF NOT, DON'T OUTPUT MESSAGE JUST SET FLAG.
006430                                  PRINTX  #FMG27,L$TEST   ;INFORM THE USER THAT THE TEST CAN'T BE RUN
006430  013746  002114                                                          MOV     L$TEST,-(SP)
006434  012746  012671                                                          MOV     #FMG27,-(SP)
006440  012746  000002                                                          MOV     #2,-(SP)
006444  010600                                                                  MOV     SP,R0
006446  104415                                                                  TRAP    C$PNTX
006450  062706  000006                                                          ADD     #6,SP
                                                                ;WITH THIS CPU AND RS422.
006454                          1$:
006454  000261                          SEC                     ;FLAG NOT TO DO THE TEST.
006456  000401                          BR      10$             ;BR TO RETURN.
006460                          5$:
006460  000241                          CLC                     ;FLAG TO DO THE TEST.
006462                          10$:
006462  000207                          RETURN
```

```
                                ;;*******************************************************************
                                ;;*******************************************************************
                                ;
                                ;                    SUBROUTINE $DLAY
                                ;
                                ;            FUNCTION - TO SAVE PROGRAM SPACE BY USING ONLY 1
                                ;                       EXPANSION OF THE SUPERVISOR MACRO 'DELAY''
                                ;
                                ;
                                ;       CALLING FORMAT:         JSR     PC,$DLAY
                                ;                                       .WORD   #
                                ;
                                ;       ENTRY CONDITIONS -      @(SP) = # OF DELAY LOOPS TO USE.
                                ;
                                ;
                                ;
                                ;       EXIT CONDITIONS  -
                                ;
                                ;       CALLED BY        - TESTS  2, 5-9, 12, 13
                                ;
                                ;    REGISTER R0 RESTORED
                                ;
                                ;;*******************************************************************
                                ;;*******************************************************************
006464                          $DLAY:
006464  017600  000000                  MOV     @(SP),R0        ;GET THE # OF DELAY LOOPS
006470  062716  000002                  ADD     #2,(SP)         ;UPDATE THE PC
006474                          10$:
006474                                  DELAY   1               ;1 DELAY LOOP
006474  012727  000001                                                          MOV     #1,(PC)+
006500  000000                                                                  .WORD   0
006502  013727  002116                                                          MOV     L$DLY,(PC)+
006506  000000                                                                  .WORD   0
006510  005367  177772                                                          DEC     -6(PC)
006514  001375                                                                  BNE     .-4
006516  005367  177756                                                          DEC     -22(PC)
006522  001367                                                                  BNE     .-20
006524  005300                          DEC     R0              ;DECREMENT VARIABLE LOOP COUNTER
006526  001362                          BNE     10$             ;LOOP UNTIL DONE
006530  000207                          RETURN
```

1

```
                                .SBTTL  GLOBAL ERROR REPORT REPORT SECTION
                                ;////////////////////////////////////////////////////////////////////////////
                                ;/      THE GLOBAL ERROR REPORT SECTION CONTAINS ERROR MESSAGES
                                ;/      THAT ARE USED IN MORE THAN ONE TEST.
                                ;////////////////////////////////////////////////////////////////////////////
                                        .EVEN

006532                          BGNMSG  ERRG1
006532                                                                          ERRG1::
006532                                  PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
006532  013746  002416                                                          MOV     SUBRPC,-(SP)
006536  012746  011140                                                          MOV     #FMG3,-(SP)
006542  012746  000002                                                          MOV     #2,-(SP)
006546  010600                                                                  MOV     SP,R0
006550  104414                                                                  TRAP    C$PNTB
006552  062706  000006                                                          ADD     #6,SP
006556                          ENDMSG
006556                                                                          L10001:
006556  104423                                                                  TRAP    C$MSG


006560                          BGNMSG  ERRG2
006560                                                                          ERRG2::
006560  005737  002416                  TST     SUBRPC          ;IS THE ERROR IN A SUBROUTINE?
006564  001412                          BEQ     10$             ;IF NOT, DON'T PRINT SUBR. PC
006566                                  PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
006566  013746  002416                                                          MOV     SUBRPC,-(SP)
006572  012746  011140                                                          MOV     #FMG3,-(SP)
006576  012746  000002                                                          MOV     #2,-(SP)
006602  010600                                                                  MOV     SP,R0
006604  104414                                                                  TRAP    C$PNTB
006606  062706  000006                                                          ADD     #6,SP
006612                          10$:
006612                                  PRINTB  #FMG1,@CSR0,@CSR2 ;PRINT CSR0 AND CSR2 CONTENTS.
006612  017746  173454                                                          MOV     @CSR2,-(SP)
006616  017746  173446                                                          MOV     @CSR0,-(SP)
006622  012746  011046                                                          MOV     #FMG1,-(SP)
006626  012746  000003                                                          MOV     #3,-(SP)
006632  010600                                                                  MOV     SP,R0
006634  104414                                                                  TRAP    C$PNTB
006636  062706  000010                                                          ADD     #10,SP
006642                                  PRINTB  #FMG2,@CSR4,@CSR6 ;PRINT CSR4 AND CSR2 CONTENTS.
006642  017746  173430                                                          MOV     @CSR6,-(SP)
006646  017746  173422                                                          MOV     @CSR4,-(SP)
006652  012746  011103                                                          MOV     #FMG2,-(SP)
006656  012746  000003                                                          MOV     #3,-(SP)
006662  010600                                                                  MOV     SP,R0
006664  104414                                                                  TRAP    C$PNTB
006666  062706  000010                                                          ADD     #10,SP
006672                          ENDMSG
006672                                                                          L10002:
006672  104423                                                                  TRAP    C$MSG


006674                          BGNMSG  ERRG3
006674                                                                          ERRG3::
006674                                  PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
006674  013746  002416                                                          MOV     SUBRPC,-(SP)
```

```
        006700  012746  011140                                                          MOV     #FMG3,-(SP)
        006704  012746  000002                                                          MOV     #2,-(SP)
        006710  010600                                                                  MOV     SP,R0
        006712  104414                                                                  TRAP    C$PNTB
        006714  062706  000006                                                          ADD     #6,SP
     24 006720                          PRINTB  #FMG8,<B,@R1>,<B,@R2>
        006720  005046                                                                  CLR     -(SP)
        006722  151216                                                                  BISB    @R2,(SP)
        006724  005046                                                                  CLR     -(SP)
        006726  151116                                                                  BISB    @R1,(SP)
        006730  012746  011337                                                          MOV     #FMG8,-(SP)
        006734  012746  000003                                                          MOV     #3,-(SP)
        006740  010600                                                                  MOV     SP,R0
        006742  104414                                                                  TRAP    C$PNTB
        006744  062706  000010                                                          ADD     #10,SP
     25 006750                      ENDMSG
        006750                                                                  L10003:
        006750  104423                                                                  TRAP    C$MSG
     26
     27
     28 006752                      BGNMSG  ERRG4
        006752                                                                  ERRG4::
     29 006752                          PRINTB  #FMG4                   ;PRINT HEADER
        006752  012746  011212                                                          MOV     #FMG4,-(SP)
        006756  012746  000001                                                          MOV     #1,-(SP)
        006762  010600                                                                  MOV     SP,R0
        006764  104414                                                                  TRAP    C$PNTB
        006766  062706  000004                                                          ADD     #4,SP
     30 006772                          PRINTB  #FMG7,CSR0,<B,@CSR0>    ;PRINT THE LOW BYTE OF CSR0
        006772  005046                                                                  CLR     -(SP)
        006774  157716  173270                                                          BISB    @CSR0,(SP)
        007000  013746  002270                                                          MOV     CSR0,-(SP)
        007004  012746  011273                                                          MOV     #FMG7,-(SP)
        007010  012746  000003                                                          MOV     #3,-(SP)
        007014  010600                                                                  MOV     SP,R0
        007016  104414                                                                  TRAP    C$PNTB
        007020  062706  000010                                                          ADD     #10,SP
     31 007024                          PRINTB  #FMG5,<B,R1>            ;PRINT EXPECTED CONTENTS
        007024  005046                                                                  CLR     -(SP)
        007026  150116                                                                  BISB    R1,(SP)
        007030  012746  011257                                                          MOV     #FMG5,-(SP)
        007034  012746  000002                                                          MOV     #2,-(SP)
        007040  010600                                                                  MOV     SP,R0
        007042  104414                                                                  TRAP    C$PNTB
        007044  062706  000006                                                          ADD     #6,SP
     32 007050                      ENDMSG
        007050                                                                  L10004:
        007050  104423                                                                  TRAP    C$MSG
     33
     34
     35 007052                      BGNMSG  ERRG7
        007052                                                                  ERRG7::
     36 007052                          PRINTB  #FMG4                   ;PRINT HEADER
        007052  012746  011212                                                          MOV     #FMG4,-(SP)
        007056  012746  000001                                                          MOV     #1,-(SP)
        007062  010600                                                                  MOV     SP,R0
        007064  104414                                                                  TRAP    C$PNTB
```

```
        007066  062706  000004                                                          ADD     #4,SP
     37 007072                          PRINTB  #FMG10,CSR4,<B,@CSR4>   ;PRINT THE LOW BYTE OF CSR4
        007072  005046                                                                  CLR     -(SP)
        007074  157716  173174                                                          BISB    @CSR4,(SP)
        007100  013746  002274                                                          MOV     CSR4,-(SP)
        007104  012746  011454                                                          MOV     #FMG10,-(SP)
        007110  012746  000003                                                          MOV     #3,-(SP)
        007114  010600                                                                  MOV     SP,R0
        007116  104414                                                                  TRAP    C$PNTB
        007120  062706  000010                                                          ADD     #10,SP
     38 007124                          PRINTB  #FMG5,<B,R1>            ;PRINT EXPECTED CONTENTS
        007124  005046                                                                  CLR     -(SP)
        007126  150116                                                                  BISB    R1,(SP)
        007130  012746  011257                                                          MOV     #FMG5,-(SP)
        007134  012746  000002                                                          MOV     #2,-(SP)
        007140  010600                                                                  MOV     SP,R0
        007142  104414                                                                  TRAP    C$PNTB
        007144  062706  000006                                                          ADD     #6,SP
     39 007150                  ENDMSG
        007150                                                          L10005:
        007150  104423                                                                  TRAP    C$MSG
     40
     41 007152                  BGNMSG  ERRG8
        007152                                                          ERRG8::
     42 007152                          PRINTB  #FMG4                   ;PRINT HEADER
        007152  012746  011212                                                          MOV     #FMG4,-(SP)
        007156  012746  000001                                                          MOV     #1,-(SP)
        007162  010600                                                                  MOV     SP,R0
        007164  104414                                                                  TRAP    C$PNTB
        007166  062706  000004                                                          ADD     #4,SP
     43 007172                          PRINTB  #FMG11,CSR5,<B,@PCR>    ;PRINT THE HIGH BYTE OF CSR4
        007172  005046                                                                  CLR     -(SP)
        007174  157716  173104                                                          BISB    @PCR,(SP)
        007200  013746  002304                                                          MOV     CSR5,-(SP)
        007204  012746  011520                                                          MOV     #FMG11,-(SP)
        007210  012746  000003                                                          MOV     #3,-(SP)
        007214  010600                                                                  MOV     SP,R0
        007216  104414                                                                  TRAP    C$PNTB
        007220  062706  000010                                                          ADD     #10,SP
     44 007224                          PRINTB  #FMG5,<B,R1>            ;PRINT EXPECTED CONTENTS
        007224  005046                                                                  CLR     -(SP)
        007226  150116                                                                  BISB    R1,(SP)
        007230  012746  011257                                                          MOV     #FMG5,-(SP)
        007234  012746  000002                                                          MOV     #2,-(SP)
        007240  010600                                                                  MOV     SP,R0
        007242  104414                                                                  TRAP    C$PNTB
        007244  062706  000006                                                          ADD     #6,SP
     45 007250                  ENDMSG
        007250                                                          L10006:
        007250  104423                                                                  TRAP    C$MSG
     46
     47 007252                  BGNMSG  ERRG9
        007252                                                          ERRG9::
     48 007252                          PRINTB  #FMG4                   ;PRINT HEADER
        007252  012746  011212                                                          MOV     #FMG4,-(SP)
        007256  012746  000001                                                          MOV     #1,-(SP)
        007262  010600                                                                  MOV     SP,R0
```

```
        007264  104414                                                                    TRAP    C$PNTB
        007266  062706  000004                                                            ADD     #4,SP
     49 007272                          PRINTB  #FMG12,CSR6,<B,@CSR6>   ;PRINT THE LOW BYTE OF CSR6
        007272  005046                                                                    CLR     -(SP)
        007274  157716  172776                                                            BISB    @CSR6,(SP)
        007300  013746  002276                                                            MOV     CSR6,-(SP)
        007304  012746  011564                                                            MOV     #FMG12,-(SP)
        007310  012746  000003                                                            MOV     #3,-(SP)
        007314  010600                                                                    MOV     SP,R0
        007316  104414                                                                    TRAP    C$PNTB
        007320  062706  000010                                                            ADD     #10,SP
     50 007324                          PRINTB  #FMG5,<B,R1>            ;PRINT EXPECTED CONTENTS
        007324  005046                                                                    CLR     -(SP)
        007326  150116                                                                    BISB    R1,(SP)
        007330  012746  011257                                                            MOV     #FMG5,-(SP)
        007334  012746  000002                                                            MOV     #2,-(SP)
        007340  010600                                                                    MOV     SP,R0
        007342  104414                                                                    TRAP    C$PNTB
        007344  062706  000006                                                            ADD     #6,SP
     51 007350                      ENDMSG
        007350                                                                  L10007:
        007350  104423                                                                    TRAP    C$MSG
     52
     53 007352                      BGNMSG  ERRG10
        007352                                                                  ERRG10::
     54 007352                          PRINTB  #FMG4                   ;PRINT HEADER
        007352  012746  011212                                                            MOV     #FMG4,-(SP)
        007356  012746  000001                                                            MOV     #1,-(SP)
        007362  010600                                                                    MOV     SP,R0
        007364  104414                                                                    TRAP    C$PNTB
        007366  062706  000004                                                            ADD     #4,SP
     55 007372                          PRINTB  #FMG13,CSR7,<B,@CSR7>   ;PRINT THE HIGH BYTE OF CSR6
        007372  005046                                                                    CLR     -(SP)
        007374  157716  172706                                                            BISB    @CSR7,(SP)
        007400  013746  002306                                                            MOV     CSR7,-(SP)
        007404  012746  011630                                                            MOV     #FMG13,-(SP)
        007410  012746  000003                                                            MOV     #3,-(SP)
        007414  010600                                                                    MOV     SP,R0
        007416  104414                                                                    TRAP    C$PNTB
        007420  062706  000010                                                            ADD     #10,SP
     56 007424                          PRINTB  #FMG5,<B,R1>            ;PRINT EXPECTED CONTENTS
        007424  005046                                                                    CLR     -(SP)
        007426  150116                                                                    BISB    R1,(SP)
        007430  012746  011257                                                            MOV     #FMG5,-(SP)
        007434  012746  000002                                                            MOV     #2,-(SP)
        007440  010600                                                                    MOV     SP,R0
        007442  104414                                                                    TRAP    C$PNTB
        007444  062706  000006                                                            ADD     #6,SP
     57 007450                      ENDMSG
        007450                                                                  L10010:
        007450  104423                                                                    TRAP    C$MSG
     58
     59
     60 007452                      BGNMSG  ERRG11
        007452                                                                  ERRG11::
     61 007452  005737  002416              TST     SUBRPC                  ;WAS THE RESET ERROR FOUND IN THE SUB
     62 007456  001412                      BEQ     5$                      ;IF NOT SKIP
```

```
 63 007460                                  PRINTB  #FMG23,SUBRPC          ;PRINT WHERE CALLED
    007460  013746  002416                                                                  MOV     SUBRPC,-(SP)
    007464  012746  012416                                                                  MOV     #FMG23,-(SP)
    007470  012746  000002                                                                  MOV     #2,-(SP)
    007474  010600                                                                          MOV     SP,R0
    007476  104414                                                                          TRAP    C$PNTB
    007500  062706  000006                                                                  ADD     #6,SP
 64 007504                              5$:
 65 007504                                  PRINTB  #FMG4                  ;PRINT HEADER
    007504  012746  011212                                                                  MOV     #FMG4,-(SP)
    007510  012746  000001                                                                  MOV     #1,-(SP)
    007514  010600                                                                          MOV     SP,R0
    007516  104414                                                                          TRAP    C$PNTB
    007520  062706  000004                                                                  ADD     #4,SP
 66 007524                                  PRINTB  #FMG7,CSR0,<B,@CSR0>   ;PRINT THE LOW BYTE OF CSR0
    007524  005046                                                                          CLR     -(SP)
    007526  157716  172536                                                                  BISB    @CSR0,(SP)
    007532  013746  002270                                                                  MOV     CSR0,-(SP)
    007536  012746  011273                                                                  MOV     #FMG7,-(SP)
    007542  012746  000003                                                                  MOV     #3,-(SP)
    007546  010600                                                                          MOV     SP,R0
    007550  104414                                                                          TRAP    C$PNTB
    007552  062706  000010                                                                  ADD     #10,SP
 67 007556                                  PRINTB  #FMG5,#0               ;PRINT EXPECTED CONTENTS
    007556  012746  000000                                                                  MOV     #0,-(SP)
    007562  012746  011257                                                                  MOV     #FMG5,-(SP)
    007566  012746  000002                                                                  MOV     #2,-(SP)
    007572  010600                                                                          MOV     SP,R0
    007574  104414                                                                          TRAP    C$PNTB
    007576  062706  000006                                                                  ADD     #6,SP
 68 007602                                  PRINTB  #FMG10,CSR4,<B,@CSR4>  ;PRINT THE LOW BYTE OF CSR4
    007602  005046                                                                          CLR     -(SP)
    007604  157716  172464                                                                  BISB    @CSR4,(SP)
    007610  013746  002274                                                                  MOV     CSR4,-(SP)
    007614  012746  011454                                                                  MOV     #FMG10,-(SP)
    007620  012746  000003                                                                  MOV     #3,-(SP)
    007624  010600                                                                          MOV     SP,R0
    007626  104414                                                                          TRAP    C$PNTB
    007630  062706  000010                                                                  ADD     #10,SP
 69 007634                                  PRINTB  #FMG5,#TBE             ;PRINT EXPECTED CONTENTS
    007634  012746  000004                                                                  MOV     #TBE,-(SP)
    007640  012746  011257                                                                  MOV     #FMG5,-(SP)
    007644  012746  000002                                                                  MOV     #2,-(SP)
    007650  010600                                                                          MOV     SP,R0
    007652  104414                                                                          TRAP    C$PNTB
    007654  062706  000006                                                                  ADD     #6,SP
 70 007660                                  PRINTB  #FMG11,PCR,<B,@PCR>    ;PRINT THE HIGH BYTE OF CSR4
    007660  005046                                                                          CLR     -(SP)
    007662  157716  172416                                                                  BISB    @PCR,(SP)
    007666  013746  002304                                                                  MOV     PCR,-(SP)
    007672  012746  011520                                                                  MOV     #FMG11,-(SP)
    007676  012746  000003                                                                  MOV     #3,-(SP)
    007702  010600                                                                          MOV     SP,R0
    007704  104414                                                                          TRAP    C$PNTB
    007706  062706  000010                                                                  ADD     #10,SP
 71 007712                                  PRINTB  #FMG5,#0               ;PRINT EXPECTED CONTENTS
    007712  012746  000000                                                                  MOV     #0,-(SP)
```

```
        007716  012746  011257                                                          MOV     #FMG5,-(SP)
        007722  012746  000002                                                          MOV     #2,-(SP)
        007726  010600                                                                  MOV     SP,R0
        007730  104414                                                                  TRAP    C$PNTB
        007732  062706  000006                                                          ADD     #6,SP
    72  007736                          PRINTB  #FMG12,CSR6,<B,@CSR6>   ;PRINT THE LOW BYTE OF CSR6
        007736  005046                                                                  CLR     -(SP)
        007740  157716  172332                                                          BISB    @CSR6,(SP)
        007744  013746  002276                                                          MOV     CSR6,-(SP)
        007750  012746  011564                                                          MOV     #FMG12,-(SP)
        007754  012746  000003                                                          MOV     #3,-(SP)
        007760  010600                                                                  MOV     SP,R0
        007762  104414                                                                  TRAP    C$PNTB
        007764  062706  000010                                                          ADD     #10,SP
    73  007770                          PRINTB  #FMG5,#0                ;PRINT EXPECTED CONTENTS
        007770  012746  000000                                                          MOV     #0,-(SP)
        007774  012746  011257                                                          MOV     #FMG5,-(SP)
        010000  012746  000002                                                          MOV     #2,-(SP)
        010004  010600                                                                  MOV     SP,R0
        010006  104414                                                                  TRAP    C$PNTB
        010010  062706  000006                                                          ADD     #6,SP
    74  010014                          PRINTB  #FMG13,CSR7,<B,@CSR7>   ;PRINT THE HIGH BYTE OF CSR6
        010014  005046                                                                  CLR     -(SP)
        010016  157716  172264                                                          BISB    @CSR7,(SP)
        010022  013746  002306                                                          MOV     CSR7,-(SP)
        010026  012746  011630                                                          MOV     #FMG13,-(SP)
        010032  012746  000003                                                          MOV     #3,-(SP)
        010036  010600                                                                  MOV     SP,R0
        010040  104414                                                                  TRAP    C$PNTB
        010042  062706  000010                                                          ADD     #10,SP
    75  010046                          PRINTB  #FMG5,#0                ;PRINT EXPECTED CONTENTS
        010046  012746  000000                                                          MOV     #0,-(SP)
        010052  012746  011257                                                          MOV     #FMG5,-(SP)
        010056  012746  000002                                                          MOV     #2,-(SP)
        010062  010600                                                                  MOV     SP,R0
        010064  104414                                                                  TRAP    C$PNTB
        010066  062706  000006                                                          ADD     #6,SP
    76  010072                  ENDMSG
        010072                                                          L10011:
        010072  104423                                                                  TRAP    C$MSG
    77
    78  010074                  BGNMSG  ERRG12
        010074                                                          ERRG12::
    79  010074                          PRINTB  #FMG3,SUBRPC            ;PC THAT SUBROUTINE WAS CALLED.
        010074  013746  002416                                                          MOV     SUBRPC,-(SP)
        010100  012746  011140                                                          MOV     #FMG3,-(SP)
        010104  012746  000002                                                          MOV     #2,-(SP)
        010110  010600                                                                  MOV     SP,R0
        010112  104414                                                                  TRAP    C$PNTB
        010114  062706  000006                                                          ADD     #6,SP
    80  010120                          PRINTB  #FMG14,REG,R1,R2        ;PRINT TIME OUT ERROR
        010120  010246                                                                  MOV     R2,-(SP)
        010122  010146                                                                  MOV     R1,-(SP)
        010124  013746  002374                                                          MOV     REG,-(SP)
        010130  012746  011674                                                          MOV     #FMG14,-(SP)
        010134  012746  000004                                                          MOV     #4,-(SP)
        010140  010600                                                                  MOV     SP,R0
```

```
        010142  104414                                                                    TRAP    C$PNTB
        010144  062706  000012                                                            ADD     #12,SP
     81 010150                          ENDMSG
        010150                                                                  L10012:
        010150  104423                                                                    TRAP    C$MSG
     82
     83 010152                          BGNMSG  ERRG13
        010152                                                                  ERRG13::
     84 010152  032777  000004  172110          BIT     #RTS,@RXCSR             ;IS RTS SET
     85 010160  001413                          BEQ     5$
     86 010162  012701  030004                  MOV     #RTS!CTS!RR,R1          ;SET UP THE EXPECTED RESULTS
     87 010166                                  PRINTB  #FMG17
        010166  012746  012024                                                            MOV     #FMG17,-(SP)
        010172  012746  000001                                                            MOV     #1,-(SP)
        010176  010600                                                                    MOV     SP,R0
        010200  104414                                                                    TRAP    C$PNTB
        010202  062706  000004                                                            ADD     #4,SP
     88 010206  000544                          BR      20$
     89 010210                          5$:
     90 010210  032777  000002  172052          BIT     #DTR,@RXCSR             ;IS DTR SET?
     91 010216  001413                          BEQ     10$                     ;BR IF NOT
     92 010220  012701  040002                  MOV     #DTR!IC,R1              ;SET UP THE EXPECTED RESULTS
     93 010224                                  PRINTB  #FMG18
        010224  012746  012101                                                            MOV     #FMG18,-(SP)
        010230  012746  000001                                                            MOV     #1,-(SP)
        010234  010600                                                                    MOV     SP,R0
        010236  104414                                                                    TRAP    C$PNTB
        010240  062706  000004                                                            ADD     #4,SP
     94 010244  000525                          BR      20$
     95 010246                          10$:
     96 010246  032777  000010  172014          BIT     #LL,@RXCSR              ;IS LOCAL LOOP SET
     97 010254  001433                          BEQ     15$
     98 010256  012701  001010                  MOV     #LL!DM,R1               ;SET UP THE EXPECTED RESULTS
     99 010262                                  PRINTB  #FMG19
        010262  012746  012150                                                            MOV     #FMG19,-(SP)
        010266  012746  000001                                                            MOV     #1,-(SP)
        010272  010600                                                                    MOV     SP,R0
        010274  104414                                                                    TRAP    C$PNTB
        010276  062706  000004                                                            ADD     #4,SP
    100 010302                                  PRINTB  #FMG21
        010302  012746  012302                                                            MOV     #FMG21,-(SP)
        010306  012746  000001                                                            MOV     #1,-(SP)
        010312  010600                                                                    MOV     SP,R0
        010314  104414                                                                    TRAP    C$PNTB
        010316  062706  000004                                                            ADD     #4,SP
    101 010322                                  PRINTB  #FMG29
        010322  012746  013075                                                            MOV     #FMG29,-(SP)
        010326  012746  000001                                                            MOV     #1,-(SP)
        010332  010600                                                                    MOV     SP,R0
        010334  104414                                                                    TRAP    C$PNTB
        010336  062706  000004                                                            ADD     #4,SP
    102 010342  000466                          BR      20$
    103
    104 010344                          15$:
    105 010344  032777  000001  171716          BIT     #SF,@RXCSR              ;IS SEL FREQ SET?
    106 010352  001520                          BEQ     25$                     ;IF NONE OF THOSE BITS SET - ERROR
    107 010354  012701  000040                  MOV     #SQ,R1                  ;SET UP THE EXPECTED RESULTS
```

```
    108 010360                          PRINTB  #FMG20
        010360  012746  012215                                                  MOV     #FMG20,-(SP)
        010364  012746  000001                                                  MOV     #1,-(SP)
        010370  010600                                                          MOV     SP,R0
        010372  104414                                                          TRAP    C$PNTB
        010374  062706  000004                                                  ADD     #4,SP
    109 010400                          PRINTB  #FMG21
        010400  012746  012302                                                  MOV     #FMG21,-(SP)
        010404  012746  000001                                                  MOV     #1,-(SP)
        010410  010600                                                          MOV     SP,R0
        010412  104414                                                          TRAP    C$PNTB
        010414  062706  000004                                                  ADD     #4,SP
    110 010420                          PRINTB  #FMG4                   ;PRINT HEADER
        010420  012746  011212                                                  MOV     #FMG4,-(SP)
        010424  012746  000001                                                  MOV     #1,-(SP)
        010430  010600                                                          MOV     SP,R0
        010432  104414                                                          TRAP    C$PNTB
        010434  062706  000004                                                  ADD     #4,SP
    111 010440                          PRINTB  #FMG10,CSR4,<B,@CSR4>   ;PRINT THE LOW BYTE OF CSR4
        010440  005046                                                          CLR     -(SP)
        010442  157716  171626                                                  BISB    @CSR4,(SP)
        010446  013746  002274                                                  MOV     CSR4,-(SP)
        010452  012746  011454                                                  MOV     #FMG10,-(SP)
        010456  012746  000003                                                  MOV     #3,-(SP)
        010462  010600                                                          MOV     SP,R0
        010464  104414                                                          TRAP    C$PNTB
        010466  062706  000010                                                  ADD     #10,SP
    112 010472                          PRINTB  #FMG5,<B,R1>            ;PRINT EXPECTED CONTENTS
        010472  005046                                                          CLR     -(SP)
        010474  150116                                                          BISB    R1,(SP)
        010476  012746  011257                                                  MOV     #FMG5,-(SP)
        010502  012746  000002                                                  MOV     #2,-(SP)
        010506  010600                                                          MOV     SP,R0
        010510  104414                                                          TRAP    C$PNTB
        010512  062706  000006                                                  ADD     #6,SP
    113 010516  000447                  BR      30$
    114
    115 010520                  20$:
    116 010520                          PRINTB  #FMG4                   ;PRINT HEADER
        010520  012746  011212                                                  MOV     #FMG4,-(SP)
        010524  012746  000001                                                  MOV     #1,-(SP)
        010530  010600                                                          MOV     SP,R0
        010532  104414                                                          TRAP    C$PNTB
        010534  062706  000004                                                  ADD     #4,SP
    117 010540                          PRINTB  #FMG15,CSR0,@CSR0       ;PRINT THE LOW BYTE OF CSR0
        010540  017746  171524                                                  MOV     @CSR0,-(SP)
        010544  013746  002270                                                  MOV     CSR0,-(SP)
        010550  012746  011751                                                  MOV     #FMG15,-(SP)
        010554  012746  000003                                                  MOV     #3,-(SP)
        010560  010600                                                          MOV     SP,R0
        010562  104414                                                          TRAP    C$PNTB
        010564  062706  000010                                                  ADD     #10,SP
    118 010570                          PRINTB  #FMG16,R1               ;PRINT EXPECTED CONTENTS
        010570  010146                                                          MOV     R1,-(SP)
        010572  012746  012013                                                  MOV     #FMG16,-(SP)
        010576  012746  000002                                                  MOV     #2,-(SP)
        010602  010600                                                          MOV     SP,R0
```

```
        010604  104414                                                                    TRAP    C$PNTB
        010606  062706  000006                                                            ADD     #6,SP
    119 010612  000411                      BR      30$
    120 010614                      25$:
    121 010614                              PRINTB  #FMG22,R2               ;PRINT BIT THAT ISN'T WRITTEN.
        010614  010246                                                                    MOV     R2,-(SP)
        010616  012746  012351                                                            MOV     #FMG22,-(SP)
        010622  012746  000002                                                            MOV     #2,-(SP)
        010626  010600                                                                    MOV     SP,R0
        010630  104414                                                                    TRAP    C$PNTB
        010632  062706  000006                                                            ADD     #6,SP
    122 010636                      30$:
    123 010636                      ENDMSG
        010636                                                                  L10013:
        010636  104423                                                                    TRAP    C$MSG
    124
    125 010640                      BGNMSG  ERRG14
        010640                                                                  ERRG14::
    126 010640  005737  002416              TST     SUBRPC          ;IS THE ERROR IN A SUBROUTINE?
    127 010644  001412                      BEQ     10$             ;IF NOT, DON'T PRINT SUBR. PC
    128 010646                              PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
        010646  013746  002416                                                            MOV     SUBRPC,-(SP)
        010652  012746  011140                                                            MOV     #FMG3,-(SP)
        010656  012746  000002                                                            MOV     #2,-(SP)
        010662  010600                                                                    MOV     SP,R0
        010664  104414                                                                    TRAP    C$PNTB
        010666  062706  000006                                                            ADD     #6,SP
    129 010672                      10$:
    130 010672                              PRINTB  #FMG24,XMITD,RCOUNT     ;PRINT CHARACTERS XMITTED AND RCVD.
        010672  013746  002500                                                            MOV     RCOUNT,-(SP)
        010676  013746  002476                                                            MOV     XMITD,-(SP)
        010702  012746  012465                                                            MOV     #FMG24,-(SP)
        010706  012746  000003                                                            MOV     #3,-(SP)
        010712  010600                                                                    MOV     SP,R0
        010714  104414                                                                    TRAP    C$PNTB
        010716  062706  000010                                                            ADD     #10,SP
    131 010722                      ENDMSG
        010722                                                                  L10014:
        010722  104423                                                                    TRAP    C$MSG
    132
    133 010724                      BGNMSG  ERRG15
        010724                                                                  ERRG15::
    134 010724                              PRINTB  #FMG25,R2               ;PRINT BIT THAT ISN'T CLEARED.
        010724  010246                                                                    MOV     R2,-(SP)
        010726  012746  012532                                                            MOV     #FMG25,-(SP)
        010732  012746  000002                                                            MOV     #2,-(SP)
        010736  010600                                                                    MOV     SP,R0
        010740  104414                                                                    TRAP    C$PNTB
        010742  062706  000006                                                            ADD     #6,SP
    135 010746                      ENDMSG
        010746                                                                  L10015:
        010746  104423                                                                    TRAP    C$MSG
    136
    137 010750      045     101     125     FMG0:   .ASCIZ  /%AUNABLE TO RUN TEST %D2%A ON UNIT %D2%A WITHOUT TURNAROUND%N/
        010753      116     101     102
        010756      114     105     040
        010761      124     117     040
```

```
        010764    122    125    116
        010767    040    124    105
        010772    123    124    040
        010775    045    104    062
        011000    045    101    040
        011003    117    116    040
        011006    125    116    111
        011011    124    040    045
        011014    104    062    045
        011017    101    040    127
        011022    111    124    110
        011025    117    125    124
        011030    040    124    125
        011033    122    116    101
        011036    122    117    125
        011041    116    104    045
        011044    116    000
    138 011046    045    101    122  FMG1:   .ASCIZ  /%ARXCSR: %O6%N%ARDSR : %O6%N/
        011051    130    103    123
        011054    122    072    040
        011057    045    117    066
        011062    045    116    045
        011065    101    122    104
        011070    123    122    040
        011073    072    040    045
        011076    117    066    045
        011101    116    000
    139 011103    045    101    124  FMG2:   .ASCIZ  /%ATXCSR: %O6%N%ATDSR : %O6%N/
        011106    130    103    123
        011111    122    072    040
        011114    045    117    066
        011117    045    116    045
        011122    101    124    104
        011125    123    122    040
        011130    072    040    045
        011133    117    066    045
        011136    116    000
    140 011140    045    101    105  FMG3:   .ASCIZ  /%AERROR IN SUBROUTINE CALLED AT PC: %O6%N/
        011143    122    122    117
        011146    122    040    111
        011151    116    040    123
        011154    125    102    122
        011157    117    125    124
        011162    111    116    105
        011165    040    103    101
        011170    114    114    105
        011173    104    040    101
        011176    124    040    120
        011201    103    072    040
        011204    045    117    066
        011207    045    116    000
    141 011212    045    123    071  FMG4:   .ASCIZ  /%S9%S9%S9%S3%AFOUND:%S2%AEXPECTED:%N/
        011215    045    123    071
        011220    045    123    071
        011223    045    123    063
        011226    045    101    106
        011231    117    125    116
```

```
        011234    104    072    045
        011237    123    062    045
        011242    101    105    130
        011245    120    105    103
        011250    124    105    104
        011253    072    045    116
        011256    000
    142 011257    045    123    067  FMG5:   .ASCIZ  /%S7%O3%N/
        011262    045    117    063
        011265    045    116    000
    143 011270    045    116    000  FMG6:   .ASCIZ  /%N/
    144 011273    045    101    122  FMG7:   .ASCIZ  /%ARXCSR    = %O6%A (EXTERNAL):  %O3/
        011276    130    103    123
        011301    122    040    040
        011304    040    040    075
        011307    040    045    117
        011312    066    045    101
        011315    040    050    105
        011320    130    124    105
        011323    122    116    101
        011326    114    051    072
        011331    040    040    045
        011334    117    063    000
    145 011337    045    101    130  FMG8:   .ASCIZ  /%AXMIT DATA: %O3%A RCV DATA: %O3%N/
        011342    115    111    124
        011345    040    104    101
        011350    124    101    072
        011353    040    045    117
        011356    063    045    101
        011361    040    122    103
        011364    126    040    104
        011367    101    124    101
        011372    072    040    045
        011375    117    063    045
        011400    116    000
    146 011402    045    116    045  FMG9:   .ASCIZ  /%N%A** CHECK -V FROM THE CHARGE PUMP **%N/
        011405    101    052    052
        011410    040    103    110
        011413    105    103    113
        011416    040    055    126
        011421    040    106    122
        011424    117    115    040
        011427    124    110    105
        011432    040    103    110
        011435    101    122    107
        011440    105    040    120
        011443    125    115    120
        011446    040    052    052
        011451    045    116    000
    147 011454    045    101    124  FMG10:  .ASCIZ  /%ATXCSR    = %O6%A (EXTERNAL):  %O3/
        011457    130    103    123
        011462    122    040    040
        011465    040    040    075
        011470    040    045    117
        011473    066    045    101
        011476    040    050    105
        011501    130    124    105
```

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        011504    122    116    101
        011507    114    051    072
        011512    040    040    045
        011515    117    063    000
    148 011520    045    101    120  FMG11:  .ASCIZ  /%APCR      = %06%A (USYNRT R7): %03/
        011523    103    122    040
        011526    040    040    040
        011531    040    040    075
        011534    040    045    117
        011537    066    045    101
        011542    040    050    125
        011545    123    131    116
        011550    122    124    040
        011553    122    067    051
        011556    072    040    045
        011561    117    063    000
    149 011564    045    101    124  FMG12:  .ASCIZ  /%AT. DATA  = %06%A (USYNRT R2): %03/
        011567    056    040    104
        011572    101    124    101
        011575    040    040    075
        011600    040    045    117
        011603    066    045    101
        011606    040    050    125
        011611    123    131    116
        011614    122    124    040
        011617    122    062    051
        011622    072    040    045
        011625    117    063    000
    150 011630    045    101    124  FMG13:  .ASCIZ  /%AT. STATUS= %06%A (USYNRT R3): %03/
        011633    056    040    123
        011636    124    101    124
        011641    125    123    075
        011644    040    045    117
        011647    066    045    101
        011652    040    050    125
        011655    123    131    116
        011660    122    124    040
        011663    122    063    051
        011666    072    040    045
        011671    117    063    000
    151 011674    045    101    103  FMG14:  .ASCIZ  /%ACONTENTS OF %06%A = %06%A   EXPECTED %06%N/
        011677    117    116    124
        011702    105    116    124
        011705    123    040    117
        011710    106    040    045
        011713    117    066    045
        011716    101    040    075
        011721    040    045    117
        011724    066    045    101
        011727    040    040    040
        011732    105    130    120
        011735    105    103    124
        011740    105    104    040
        011743    045    117    066
        011746    045    116    000
    152 011751    045    101    122  FMG15:  .ASCIZ  /%ARXCSR   = %06%A (EXTERNAL): %06/
        011754    130    103    123
```

```
        011757    122    040    040
        011762    040    075    040
        011765    045    117    066
        011770    045    101    040
        011773    050    105    130
        011776    124    105    122
        012001    116    101    114
        012004    051    072    040
        012007    045    117    066
        012012    000
    153 012013    045    123    063  FMG16:  .ASCIZ  /%S3%O6%N/
        012016    045    117    066
        012021    045    116    000
    154 012024    045    101    122  FMG17:  .ASCIZ  /%ARTS NOT TURNED AROUND TO CTS AND RR (CD)%N/
        012027    124    123    040
        012032    116    117    124
        012035    040    124    125
        012040    122    116    105
        012043    104    040    101
        012046    122    117    125
        012051    116    104    040
        012054    124    117    040
        012057    103    124    123
        012062    040    101    116
        012065    104    040    122
        012070    122    040    050
        012073    103    104    051
        012076    045    116    000
    155 012101    045    101    104  FMG18:  .ASCIZ  /%ADTR NOT TURNED AROUND TO IC (RING)%N/
        012104    124    122    040
        012107    116    117    124
        012112    040    124    125
        012115    122    116    105
        012120    104    040    101
        012123    122    117    125
        012126    116    104    040
        012131    124    117    040
        012134    111    103    040
        012137    050    122    111
        012142    116    107    051
        012145    045    116    000
    156 012150    045    101    114  FMG19:  .ASCIZ  /%ALL NOT TURNED AROUND TO DM (DSR)%N/
        012153    114    040    116
        012156    117    124    040
        012161    124    125    122
        012164    116    105    104
        012167    040    101    122
        012172    117    125    116
        012175    104    040    124
        012200    117    040    104
        012203    115    040    050
        012206    104    123    122
        012211    051    045    116
        012214    000
    157 012215    045    101    122  FMG20:  .ASCIZ  /%ARL NOT TURNED AROUND TO TEST MODE (SIG. QUALITY)%N/
        012220    114    040    116
        012223    117    124    040
```

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        012226    124    125    122
        012231    116    105    104
        012234    040    101    122
        012237    117    125    116
        012242    104    040    124
        012245    117    040    124
        012250    105    123    124
        012253    040    115    117
        012256    104    105    040
        012261    050    123    111
        012264    107    056    040
        012267    121    125    101
        012272    114    111    124
        012275    131    051    045
        012300    116    000
    158 012302    045    101    103  FMG21:  .ASCIZ  /%ACHECK THAT THE JUMPER IS INSTALLED%N/
        012305    110    105    103
        012310    113    040    124
        012313    110    101    124
        012316    040    124    110
        012321    105    040    112
        012324    125    115    120
        012327    105    122    040
        012332    111    123    040
        012335    111    116    123
        012340    124    101    114
        012343    114    105    104
        012346    045    116    000
    159 012351    045    101    103  FMG22:  .ASCIZ  /%ACAN'T WRITE BIT %O6%A INTO RXCSR%N/
        012354    101    116    047
        012357    124    040    127
        012362    122    111    124
        012365    105    040    102
        012370    111    124    040
        012373    045    117    066
        012376    045    101    040
        012401    111    116    124
        012404    117    040    122
        012407    130    103    123
        012412    122    045    116
        012415    000
    160 012416    045    101    122  FMG23:  .ASCIZ  /%ARESET SUBROUTINE CALLED AT PC: %O6%N/
        012421    105    123    105
        012424    124    040    123
        012427    125    102    122
        012432    117    125    124
        012435    111    116    105
        012440    040    103    101
        012443    114    114    105
        012446    104    040    101
        012451    124    040    120
        012454    103    072    040
        012457    045    117    066
        012462    045    116    000
    161 012465    045    101    124  FMG24:  .ASCIZ  /%ATRANSMITTED: %D2%A RECEIVED: %D2%N/
        012470    122    101    116
        012473    123    115    111
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        012476    124    124    105
        012501    104    072    040
        012504    045    104    062
        012507    045    101    040
        012512    122    105    103
        012515    105    111    126
        012520    105    104    072
        012523    040    045    104
        012526    062    045    116
        012531    000
    162 012532    045    101    103  FMG25:  .ASCIZ  /%ACAN'T CLEAR BIT %06%A IN RXCSR%N/
        012535    101    116    047
        012540    124    040    103
        012543    114    105    101
        012546    122    040    102
        012551    111    124    040
        012554    045    117    066
        012557    045    101    040
        012562    111    116    040
        012565    122    130    103
        012570    123    122    045
        012573    116    000
    163 012575    045    101    116  FMG26:  .ASCIZ  /%ANOTE: DATA SET INTERRUPT MAY BE DISABLED - CHECK JUMPER%N/
        012600    117    124    105
        012603    072    040    104
        012606    101    124    101
        012611    040    123    105
        012614    124    040    111
        012617    116    124    105
        012622    122    122    125
        012625    120    124    040
        012630    115    101    131
        012633    040    102    105
        012636    040    104    111
        012641    123    101    102
        012644    114    105    104
        012647    040    055    040
        012652    103    110    105
        012655    103    113    040
        012660    112    125    115
        012663    120    105    122
        012666    045    116    000
    164 012671    045    101    124  FMG27:  .ASCIZ  /%ATEST %D2%A - UNABLE TO RUN RS422 ON THIS LSI11%N/
        012674    105    123    124
        012677    040    045    104
        012702    062    045    101
        012705    040    055    040
        012710    125    116    101
        012713    102    114    105
        012716    040    124    117
        012721    040    122    125
        012724    116    040    122
        012727    123    064    062
        012732    062    040    117
        012735    116    040    124
        012740    110    111    123
        012743    040    114    123
```

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        012746    111    061    061
        012751    045    116    000
    165 012754    045    101    111   FMG28:  .ASCII  /%AIF CPU IS A M7264 WITH MEMORY REFRESH ENABLED, A HIGH/
        012757    106    040    103
        012762    120    125    040
        012765    111    123    040
        012770    101    040    115
        012773    067    062    066
        012776    064    040    127
        013001    111    124    110
        013004    040    115    105
        013007    115    117    122
        013012    131    040    122
        013015    105    106    122
        013020    105    123    110
        013023    040    105    116
        013026    101    102    114
        013031    105    104    054
        013034    040    101    040
        013037    110    111    107
        013042    110
    166 013043    045    101    040          .ASCIZ  /%A SPEED TEST CAN'T RUN%N/
        013046    123    120    105
        013051    105    104    040
        013054    124    105    123
        013057    124    040    103
        013062    101    116    047
        013065    124    040    122
        013070    125    116    045
        013073    116    000
    167 013075    045    101    052   FMG29:  .ASCIZ  /%A** IF M8020 JUMPERED FOR RS422, THIS ERROR EXPECTED **%N/
        013100    052    040    111
        013103    106    040    115
        013106    070    060    062
        013111    060    040    112
        013114    125    115    120
        013117    105    122    105
        013122    104    040    106
        013125    117    122    040
        013130    122    123    064
        013133    062    062    054
        013136    040    124    110
        013141    111    123    040
        013144    105    122    122
        013147    117    122    040
        013152    105    130    120
        013155    105    103    124
        013160    105    104    040
        013163    052    052    045
        013166    116    000
    168 013170    045    101    052   FMG30:  .ASCIZ  /%A** CHECK BYTE OP SIGNAL - STUCK LOW ?? **%N/
        013173    052    040    103
        013176    110    105    103
        013201    113    040    102
        013204    131    124    105
        013207    040    117    120
        013212    040    123    111
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        013215    107    116    101
        013220    114    040    055
        013223    040    123    124
        013226    125    103    113
        013231    040    114    117
        013234    127    040    077
        013237    077    040    052
        013242    052    045    116
        013245    000
    169
    170 013246    122    105    123  EMG0:   .ASCIZ  /RESET ERROR AFTER BUS RESET (DETECTED ONLY ON 1ST PASS)/
        013251    105    124    040
        013254    105    122    122
        013257    117    122    040
        013262    101    106    124
        013265    105    122    040
        013270    102    125    123
        013273    040    122    105
        013276    123    105    124
        013301    040    050    104
        013304    105    124    105
        013307    103    124    105
        013312    104    040    117
        013315    116    114    131
        013320    040    117    116
        013323    040    061    123
        013326    124    040    120
        013331    101    123    123
        013334    051    000
    171 013336    124    111    115  EMG1:   .ASCIZ  /TIME OUT/
        013341    105    040    117
        013344    125    124    000
    172 013347    124    111    115  EMG2:   .ASCIZ  /TIME OUT - DURING INTERRUPT EXERCISE/
        013352    105    040    117
        013355    125    124    040
        013360    055    040    104
        013363    125    122    111
        013366    116    107    040
        013371    111    116    124
        013374    105    122    122
        013377    125    120    124
        013402    040    105    130
        013405    105    122    103
        013410    111    123    105
        013413    000
    173 013414    122    105    123  EMG3:   .ASCIZ  /RESET ERROR/
        013417    105    124    040
        013422    105    122    122
        013425    117    122    000
    174 013430    103    123    122  EMG4:   .ASCIZ  /CSR READ-WRITE ERROR/
        013433    040    122    105
        013436    101    104    055
        013441    127    122    111
        013444    124    105    040
        013447    105    122    122
        013452    117    122    000
    175 013455    125    123    131  EMG5:   .ASCIZ  /USYNRT XMIT ACTIVE NOT SET/
```

```
        013460    116    122    124
        013463    040    130    115
        013466    111    124    040
        013471    101    103    124
        013474    111    126    105
        013477    040    116    117
        013502    124    040    123
        013505    105    124    000
    176 013510    125    123    131   EMG6:   .ASCIZ  /USYNRT XMIT ACTIVE NOT CLEAR/
        013513    116    122    124
        013516    040    130    115
        013521    111    124    040
        013524    101    103    124
        013527    111    126    105
        013532    040    116    117
        013535    124    040    103
        013540    114    105    101
        013543    122    000
    177 013545    124    102    105   EMG7:   .ASCIZ  /TBE NOT CLEAR/
        013550    040    116    117
        013553    124    040    103
        013556    114    105    101
        013561    122    000
    178 013563    124    102    105   EMG8:   .ASCIZ  /TBE NOT SET/
        013566    040    116    117
        013571    124    040    123
        013574    105    124    000
    179 013577    130    115    111   EMG9:   .ASCIZ  /XMIT INTERRUPT NOT RECEIVED/
        013602    124    040    111
        013605    116    124    105
        013610    122    122    125
        013613    120    124    040
        013616    116    117    124
        013621    040    122    105
        013624    103    105    111
        013627    126    105    104
        013632    000
    180 013633    130    115    111   EMG10:  .ASCIZ  /XMIT INTERRUPT RECEIVED WHEN NOT EXPECTED/
        013636    124    040    111
        013641    116    124    105
        013644    122    122    125
        013647    120    124    040
        013652    122    105    103
        013655    105    111    126
        013660    105    104    040
        013663    127    110    105
        013666    116    040    116
        013671    117    124    040
        013674    105    130    120
        013677    105    103    124
        013702    105    104    000
    181 013705    122    105    103   EMG11:  .ASCIZ  /RECEIVER NOT DEACTIVATED/
        013710    105    111    126
        013713    105    122    040
        013716    116    117    124
        013721    040    104    105
        013724    101    103    124
```

```
        013727    111    126    101
        013732    124    105    104
        013735    000
    182 013736    122    105    103  EMG12:  .ASCIZ  /RECEIVER NOT ACTIVE/
        013741    105    111    126
        013744    105    122    040
        013747    116    117    124
        013752    040    101    103
        013755    124    111    126
        013760    105    000
    183 013762    122    105    103  EMG13:  .ASCIZ  /RECEIVER NOT INITIALIZED AFTER RECEIVER DISABLED/
        013765    105    111    126
        013770    105    122    040
        013773    116    117    124
        013776    040    111    116
        014001    111    124    111
        014004    101    114    111
        014007    132    105    104
        014012    040    101    106
        014015    124    105    122
        014020    040    122    105
        014023    103    105    111
        014026    126    105    122
        014031    040    104    111
        014034    123    101    102
        014037    114    105    104
        014042    000
    184 014043    122    105    103  EMG14:  .ASCIZ  /RECEIVER ACTIVE BEFORE FIRST DATA CHARACTER/
        014046    105    111    126
        014051    105    122    040
        014054    101    103    124
        014057    111    126    105
        014062    040    102    105
        014065    106    117    122
        014070    105    040    106
        014073    111    122    123
        014076    124    040    104
        014101    101    124    101
        014104    040    103    110
        014107    101    122    101
        014112    103    124    105
        014115    122    000
    185 014117    122    103    126  EMG15:  .ASCIZ  /RCV INTERRUPT NOT RECEIVED/
        014122    040    111    116
        014125    124    105    122
        014130    122    125    120
        014133    124    040    116
        014136    117    124    040
        014141    122    105    103
        014144    105    111    126
        014147    105    104    000
    186 014152    122    103    126  EMG16:  .ASCIZ  /RCV INTERRUPT RECEIVED BEFORE EXPECTED/
        014155    040    111    116
        014160    124    105    122
        014163    122    125    120
        014166    124    040    122
        014171    105    103    105
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        014174    111    126    105
        014177    104    040    102
        014202    105    106    117
        014205    122    105    040
        014210    105    130    120
        014213    105    103    124
        014216    105    104    000
    187 014221    122    103    126  EMG17:  .ASCIZ  /RCV END OF MESSAGE NOT RECEIVED/
        014224    040    105    116
        014227    104    040    117
        014232    106    040    115
        014235    105    123    123
        014240    101    107    105
        014243    040    116    117
        014246    124    040    122
        014251    105    103    105
        014254    111    126    105
        014257    104    000
    188 014261    122    103    126  EMG18:  .ASCIZ  /RCV STATUS NOT CLEARED/
        014264    040    123    124
        014267    101    124    125
        014272    123    04     116
        014275    117    124    040
        014300    103    114    105
        014303    101    122    105
        014306    104    000
    189 014310    122    103    126  EMG19:  .ASCIZ  /RCV OVERRUN NOT RECEIVED/
        014313    040    117    126
        014316    105    122    122
        014321    125    116    040
        014324    116    117    124
        014327    040    122    105
        014332    103    105    111
        014335    126    105    104
        014340    000
    190 014341    122    103    126  EMG20:  .ASCIZ  /RCV ABORT NOT RECEIVED/
        014344    040    101    102
        014347    117    122    124
        014352    040    116    117
        014355    124    040    122
        014360    105    103    105
        014363    111    126    105
        014366    104    000
    191 014370    122    103    126  EMG21:  .ASCIZ  /RCV STATUS INTERRUPT NOT RECEIVED/
        014373    040    123    124
        014376    101    124    125
        014401    123    040    111
        014404    116    124    105
        014407    122    122    125
        014412    120    124    040
        014415    116    117    124
        014420    040    122    105
        014423    103    105    111
        014426    126    105    104
        014431    000
    192 014432    115    117    104  EMG22:  .ASCIZ  /MODEM LOOPBACK ERROR/
        014435    105    115    040
```

```
        014440    114    117    117
        014443    120    102    101
        014446    103    113    040
        014451    105    122    122
        014454    117    122    000
    193 014457    115    117    104   EMG23:  .ASCIZ  /MODEM STATUS INTERRUPT RECEIVED WHEN DISABLED/
        014462    105    115    040
        014465    123    124    101
        014470    124    125    123
        014473    040    111    116
        014476    124    105    122
        014501    122    125    120
        014504    124    040    122
        014507    105    103    105
        014512    111    126    105
        014515    104    040    127
        014520    110    105    116
        014523    040    104    111
        014526    123    101    102
        014531    114    105    104
        014534    000
    194 014535    115    117    104   EMG24:  .ASCIZ  /MODEM STATUS INTERRUPT NOT RECEIVED/
        014540    105    115    040
        014543    123    124    101
        014546    124    125    123
        014551    040    111    116
        014554    124    105    122
        014557    122    125    120
        014562    124    040    116
        014565    117    124    040
        014570    122    105    103
        014573    105    111    126
        014576    105    104    000
    195 014601    103    110    101   EMG25:  .ASCIZ  /CHARACTER COUNT ERROR/
        014604    122    101    103
        014607    124    105    122
        014612    040    103    117
        014615    125    116    124
        014620    040    105    122
        014623    122    117    122
        014626    000
    196 014627    104    101    124   EMG26:  .ASCIZ  /DATA ERROR/
        014632    101    040    105
        014635    122    122    117
        014640    122    000
    197 014642    130    115    111   EMG30:  .ASCIZ  /XMIT UNDERRUN/
        014645    124    040    125
        014650    116    104    105
        014653    122    122    125
        014656    116    000
    198 014660    122    105    103   EMG31:  .ASCIZ  /RECEIVER ERROR/
        014663    105    111    126
        014666    105    122    040
        014671    105    122    122
        014674    117    122    000
    199 014677    101    102    117   EMG32:  .ASCIZ  /ABORT NOT RECEIVED/
        014702    122    124    040
```

```
        014705    116    117    124
        014710    040    122    105
        014713    103    105    111
        014716    126    105    104
        014721    000
    200 014722    107    117    040  EMG33:  .ASCIZ  /GO AHEAD NOT RECEIVED/
        014725    101    110    105
        014730    101    104    040
        014733    116    117    124
        014736    040    122    105
        014741    103    105    111
        014744    126    105    104
        014747    000
    201 014750    101    102    117  EMG34:  .ASCIZ  /ABORT RECEIVED WHEN NOT EXPECTED/
        014753    122    124    040
        014756    122    105    103
        014761    105    111    126
        014764    105    104    040
        014767    127    110    105
        014772    116    040    116
        014775    117    124    040
        015000    105    130    120
        015003    105    103    124
        015006    105    104    000
    202 015011    101    104    104  EMG35:  .ASCIZ  /ADDRESS INCORRECTLY RECOGNIZED/
        015014    122    105    123
        015017    123    040    111
        015022    116    103    117
        015025    122    122    105
        015030    103    124    114
        015033    131    040    122
        015036    105    103    117
        015041    107    116    111
        015044    132    105    104
        015047    000
    203 015050    101    123    123  EMG36:  .ASCIZ  /ASSEMBLED BIT COUNT ERROR/
        015053    105    115    102
        015056    114    105    104
        015061    040    102    111
        015064    124    040    103
        015067    117    125    116
        015072    124    040    105
        015075    122    122    117
        015100    122    000
    204 015102    103    122    103  EMG37:  .ASCIZ  /CRC ERROR/
        015105    040    105    122
        015110    122    117    122
        015113    000
    205 015114    103    122    103  EMG38:  .ASCIZ  /CRC ERROR NOT DETECTED/
        015117    040    105    122
        015122    122    117    122
        015125    040    116    117
        015130    124    040    104
        015133    105    124    105
        015136    103    124    105
        015141    104    000
    206 015143    120    101    122  EMG39:  .ASCIZ  /PARITY ERROR NOT DETECTED/
```

```
        015146    111    124    131
        015151    040    105    122
        015154    122    117    122
        015157    040    116    117
        015162    124    040    104
        015165    105    124    105
        015170    103    124    105
        015173    104    000
    207 015175    115    125    114  EMG40:  .ASCIZ  /MULTIPLE MODEM CONTROL INTERRUPTS/
        015200    124    111    120
        015203    114    105    040
        015206    115    117    104
        015211    105    115    040
        015214    103    117    116
        015217    124    122    117
        015222    114    040    111
        015225    116    124    105
        015230    122    122    125
        015233    120    124    123
        015236    000
    208                                     .EVEN
    209
```

```
                                .SBTTL  LOAD DEVICE PROTECTION TABLE

                                ;////////////////////////////////////////////////////////////////////////////////
                                ;/ THIS TABLE IDENTIFIES THE LOAD DEVICE TO THE SUPERVISOR, SO THAT IT CAN BE
                                ;/ PROTECTED FROM TESTING. IF DESIRED.
                                ;////////////////////////////////////////////////////////////////////////////////

 015240                                 BGNPROT
 015240                                                                                 L$PROT::

 015240  177777                         .WORD   -1              ;DON'T CHECK CSR ADDRESS
 015242  177777                         .WORD   -1              ;DON'T CHECK MASSBUS UNIT NUMBER
 015244  177777                         .WORD   -1              ;DON'T CHECK DRIVE NUMBER

 015246                                 ENDPROT
```

```
                                .SBTTL  INITIALIZE SECTION

                                ;////////////////////////////////////////////////////////////////////////
                                ;/ THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                ;/ AT THE BEGINNING OF THE TEST SEQUENCE ON THE NEXT UNIT.
                                ;////////////////////////////////////////////////////////////////////////

015246                          BGNINIT
015246                                                                                  L$INIT::

015246                                  SETPRI  #PRI07          ;SET DIAGNOSTIC PRIORITY = 7
015246  012700  000340                                                                  MOV     #PRI07,R0
015252  104441                                                                          TRAP    C$SPRI
015254  010637  002372                  MOV     SP,PSTACK       ;STORE BASE LEVEL PROGRAM STACK POINTER
015260  005037  002416                  CLR     SUBRPC          ;CLEAR STORAGE WORD FOR SUBROUTINE PC CALL
015264  005037  002332                  CLR     ERROR           ;CLEAR ERROR FLAGS
015270  005037  002336                  CLR     FLAG            ;CLEAR MISC. FLAGS
015274  005037  002376                  CLR     RFLAG
015300  005037  002424                  CLR     TFLAG
015304  005037  002366                  CLR     NXMFLG          ;NXM FLAG
015310  005037  002322                  CLR     ABORT
015314  005037  002432                  CLR     TOGGLE
015320  005037  002370                  CLR     OVER

015324  005737  002314                  TST     FRSTIM          ;IS THIS THE TIME THROUGH AFTER LOAD?
015330  001005                          BNE     1$              ;IF NOT - ERROR TRAP VECTOR ALREADY SAVED
015332  012737  000001  002314          MOV     #1,FRSTIM       ;FLAG THAT WE'VE BEEN THRU THE 1ST TIME
015340  005037  002316                  CLR     FRSPAS          ;CLEAR COUNTER FOR # OF PASSES AFTER LOAD

015344                          1$:
015344                                  CLRVEC  #4              ;ENSURE VECTOR 4 IS IN NORMAL STATE.
015344  012700  000004                                                                  MOV     #4,R0
015350  104436                                                                          TRAP    C$CVEC

015352                                  READEF  #EF.START       ;IS THIS JUST STARTED?
015352  012700  000040                                                                  MOV     #EF.START,R0
015356  104447                                                                          TRAP    C$REFG
015360                                  BCOMPLETE STARST        ;IF YES - BRANCH.
015360  103416                                                                          BCS     STARST
015362                                  READEF  #EF.RESTART     ;IS THIS A RESTART ?
015362  012700  000037                                                                  MOV     #EF.RESTART,R0
015366  104447                                                                          TRAP    C$REFG
015370                                  BCOMPLETE STARST        ;IF YES - BRANCH.
015370  103412                                                                          BCS     STARST
015372                                  READEF  #EF.NEW         ;IS THIS A NEW PASS?
015372  012700  000035                                                                  MOV     #EF.NEW,R0
015376  104447                                                                          TRAP    C$REFG
015400                                  BCOMPLETE NEWST         ;IF YES - BRANCH
015400  103410                                                                          BCS     NEWST
015402                                  READEF  #EF.CONTINUE    ;IS THIS A CONTINUATION?
015402  012700  000036                                                                  MOV     #EF.CONTINUE,R0
015406  104447                                                                          TRAP    C$REFG
015410                                  BNCOMPLETE GETPRM       ;IF NOT - GET PARAMETERS
015410  103013                                                                          BCC     GETPRM
015412  000137  016122                  JMP     END             ;OTHERWISE - DON'T INITIALIZE.

015416                          STARST:
```

```
INITIALIZE SECTION
015416  005037  002320                  CLR     STARES          ;CLEAR THE FLAG TO SHOW START/RESTART.

015422                          NEWST:
015422  012737  177777  002354          MOV     #-1,LOGDEV      ;INITIALIZE LOGICAL UNIT NUMBER.
015430  005237  002316                  INC     FRSPAS          ;INCREMENT # OF PASSES AFTER LOAD.
015434  005237  002320                  INC     STARES          ;INCREMENT # OF PASSES SINCE START/RESTART.
015440                          GETPRM:
015440  005237  002354                  INC     LOGDEV          ;NEXT LOGICAL UNIT TO BE TESTED
015444  023737  002354  002012          CMP     LOGDEV,L$UNIT   ;IS THE MAXIMUM UNIT # EXCEEDED?
015452  002363                          BGE     NEWST           ;IF YES - DO A NEW START
015454                                  GPHARD  LOGDEV,R1       ;GET THE P-TABLE POINTER INTO R1
015454  013700  002354                                                          MOV     LOGDEV,R0
015460  104442                                                                  TRAP    C$GPHRD
015462  010001                                                                  MOV     R0,R1
015464                                  BNCOMPLETE  GETPRM      ;IF NOT AVAILABLE, GET THE NEXT ONE
015464  103365                                                                  BCC     GETPRM
015466  011100                          MOV     (R1),R0         ;SAVE THE ADDRESS
015470  032700  000007                  BIT     #7,R0           ;DOES THIS DEVICE ADDRESS END IN NON-ZERO?
015474  001414                          BEQ     10$             ;IF NOT - OK (76XXX0)
015476  042711  000007                  BIC     #7,(R1)         ;MAKE IT 76XXX0
015502                                  PRINTB  #FINIT1,(R1),R0 ;INFORM THE USER
015502  010046                                                                  MOV     R0,-(SP)
015504  011146                                                                  MOV     (R1),-(SP)
015506  012746  016124                                                          MOV     #FINIT1,-(SP)
015512  012746  000003                                                          MOV     #3,-(SP)
015516  010600                                                                  MOV     SP,R0
015520  104414                                                                  TRAP    C$PNTB
015522  062706  000010                                                          ADD     #10,SP
015526                          10$:
015526  011137  002270                  MOV     (R1),CSR0       ;CSR ADDRESS 0 = RECEIVER CSR (RXCSR)
                                                                ;                READ/WRITE
015532  013737  002270  002300          MOV     CSR0,CSR1       ;SAVE HIGH BYTE ADDRESS
015540  005237  002300                  INC     CSR1
015544  011137  002272                  MOV     (R1),CSR2
015550  062737  000002  002272          ADD     #2,CSR2         ;CSR ADDRESS 2 = RECEIVE DATA/STATUS (RDSR)
                                                                ;                READ ONLY
                                                                ;CSR ADDRESS 2 = PARAMETER CONTROL/SYNCH ADDR
                                                                ;                (PCSAR) - WRITE ONLY
015556  013737  002272  002302          MOV     CSR2,CSR3       ;SAVE HIGH BYTE ADDRESS
015564  005237  002302                  INC     CSR3
015570  011137  002274                  MOV     (R1),CSR4
015574  062737  000004  002274          ADD     #4,CSR4         ;CSR ADDRESS 4 = TRANSMITTER CSR (TXCSR)
                                                                ;                READ/WRITE

015602  013737  002274  002304          MOV     CSR4,CSR5       ;CSR ADDRESS 5 = PARAMETER CONTROL REG (PCR)
                                                                ;                READ/WRITE
015610  005237  002304                  INC     CSR5            ;                PCR IS HI BYTE OF TXCSR
015614  012137  002276                  MOV     (R1)+,CSR6
015620  062737  000006  002276          ADD     #6,CSR6         ;CSR ADDRESS 6 = TRANSMIT DATA/STATUS (TDSR)
                                                                ;                READ/WRITE
015626  013737  002276  002306          MOV     CSR6,CSR7       ;SAVE HIGH BYTE ADDRESS
015634  005237  002306                  INC     CSR7
015640  011100                          MOV     (R1),R0         ;GET VECTOR
015642  032700  000007                  BIT     #7,R0           ;DOES THIS VECTOR END IN NON-ZERO?
015646  001414                          BEQ     11$             ;IF NOT - OK (XX0)
015650  042711  000007                  BIC     #7,(R1)         ;MAKE IT XX0
015654                                  PRINTB  #FINIT2,(R1),R0 ;INFORM THE USER
```

```
INITIALIZE SECTION
        015654  010046                                                                    MOV     R0,-(SP)
        015656  011146                                                                    MOV     (R1),-(SP)
        015660  012746  016217                                                            MOV     #FINIT2,-(SP)
        015664  012746  000003                                                            MOV     #3,-(SP)
        015670  010600                                                                    MOV     SP,R0
        015672  104414                                                                    TRAP    C$PNTB
        015674  062706  000010                                                            ADD     #10,SP
     87 015700                          11$:
     88 015700  011137  002264                  MOV     (R1),RCVEC      ;RCV. VECTOR
     89 015704  012137  002266                  MOV     (R1)+,XMTVEC    ;TRANSMIT VECTOR
     90 015710  062737  000004  002266          ADD     #4,XMTVEC       ;ADJUST XMIT VECTOR
     91
     92 015716  012137  002310                  MOV     (R1)+,TURN      ;TURNAROUND.
     93 015722  011137  002312                  MOV     (R1),CPU        ;CPU TYPE.
     94 015726  012737  000020  002402          MOV     #RXENA,RXINI    ;RECEIVER INIT WORD
     95 015734  012737  000020  002436          MOV     #TXENA,TXINI    ;TRANSMITTER INIT WORD
     96 015742  005737  002310                  TST     TURN            ;WHAT WAS THE TURNAROUND
     97 015746  001004                          BNE     15$             ;IF ACTUAL TURNAROUND DON'T SET MAINT MODE
     98 015750  052737  000010  002436          BIS     #MM,TXINI       ;SET THE MAINT. MODE BIT.
     99 015756  000422                          BR      20$
    100 015760                          15$:
    101 015760  052737  000004  002402          BIS     #RTS,RXINI      ;SET RTS FOR TURNAROUND LOOP.
    102 015766  022737  000003  002310          CMP     #3,TURN         ;LOCAL LOOPBACK?
    103 015774  001004                          BNE     17$             ;IF NOT SKIP.
    104 015776  052737  000012  002402          BIS     #LL!DTR,RXINI   ;SET LOCAL LOOP AND DTR.
    105 016004  000407                          BR      20$
    106 016006                          17$:
    107 016006  022737  000004  002310          CMP     #4,TURN         ;REMOTE LOOPBACK?
    108 016014  001003                          BNE     20$
    109 016016  052737  000003  002402          BIS     #DTR!RL,RXINI   ;SET REMOTE LOOP AND DTR
    110 016024                          20$:
    111 016024  013737  002402  002404          MOV     RXINI,RXINIT    ;SAVE RECEIVER INIT WORD
    112 016032  052737  000140  002404          BIS     #RXITEN!DSITEN,RXINIT ;MAKE IT AN INTERRUPT INIT WORD
    113 016040  013737  002436  002440          MOV     TXINI,TXINIT    ;SAVE TRANSMITTER INIT WORD
    114 016046  052737  000100  002440          BIS     #TXIE,TXINIT    ;MAKE IT AN INTERRUPT INIT WORD
    115 016054  012737  000120  002406          MOV     #RXITEN!RXENA,RXMINI    ;RCV INIT FOR MAINT. LOOP.
    116 016062  012737  000130  002442          MOV     #TXIE!TXENA!MM,TXMINI   ;TRANS INIT WITH MAINT. LOOP.
    117 016070  005737  002312                  TST     CPU             ;IS THE CPU A LSI11/23 ?
    118 016074  001004                          BNE     25$             ;BR IF YES
    119 016076  012737  000020  002430          MOV     #20,TIMER       ;SET THE TIMER FOR A LSI11 OR 11/2.
    120 016104  000403                          BR      30$
    121 016106                          25$:
    122 016106  012737  000050  002430          MOV     #50,TIMER       ;SET THE TIMER FOR A LSI-11/23.
    123 016114                          30$:
    124 016114  013737  002430  002412          MOV     TIMER,SAVTIM    ;STORE THE TIMER VALUE.
    125 016122                          END:
    126 016122                          ENDINIT
        016122                                                                      L10017:
        016122  104411                                                                      TRAP    C$INIT
    127 016124     045     101     052  FINIT1: .ASCIZ  /%A** WARNING - WILL ASSUME DPV ADDRESS %06%A (NOT %06%A)%N/
        016127     052     040     127
        016132     101     122     116
        016135     111     116     107
        016140     040     055     040
        016143     127     111     114
        016146     114     040     101
        016151     123     123     125
```

```
        016154    115    105    040
        016157    104    120    126
        016162    040    101    104
        016165    104    122    105
        016170    123    123    040
        016173    045    117    066
        016176    045    101    040
        016201    050    116    117
        016204    124    040    045
        016207    117    066    045
        016212    101    051    045
        016215    116    000
    128 016217    045    101    052  FINIT2: .ASCIZ  /%A** WARNING - WILL ASSUME DPV VECTOR  %O3%A (NOT %O3%A)%N/
        016222    052    040    127
        016225    101    122    116
        016230    111    116    107
        016233    040    055    040
        016236    127    111    114
        016241    114    040    101
        016244    123    123    125
        016247    115    105    040
        016252    104    120    126
        016255    040    126    105
        016260    103    124    117
        016263    122    040    040
        016266    045    117    063
        016271    045    101    040
        016274    050    116    117
        016277    124    040    045
        016302    117    063    045
        016305    101    051    045
        016310    116    000
    129                                  .EVEN
    130
    131
    132
    133
    134
```

```
                                .SBTTL  AUTO DROP UNIT SECTION

                                ;////////////////////////////////////////////////////////////////////////////
                                ;/ THE AUTO DROP CODING DETERMINES WHETHER OR NOT THE DEVICE WHOSE P-TABLE
                                ;/ WAS JUST OBTAINED IS READY FOR TESTING, AND IT IS DROPPED IF NOT READY.
                                ;////////////////////////////////////////////////////////////////////////////

016312                          BGNAUTO
016312                                                                                  L$AUTO::

016312                                  SETVEC  #4,#NXM,#PRI07  ;SET UP NON -EXISTENT MEMORY TRAP VECTOR.
016312  012746  000340                                                                  MOV     #PRI07,-(SP)
016316  012746  017534                                                                  MOV     #NXM,-(SP)
016322  012746  000004                                                                  MOV     #4,-(SP)
016326  012746  000003                                                                  MOV     #3,-(SP)
016332  104437                                                                          TRAP    C$SVEC
016334  062706  000010                                                                  ADD     #10,SP
016340  005037  002366                  CLR     NXMFLG          ;CLEAR FLAG USED IN TEST
016344  005777  163720                  TST     @CSR0           ;REFERENCE MEMORY ADDRESS FOR THE DEVICE
                                                                ;TO SEE IF IT EXISTS.

                                ;;*************************************************************************
                                ; IF THE DEVICE DOESN'T EXIST THE RESULTANT TRAP TO VECTOR 04 WILL
                                ; CAUSE THE DEVICE TO BE DROPPED (SEE INTERRUPT ROUTINE 'DROP04').
                                ; OTHERWISE THE MEMORY REFERENCE IS UNEVENTFUL AND THE DEVICE IS READY.
                                ;;*************************************************************************
016350  005737  002366                  TST     NXMFLG          ;WAS THERE A TRAP?
016354  001407                          BEQ     10$             ;BR IF NOT
016356                                  DODU    LOGDEV          ;DROP THE DEVICE
016356  013700  002354                                                                  MOV     LOGDEV,R0
016362  104451                                                                          TRAP    C$DODU
016364                                  DOCLN                   ;CLEAN UP CODE.
016364  104444                                                                          TRAP    C$DCLN
016366                                  CLRVEC  #4              ;RETURN VECTOR 04 TO NORMAL STATE
016366  012700  000004                                                                  MOV     #4,R0
016372  104436                                                                          TRAP    C$CVEC
016374                          10$:

016374                          ENDAUTO
016374                                                                          L10020:
016374  104461                                                                          TRAP    C$AUTO
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;////////////////////////////////////////////////////////////////////////////
                                        ;/  THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED AT THE
                                        ;/  END OF THE TEST SEQUENCE ON A PARTICULAR UNIT.  THIS SECTION IS REQUIRED
                                        ;/  EVEN IF IT IS A NULL CLEANUP
                                        ;////////////////////////////////////////////////////////////////////////////

016376                                  BGNCLN
016376                                                                                          L$CLEAN::
016376  005737  002366                          TST     NXMFLG          ;WAS THERE A NXM TRAP
016402  001003                                  BNE     10$             ;IF YES, SKIP RESET
016404  012777  000001  163662                  MOV     #RESET,@TXCSR   ;RESET THE DPV
016412                                  10$:
016412                                  ENDCLN
016412                                                                                          L10021:
016412  104412                                                                                          TRAP    C$CLEAN
```

```
                                        .SBTTL  GLOBAL INTERRUPT HANDLING ROUTINES

                                        ;////////////////////////////////////////////////////////////////////////
                                        ;/ THE INTERRUPT HANDLING SECTION CONTAINS CODING REQUIRED TO USE
                                        ;/ THE 'SETVEC' MACRO.  NOTE EVERY INTERRUPT ROUTINE SHOULD SAVE
                                        ;/ AND RESTORE R0.
                                        ;////////////////////////////////////////////////////////////////////////

                                        ;*********************************************************************
                                        ;       RINT -  INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - RECEIVE INTERRUPT ROUTINE THAT SETS FLAGS WHEN
                                        ;                  A RECEIVE INTERRUPT CONDITON IS RECEIVED.
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                       TOGGLE = IF NON ZERO, XOR THE BITS IN TOGGLE
                                        ;                                INTO THE RXCSR
                                        ;
                                        ;       EXIT CONDITIONS RFLAG =  1 SET - DATA RECEIVED
                                        ;                             =  2 SET - STATUS RECEIVED
                                        ;                       IRXCSR=  IMAGE OF RXCSR
                                        ;                       RSAVE =  IMAGE OF RDSR
                                        ;                       MCFLAG=  MODEM CONTROL INTERRUPT COUNT.
                                        ;
                                        ;       USED IN TESTS: 8,10,11,13,14
                                        ;
                                        ;*********************************************************************


016414                                  BGNSRV  RINT
016414                                                                                          RINT::
016414                                  1$:
016414  017737  163650  002346                  MOV     @RXCSR,IRXCSR   ;SAVE RXCSR
016422  100011                                  BPL     5$              ;BR IF NOT
016424  005237  002360                          INC     MCFLAG          ;INCREMENT MODEM CONTROL FLAG.
016430  022737  000002  002360                  CMP     #2,MCFLAG       ;HAS THERE BEEN MORE THAN 2 INTERRUPTS?
016436  002003                                  BGE     5$              ;IF NOT, PROCEED.
016440  042777  000040  163622                  BIC     #DSITEN,@RXCSR  ;DISABLE THE INTERRUPT.
016446                                  5$:
016446  032737  000200  002346                  BIT     #RDATRY,IRXCSR  ;IS DATA READY?
016454  001414                                  BEQ     10$             ;IF NOT - CHECK STATUS.
016456  052737  000001  002376                  BIS     #1,RFLAG        ;FLAG FOR DATA
016464  005737  002432                          TST     TOGGLE          ;TOGGLE ?
016470  001406                                  BEQ     10$             ;IF NOT, SKIP TOGGLE
016472  013702  002432                          MOV     TOGGLE,R2       ;GET THE TOGGLE VALUE
016476  005037  002432                          CLR     TOGGLE          ;ONLY TOGGLE ONCE.
016502  074277  163562                          XOR     R2,@RXCSR       ;TOGGLE RTS.
016506                                  10$:
016506  032737  002000  002346                  BIT     #RSTARY,IRXCSR  ;IS STATUS READY?
016514  001404                                  BEQ     20$             ;IF NOT - DON'T SET THE FLAG.
016516  052737  000002  002376                  BIS     #2,RFLAG        ;SET THE FLAG
016524  000403                                  BR      25$
016526                                  20$:
016526  005737  002370                          TST     OVER            ;CREATE AN OVERRUN?
016532  001330                                  BNE     1$              ;IF YES - DON'T READ THE DATA
                                                                        ;UNTIL THE STATUS FLAG IS SET.
016534                                  25$:
```

```
     57 016534  017737  163532  002400          MOV     @RDSR,RSAVE     ;SAVE RECEIVE DATA AND STATUS.
     58
     59 016542                          ENDSRV
        016542                                                                                  L10022:
        016542  000002                                                                                  RTI
     60
```

```
                                        ;*****************************************************************
                                        ;       RDATA - INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - GENERAL PURPOSE RECEIVE INTERRUPT ROUTINE
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                       ECOUNT = # OF CHARACTERS TO BE RECEIVED.
                                        ;                       R1     = ADDRESS OF BUFFER FOR NEXT CHARACTER
                                        ;
                                        ;       EXIT CONDITIONS
                                        ;                       IRXCSR = IMAGE OF RXCSR
                                        ;                       IRDSR  = IMAGE OF RDSR
                                        ;                       RCOUNT = COUNT OF CHARACTERS RECEIVED
                                        ;                       MODE   = PROTOCOL MODE ( 0 = BCP, NON 0 = BOP)
                                        ;                       MCFLAG = COUNT OF MODEM CONTROL INTERRUPTS RECEIVED
                                        ;                       MODEM  = ADDRESS OF MODEM CONTROL INTERRUPT TABLE
                                        ;                       RFLAG  = RECEIVE END FLAG ( 1 = NO ERROR, -1 = ERROR)
                                        ;                       R1     = INCREMENTED TO NEXT BYTE IN BUFFER.
                                        ;
                                        ;       USED IN TESTS: 15-28 & 30-40 (CALLED IN SUBROUTINE $DATA), 41
                                        ;
                                        ;*****************************************************************

016544                          BGNSRV  RDATA
016544                                                                          RDATA::

016544  017737  163520  002346          MOV     @RXCSR,IRXCSR   ;SAVE THE RXCSR
016552  100040                          BPL     10$             ;IS DATA SET CHANGE?  IF NOT SET, BR.

016554  032737  000040  002346          BIT     #DSITEN,IRXCSR  ;WAS THE DATA SET CHANGE INT. ENABLED?
016562  001434                          BEQ     10$             ;IF NOT - DON'T KEEP TRACK OF THE CHANGES.
016564  005237  002360                  INC     MCFLAG          ;INCR MODEM CONTROL FLAG.
016570  022737  000011  002360          CMP     #9.,MCFLAG      ;WERE TOO MANY INTERRUPTS RECECEIVED?
016576  002004                          BGE     1$              ;IF NOT - PROCEED.
016600  042777  000040  163462          BIC     #DSITEN,@RXCSR  ;CLEAR MODEM CONTROL INTERRUPT.
016606  000422                          BR      10$
016610                          1$:
016610                                  PUSH    <R5>            ;SAVE R5
016612  013705  002360                  MOV     MCFLAG,R5       ;USE THE INTERRUPT # AS A TABLE INDEX.
016616  006305                          ASL     R5              ;CHANGE MODEM CONTROL TO ADDRESS OFFSET
016620  013765  002346  002444          MOV     IRXCSR,MODEM(R5);SAVE THE MODEM STATUS
016626  042765  006760  002444          BIC     #6760,MODEM(R5) ;SAVE ONLY THE MODEM STATUS.
016634  032777  000040  163432          BIT     #TM,@TXCSR      ;WAS THE TEST MODE BIT SET?
016642  001403                          BEQ     5$              ;BR IF NOT
016644  052765  000040  002444          BIS     #TM,MODEM(R5)   ;SAVE TEST MODE STATUS.
016652                          5$:
016652                                  POP     <R5>            ;RESTORE R5

016654                          10$:
016654  032737  002200  002346          BIT     #RSTARY!RDATRY,IRXCSR ;IS THE DATA OR STATUS BIT SET
016662  001444                          BEQ     55$
016664  017737  163402  002350          MOV     @RDSR,IRDSR     ;SAVE THE DATA AND STATUS REG.
016672  032737  000200  002346          BIT     #RDATRY,IRXCSR  ;IS DATA SET?
016700  001404                          BEQ     20$
016702  113721  002350                  MOVB    IRDSR,(R1)+     ;SAVE THE DATA.
016706  005237  002500                  INC     RCOUNT          ;INCREMENT BYTE COUNT
016712                          20$:
```

```
016712  032737  002000  002346          BIT     #RSTARY,IRXCSR  ;IS STATUS SET?
016720  001410                          BEQ     50$
016722  032737  106000  002350          BIT     #ERR!ROVER!RABORT,IRDSR ;WAS THERE AN ERROR?
016730  001413                          BEQ     53$             ;IF NOT - MUST BE END OF MESSAGE.
016732  012737  177777  002376          MOV     #-1,RFLAG       ;OTHERWISE, SET ERROR FLAG.
016740  000412                          BR      54$
016742                          50$:
016742  005737  002362                  TST     MODE            ;IS THIS BCP?
016746  001012                          BNE     55$             ;IF NOT - EXIT
016750  023737  002500  002474          CMP     RCOUNT,ECOUNT   ;HAVE WE RECEIVED ALL THE CHARACTERS
016756  001006                          BNE     55$             ;IF NOT - EXIT
016760                          53$:
016760  012737  000001  002376          MOV     #1,RFLAG        ;SET FLAG
016766                          54$:
016766  042777  000100  163274          BIC     #RXITEN,@RXCSR  ;DISABLE INTERRUPT
016774                          55$:

016774                          ENDSRV
016774                                                                          L10023:
016774  000002                                                                          RTI
```

```
                                        ;*******************************************************************
                                        ;       RDATA2 - INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - HIGH SPEED RECEIVE INTERRUPT ROUTINE
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                       COUNTER= # OF CHARACTERS BE RECEIVED
                                        ;                       R1     = ADDRESS OF BUFFER FOR NEXT CHARACTER
                                        ;
                                        ;       EXIT CONDITIONS
                                        ;                       RCOUNT = COUNT OF CHARACTERS RECEIVED
                                        ;                       RFLAG  = RECEIVE END FLAG ( 1 = NO ERROR, -1 = ERROR)
                                        ;                       R1     = INCREMENTED TO NEXT BYTE IN BUFFER.
                                        ;
                                        ;
                                        ;       USED IN TESTS: 42 & 43
                                        ;
                                        ;*******************************************************************

016776                                  BGNSRV  RDATA2
016776                                                                                          RDATA2::

016776  105777  163266                          TSTB    @RXCSR          ;IS THIS DATA?
017002  100404                                  BMI     5$
                                                                        ;DATA OR STATUS?
017004  012737  177777  002376                  MOV     #-1,RFLAG       ;FLAG FOR ERROR
017012  000412                                  BR      20$

017014                                  5$:
017014  117721  163252                          MOVB    @RDSR,(R1)+     ;SAVE THE DATA.
017020  005237  002500                          INC     RCOUNT          ;INCREMENT BYTE COUNT
017024  005337  002326                          DEC     COUNTER         ;DECREMENT COUNT
017030  001006                                  BNE     30$             ;BR IF NOT DONE.
017032  012737  000001  002376                  MOV     #1,RFLAG        ;SET FLAG
017040                                  20$:
017040  042777  000100  163222                  BIC     #RXITEN,@RXCSR  ;DISABLE INTERRUPT
017046                                  30$:

017046                                  ENDSRV
017046                                                                                          L10024:
017046  000002                                                                                          RTI
```

```
                                        ;*****************************************************************
                                        ;       XINT -  INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - TRANSMIT INTERRUPT ROUTINE. SET A FLAG WHEN INTERRUPT
                                        ;                  GENERATED.  THIS ISR WILL TRANSMIT 4 DATA CHARACTERS AND
                                        ;                  END A MESSAGE IN A SPECIFIED MANNER.
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                  ABORT = FLAG, SET IF TERMINATE BY AN ABORT IS DESIRED.
                                        ;                  START = # OF START CHARACTERS (FLAGS OR SYNCHS) TO
                                        ;                          BE SENT.
                                        ;
                                        ;       EXIT CONDITIONS
                                        ;                  TFLAG = FLAG SET WHEN THIS INTERRUPT IS SERVICED
                                        ;                  DATA  = # OF DATA CHARACTERS TRANSMITTED
                                        ;
                                        ;       USED IN TESTS:  6, 8-11, 14
                                        ;
                                        ;*****************************************************************


 017050                                 BGNSRV  XINT
 017050                                                                                         XINT::
 017050  012737  000001  002424                 MOV     #1,TFLAG        ;SET THE TRANSMIT FLAG
 017056  005737  002414                         TST     START           ;SEND START
 017062  001410                                 BEQ     5$              ;IS THIS DATA OR A START
 017064  012777  000400  163204                 MOV     #TSOM,@TDSR     ;TRANSMIT A SYNCH/FLAG.
 017072  005337  002414                         DEC     START           ;DECREMENT START COUNTER.
 017076  005037  002330                         CLR     DATA            ;CLEAR DATA COUNTER
 017102  000424                                 BR      20$
 017104                                 5$:
 017104  022737  000004  002330                 CMP     #4,DATA         ;HAVE WE SENT 4 DATA CHARACTERS
 017112  001013                                 BNE     10$
 017114  005737  002322                         TST     ABORT           ;SEND AN ABORT?
 017120  001404                                 BEQ     7$
 017122  052777  002000  163146                 BIS     #TXABO,@TDSR    ;SEND AN ABORT
 017130  000411                                 BR      20$
 017132                                 7$:
 017132  012777  001021  163136                 MOV     #TEOM!21,@TDSR  ;SEND END OF MESSAGE
 017140  000405                                 BR      20$
 017142                                 10$:
 017142  012777  000041  163126                 MOV     #41,@TDSR       ;TRANSMIT DATA.
 017150  005237  002330                         INC     DATA            ;INCREMENT DATA
 017154                                 20$:
 017154                                 ENDSRV
 017154                                                                                         L10025:
 017154  000002                                                                                         RTI
```

```
                                        ;*****************************************************************
                                        ;       XDATA - INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - GENERAL PURPOSE TRANSMIT INTERRUPT ROUTINE
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                       START = # OF START CHARACTERS (FLAGS OR SYNCHS) TO
                                        ;                               BE SENT.
                                        ;                       TSTART= TRANSMIT START OF MESSAGE BIT/(OR BITS)
                                        ;                       HEADER= # OF HEADER CHARACTERS (8 BIT CHARACTERS) TO
                                        ;                               TRANSMIT BEFORE, SETTING THE SELECTED
                                        ;                               CHARACTER LENGTH.
                                        ;                       IPCR  = IMAGE OF PCR. CHARACTER LENGTH TO SET AFTER
                                        ;                               THE HEADER CHARACTERS ARE SENT.
                                        ;
                                        ;       EXIT CONDITIONS
                                        ;                       XMITD = # OF DATA CHARACTERS TRANSMITTED
                                        ;                       RCOUNT= 0 (AFTER START OF MESSAGE TRANSMITTED)
                                        ;
                                        ;
                                        ;       USED IN TESTS: 15-28 & 30-40 (CALLED IN SUBROUTINE $DATA)
                                        ;
                                        ;
                                        ;*****************************************************************

 017156                                 BGNSRV  XDATA
 017156                                                                                         XDATA::

 017156  005737  002414                          TST     START           ;ANY STARTS LEFT TO SEND?
 017162  001426                                  BEQ     10$             ;IF NOT, SKIP.
 017164  032737  000001  002434                  BIT     #BIT0,TSTART    ;IS THIS SPECIAL START SEQUENCE.
 017172  001407                                  BEQ     2$              ;IF NOT - SKIP.
                                                                         ;* NOTE: CERTAIN USYNRTS ONLY TRANSMIT
                                                                         ;* A SPECIAL START SEQUENCE WHEN
                                                                         ;* TRANSMIT START AND END OF MESSAGE
                                                                         ;* ARE SET BY A BYTE OPERATION.
 017174  113777  002434  163104                  MOVB    TSTART,@CSR7    ;SEND SPECIAL SEQUENCE START OF MESSAGE.
 017202  042737  000002  002434                  BIC     #BIT1,TSTART    ;CLEAR END OF MESSAGE IN SPECIAL START
 017210  000403                                  BR      5$
 017212                                  2$:
 017212  013777  002434  163056                  MOV     TSTART,@TDSR    ;SEND START OF MESSAGE.
 017220                                  5$:
 017220  005337  002414                          DEC     START           ;DECREMENT COUNTER.
 017224  001040                                  BNE     20$             ;IF NOT LAST START EXIT.
 017226  005037  002476                          CLR     XMITD           ;CLEAR TRANSMIT COUNT.
 017232  005037  002500                          CLR     RCOUNT          ;CLEAR RECEIVER COUNT.
 017236  000433                                  BR      20$
 017240                                  10$:
 017240  005737  002340                          TST     HEADER          ;IS THIS A CONTROL CHARACTER?
 017244  001407                                  BEQ     15$             ;IF DONE WITH CONTROL CHAR, SET LENGTH
 017246  100413                                  BMI     16$             ;AFTERWARDS - BR TO TRANSMIT
 017250  042777  000400  163020                  BIC     #TSOM,@TDSR     ;CLEAR START OF MESSAGE.
 017256  005337  002340                          DEC     HEADER          ;DECREMENT HEADER COUNT.
 017262  000405                                  BR      16$             ;
 017264                                  15$:
 017264  005337  002340                          DEC     HEADER          ;MAKE HEADER FLAG - NEGATIVE
 017270  153777  002342  163006                  BISB    IPCR,@PCR       ;SET CHARACTER LENGTH (BOP MODE)
```

```
017276                          16$:
017276  112277  162774                  MOVB    (R2)+,@TDSR     ;TRANSMIT A CHARACTER.
017302  005237  002476                  INC     XMITD           ;INCR COUNT OF ACTUALLY SENT.
017306  005303                          DEC     R3              ;DECREMENT COUNTER
017310  001006                          BNE     20$
017312  053777  002422  162756          BIS     TEND,@TDSR      ;TRANSMIT END OF MESSAGE.
017320  042777  000100  162746          BIC     #TXIE,@TXCSR    ;DISABLE TRANSMITTER INTERRUPT.
017326                          20$:

017326                          ENDSRV
017326                                                          L10026:
017326  000002                                                          RTI

```

```
                                        ;*****************************************************************
                                        ;       XDATA2 - INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - HIGH SPEED TRANSMIT INTERRUPT ROUTINE
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                       START = # OF START CHARACTERS (FLAGS OR SYNCHS) TO
                                        ;                               BE SENT.
                                        ;
                                        ;       EXIT CONDITIONS
                                        ;                       XMITD = # OF DATA CHARACTERS TRANSMITTED
                                        ;
                                        ;
                                        ;       USED IN TESTS: 42,43
                                        ;
                                        ;*****************************************************************

017330                                  BGNSRV  XDATA2
017330                                                                                          XDATA2::
017330  005737  002414                          TST     START           ;ANY STARTS LEFT TO SEND?
017334  100414                                  BMI     20$             ;IF NEGATIVE SEND DATA
017336  001406                                  BEQ     10$             ;IF NOT, SKIP.
017340  052777  000400  162730                  BIS     #TSOM,@TDSR     ;SEND SYNCH (OR FLAG)
017346                                  5$:
017346  005337  002414                          DEC     START           ;DECREMENT COUNTER.
017352  000421                                  BR      30$
017354                                  10$:
017354  005337  002414                          DEC     START           ;MAKE THE COUNTER NEGATIVE.
017360  042777  000400  162710                  BIC     #TSOM,@TDSR     ;CLEAR START OF MESSAGE
017366                                  20$:
017366  112277  162704                          MOVB    (R2)+,@TDSR     ;TRANSMIT A CHARACTER.
017372  005237  002476                          INC     XMITD           ;INCR COUNT OF ACTUALLY SENT.
017376  005303                                  DEC     R3              ;DECREMENT COUNTER
017400  001006                                  BNE     30$
017402  052777  001000  162666                  BIS     #TEOM,@TDSR     ;TRANSMIT END OF MESSAGE.
017410  042777  000100  162656                  BIC     #TXIE,@TXCSR    ;DISABLE TRANSMITTER INTERRUPT.
017416                                  30$:


017416                                  ENDSRV
017416                                                                                          L10027:
017416  000002                                                                                          RTI
```

```
                                        ;*****************************************************************
                                        ;       XDDCMP - INTERRUPT SERVICE ROUTINE
                                        ;
                                        ;       FUNCTION - DDCMP TRANSMIT INTERRUPT ROUTINE
                                        ;
                                        ;       ENTRY CONDTIONS
                                        ;                       START = # OF START CHARACTERS (FLAGS OR SYNCHS) TO
                                        ;                               BE SENT.
                                        ;                       HEADER= FLAG WHICH IS SET AFTER THE DDCMP HEADER HAS
                                        ;                               BEEN TRANSMITTED
                                        ;                       DDCMP2= # OF DATA CHARACTERS IN THE DDCMP DATA MESSAGE
                                        ;
                                        ;       EXIT CONDITIONS
                                        ;                       XMITD = # OF DATA CHARACTERS TRANSMITTED
                                        ;                       RCOUNT= 0 (AFTER START OF MESSAGE TRANSMITTED)
                                        ;
                                        ;
                                        ;       USED IN TESTS: 41
                                        ;
                                        ;*****************************************************************

 017420                                 BGNSRV  XDDCMP
 017420                                                                                         XDDCMP::

 017420  005737  002414                          TST     START           ;ANY STARTS LEFT TO SEND?
 017424  001413                                  BEQ     10$             ;IF NOT, SKIP.
 017426  012777  000400  162642                  MOV     #TSOM,@TDSR     ;SEND START OF MESSAGE.
 017434  005337  002414                          DEC     START           ;DECREMENT COUNTER.
 017440  001034                                  BNE     20$             ;
 017442  005037  002476                          CLR     XMITD           ;CLEAR TRANSMIT COUNT.
 017446  005037  002500                          CLR     RCOUNT          ;CLEAR RECEIVER COUNT.
 017452  000427                                  BR      20$
 017454                                 10$:
 017454  042777  001400  162614                  BIC     #TEOM!TSOM,@TDSR ;CLEAR START OR END OF MESSAGE.
 017462  112277  162610                          MOVB    (R2)+,@TDSR     ;TRANSMIT A CHARACTER.
 017466  005237  002476                          INC     XMITD           ;INCR COUNT OF ACTUALLY SENT.
 017472  005303                                  DEC     R3              ;DECREMENT COUNTER
 017474  001016                                  BNE     20$
 017476  052777  001000  162572                  BIS     #TEOM,@TDSR     ;TRANSMIT END OF MESSAGE.
 017504  005737  002340                          TST     HEADER          ;IS THIS THE HEADER
 017510  001005                                  BNE     15$             ;IF NOT, DISABLE THE TRANSMITTER
 017512  005237  002340                          INC     HEADER          ;SET HEADER FLAG.
 017516  012703  000015                          MOV     #DDCMP2,R3      ;COUNTER FOR THE MESSAGE
 017522  000403                                  BR      20$
 017524                                 15$:
 017524  042777  000100  162542                  BIC     #TXIE,@TXCSR    ;DISABLE TRANSMITTER INTERRUPT.
 017532                                 20$:


 017532                                 ENDSRV
 017532                                                                                         L10030:
 017532  000002                                                                                         RTI
```

```
                                ;*******************************************************************
                                ;       NXM -   INTERRUPT SERVICE ROUTINE
                                ;
                                ;       FUNCTION - NXM INTERRUPT ROUTINE.  THIS ROUTINE IS ASSIGNED
                                ;                  TO VECTOR 4 WHEN ADDRESSING THE DPV FOR THE FIRST
                                ;                  TIME.  IF THIS INTERRUPT IS GENERATED THE DPV IS
                                ;                  INCORRECTLY ADDRESSED.
                                ;
                                ;       ENTRY CONDTIONS
                                ;
                                ;       EXIT CONDITIONS
                                ;                       NXMFLG= FLAG SET WHEN THIS INTERRUPT IS SERVICED.
                                ;
                                ;       USED IN TESTS:  AUTO DROP
                                ;
                                ;*******************************************************************

017534                          BGNSRV  NXM
017534                                                                          NXM::

017534  012737  000001  002366          MOV     #1,NXMFLG               ;SET FLAG IF MEMORY IS NON-EXISTENT.

017542                          ENDSRV
017542                                                                          L10031:
017542  000002                                                                          RTI
```

```
                                .SBTTL  DROP UNIT SECTION

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

 017544                         BGNDU
 017544                                                                                 L$DU::

 017544                                 BRESET                  ;ISSUE LSI-BUS RESET TO CLEAN UP
 017544  104433                                                                         TRAP    C$RESET
 017546                                 PRINTF  #FMDROP,LOGDEV
 017546  013746  002354                                                                 MOV     LOGDEV,-(SP)
 017552  012746  017574                                                                 MOV     #FMDROP,-(SP)
 017556  012746  000002                                                                 MOV     #2,-(SP)
 017562  010600                                                                         MOV     SP,R0
 017564  104417                                                                         TRAP    C$PNTF
 017566  062706  000006                                                                 ADD     #6,SP

 017572                         ENDDU
 017572                                                                                 L10032:
 017572  104453                                                                         TRAP    C$DU

 017574     045     116     045  FMDROP: .ASCIZ  /%N%AUNIT %D2%A DROPPED/
 017577     101     125     116
 017602     111     124     040
 017605     045     104     062
 017610     045     101     040
 017613     104     122     117
 017616     120     120     105
 017621     104     000
                                .EVEN
```

DROP UNIT SECTION
1

```
                                        .SBTTL          TEST 1 - CSR ADDRESSING
                                        ;
                                        ;*******************************************************************
                                        ;*              TEST 1 - DPV-11
                                        ;* VERIFY THAT ADDRESSING THE 4 LSI-BUS CSRS DOES NOT CAUSE A NON-
                                        ;* EXISTENT MEMORY TRAP.
                                        ;*
                                        ;* THE DPV IS AN COMMUNICATION DEVICE RESIDING ON A LSI-BUS.
                                        ;* COMMUNICATION BETWEEN THE MAIN CPU AND THE DPV IS ACCOMPLISHED
                                        ;* THROUGH A SET OF FOUR 16-BIT LSI-BUS CONTROL AND STATUS REGISTERS
                                        ;* (CSRS).  THE FOUR REGISTERS ARE ASSIGNED ADDRESSES IN THE I/O PAGE
                                        ;* FLOATING ADDRESS SPACE: 76XXX0 - 76XXX6
                                        ;*
                                        ;* AN ERROR IN THIS TEST COULD MEAN THAT THE DEVICE IS INCORRECTLY
                                        ;* CONFIGURED, THAT THE ADDRESS IS WRONG OR THAT THE CRYSTAL CLOCK
                                        ;* ON THE DPV IS NOT WORKING.  THE SHIFT REGISTER CLOCK IS NEEDED
                                        ;* FOR THE LS164 (E15) IN ORDER TO PROVIDE THE BUS REPLY (BRPLY/L ON
                                        ;* PIN AF2).
                                        ;*******************************************************************
 017624                                 BGNTST
 017624                                                                                  T1::

 017624                                         SETVEC  #4,#LOCATE,#PRI07 ;SET UP NON -EXISTENT MEMORY TRAP VECTOR.
 017624  012746  000340                                                                  MOV     #PRI07,-(SP)
 017630  012746  017766                                                                  MOV     #LOCATE,-(SP)
 017634  012746  000004                                                                  MOV     #4,-(SP)
 017640  012746  000003                                                                  MOV     #3,-(SP)
 017644  104437                                                                          TRAP    C$SVEC
 017646  062706  000010                                                                  ADD     #10,SP
 017652  005037  002366                         CLR     NXMFLG          ;FLAG USED IN THE TRAP ROUTINE.
 017656  005001                                 CLR     R1              ;USE REGISTER TO REMEMBER WHICH OF THE
                                                                        ;4 CSRS WE ARE ADDRESSING.

                                        ;;*******************************************************************************
                                        ; IF ADDRESSING ANY ONE OF THE CSRS RESULTS IN A TRAP TO VECTOR 04, THE TRAP
                                        ; WILL REPORT THE ERROR (SEE INTERRUPT ROUTINE 'LOCATE').  OTHERWISE THE
                                        ; MEMORY REFERENCE IS UNEVENTFUL AND THE DEVICE IS READY FOR FURTHER TESTS
                                        ;;*******************************************************************************

 017660  005777  162404                         TST     @CSR0           ;TEST THE CSR AT 76XXX0
 017664  012701  000002                         MOV     #2,R1           ;SAVE THE OFFSET OF THE NEXT CSR
 017670  005777  162376                         TST     @CSR2           ;TEST THE CSR AT 76XXX2
 017674  012701  000004                         MOV     #4,R1           ;SAVE THE OFFSET OF THE NEXT CSR
 017700  005777  162370                         TST     @CSR4           ;TEST THE CSR AT 76XXX4
 017704  012701  000006                         MOV     #6,R1           ;SAVE THE OFFSET OF THE NEXT CSR
 017710  005777  162362                         TST     @CSR6           ;TEST THE CSR AT 76XXX6
 017714  005737  002366                         TST     NXMFLG          ;WAS THERE A TRAP?
 017720  001416                                 BEQ     10$             ;IF NOT - EXIT.
 017722                                         PRINTX  #FMT1           ;SUGGEST THE PROBLEM. (
 017722  012746  020150                                                                  MOV     #FMT1,-(SP)
 017726  012746  000001                                                                  MOV     #1,-(SP)
 017732  010600                                                                          MOV     SP,R0
 017734  104415                                                                          TRAP    C$PNTX
 017736  062706  000004                                                                  ADD     #4,SP
 017742                                         DODU    LOGDEV          ;DROP THE DEVICE
 017742  013700  002354                                                                  MOV     LOGDEV,R0
 017746  104451                                                                          TRAP    C$DODU
```

```
 44 017750                                  DOCLN                      ;CLEAN UP CODE - FORCE BACK TO INIT.
    017750  104444                                                                                   TRAP    C$DCLN
 45 017752  005037  002366                   CLR     NXMFLG             ;RESTORE THE FLAG.
 46 017756                              10$:
 47 017756                                  CLRVEC  #4                 ;RETURN VECTOR 04 TO NORMAL STATE
    017756  012700  000004                                                                           MOV     #4,R0
    017762  104436                                                                                   TRAP    C$CVEC
 48
 49 017764                              ENDTST
    017764                                                                                   L10033:
    017764  104401                                                                                   TRAP    C$ETST
 50
 51
 52 017766                              BGNSRV  LOCATE                     ;INTERRUPT SERVICE ROUTINE
    017766                                                                                   LOCATE::
 53 017766  005737  002366                   TST     NXMFLG             ;HAVE WE HAD AT LEAST 1 PREVIOUS TRAP?
 54 017772  001006                          BNE     10$                ;IF YES, DON'T BOTHER DECLARING ANOTHER
 55                                                                    ;DEVICE FATAL ERROR
 56 017774                                  ERRDF   9,EMT0             ;NON-EXISTENT DEVICE ERROR
    017774  104455                                                                                   TRAP    C$ERDF
    017776  000011                                                                                   .WORD   9
    020000  020040                                                                                   .WORD   EMT0
    020002  000000                                                                                   .WORD   0
 57 020004  005237  002366                   INC     NXMFLG             ;SET THE FLAG
 58 020010                              10$:
 59 020010                                  PRINTX  #FMT0,R1,CSR0(R1) ;PRINT THE CSR THAT DOESN'T RESPOND.
    020010  016146  002270                                                                           MOV     CSR0(R1),-(SP)
    020014  010146                                                                                   MOV     R1,-(SP)
    020016  012746  020076                                                                           MOV     #FMT0,-(SP)
    020022  012746  000003                                                                           MOV     #3,-(SP)
    020026  010600                                                                                   MOV     SP,R0
    020030  104415                                                                                   TRAP    C$PNTX
    020032  062706  000010                                                                           ADD     #10,SP
 60 020036                              ENDSRV
    020036                                                                                   L10034:
    020036  000002                                                                                   RTI
 61
 62 020040     103     123     122  EMT0:    .ASCIZ  /CSR ADDRESSING ERROR - TRAP 4/
    020043     040     101     104
    020046     104     122     105
    020051     123     123     111
    020054     116     107     040
    020057     105     122     122
    020062     117     122     040
    020065     055     040     124
    020070     122     101     120
    020073     040     064     000
 63 020076     045     123     063  FMT0:    .ASCIZ  /%S3%ACSR%D1%A AT %O6%A DOES NOT RESPOND%N/
    020101     045     101     103
    020104     123     122     045
    020107     104     061     045
    020112     101     040     101
    020115     124     040     045
    020120     117     066     045
    020123     101     040     104
    020126     117     105     123
    020131     040     116     117
```

```
        020134    124    040    122
        020137    105    123    120
        020142    117    116    104
        020145    045    116    000
     64 020150    045    101    050  FMT1:   .ASCIZ  /%A(CONFIGURATION ERROR  OR  NO BUS REPLY SIGNAL)%N2/
        020153    103    117    116
        020156    106    111    107
        020161    125    122    101
        020164    124    111    117
        020167    116    040    105
        020172    122    122    117
        020175    122    040    040
        020200    117    122    040
        020203    040    116    117
        020206    040    102    125
        020211    123    040    122
        020214    105    120    114
        020217    131    040    123
        020222    111    107    116
        020225    101    114    051
        020230    045    116    062
        020233    000
     65                                  .EVEN
     66
     67
     68
```

```
                                .SBTTL          TEST 2 - DPV RESET

                                ;*******************************************************************
                                ;*              TEST 2 - DPV-11
                                ;* DPV RESET
                                ;* RESET THE DPV AND ENSURE THAT ALL REGISTERS ARE IN THEIR
                                ;* PROPER INITIALIZATION STATE.  THE RESET IS ASYNCHRONOUS TO ALL
                                ;* DATA SET TIMING AND ANY DATA PORT ACCESSES. THE FOLLOWING
                                ;* WILL BE CHECKED BY THE $RESET SUBROUTINE:
                                ;*      1. ALL BITS IN THE DATA PORT REGISTERS ARE CLEARED.
                                ;*      2. ALL OUTPUT INDICATORS ARE CLEARED.
                                ;*      3. TRANSMIT BUFFER EMPTY (TBE) IS SET
                                ;*
                                ;* SUBTEST 1 - AFTER RESET, CHECK THAT MAINTENANCE MODE AND
                                ;*             TRANSMITTER CAN BE SET. ALSO CHECK THAT TRANSMITTER
                                ;*             BUFFER EMPTY (TBE) IS CLEARED WHEN TDSR IS ACCESSED
                                ;*             WITHOUT SETTING TRANSMITTER ENABLE.
                                ;* SUBTEST 2 - ON THE FIRST PASS ONLY, CHECK THAT A BUS RESET, DOES
                                ;*             A DPV11 RESET.
                                ;*
                                ;* NOTE: DATA MODE, CTS, RR (RECEIVER READY) AND IC (INCOMING CALL)
                                ;*       ARE UNAFFECTED BY A RESET.
                                ;*
                                ;*******************************************************************
020234                          BGNTST
020234                                                                  T2::
020234                            BGNSUB
020234                                                                  T2.1:
020234  104402                                                                  TRAP    C$BSUB
020236                                  CALL    $RESET          ;RESET THE DPV
020242                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
020242  104410                                                                  TRAP    C$ESCAPE
020244  000212                                                                  .WORD   L10035-.
020246  005001                          CLR     R1              ;BITS SHOULD BE CLEAR.
020250  005077  162022                  CLR     @TDSR           ;CLEAR TBE
020254  005777  162014                  TST     @TXCSR          ;IS TBE CLEARED?
020260  001035                          BNE     10$             ;ERROR IF NOT CLEAR
020262  012701  000010                  MOV     #10,R1          ;REMEMBER BITS TO SET.
020266  050177  162002                  BIS     R1,@TXCSR       ;SET THOSE BITS
020272  020177  161776                  CMP     R1,@TXCSR       ;WERE THOSE BITS SET
020276  001026                          BNE     10$
020300  012701  000020                  MOV     #20,R1          ;NEXT BIT TO SET
020304  110177  161764                  MOVB    R1,@TXCSR
020310  020177  161760                  CMP     R1,@TXCSR
020314  001017                          BNE     10$
020316  012701  000030                  MOV     #30,R1
020322  112777  000030  161744          MOVB    #TXENA!MM,@TXCSR ;SET THE ENABLE AND MAINT. MODE.
020330  020177  161740                  CMP     R1,@TXCSR       ;ARE THOSE BITS SET?
020334  001007                          BNE     10$             ;BR IF IN ERROR.
020336  012701  000100                  MOV     #100,R1         ;SET TX INTERRUPT ENABLE.
020342  110177  161726                  MOVB    R1,@TXCSR       ;SET THE INTERRUPT BIT
020346  020177  161722                  CMP     R1,@TXCSR       ;IS THE BIT SET?
020352  001404                          BEQ     20$             ;IF YES - OK.
020354                          10$:
020354                                  ERRDF   10,EMG4,ERRG7
020354  104455                                                                  TRAP    C$ERDF
020356  000012                                                                  .WORD   10
```

```
        020360  013430                                                                    .WORD   EMG4
        020362  007052                                                                    .WORD   ERRG7
     51 020364                          20$:
     52 020364                            ENDSUB
        020364                                                                  L10036:
        020364  104403                                                                    TRAP    C$ESUB
     53
     54
     55
     56 020366                          BGNSUB
        020366                                                                  T2.2:
        020366  104402                                                                    TRAP    C$BSUB
     57 020370  022737  000001  002320        CMP     #1,STARES       ;IS THIS THE FIRST PASS?
     58 020376  001026                        BNE     30$             ;IF NOT - SKIP THIS TEST.
     59 020400                                BRESET                  ;BUS RESET.
        020400  104433                                                                    TRAP    C$RESET
     60 020402                                $DELAY  10              ;DELAY 1 MSEC.

                                                                      ;******** MACRO EXPANSION ********
        020402  004737  006464                JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
        020406  000010                                .WORD   10      ;NUMBER OF DELAY LOOPS
                                                                      ;**********************************

     61 020410  005001                        CLR     R1              ;EXPECT 0 IN ALL R/W REGISTERS
     62 020412  105777  161652                TSTB    @RXCSR          ;IS THE RECEIVE CSR 0?
     63 020416  001012                        BNE     20$             ;BRANCH ON ERROR.
     64 020420  005777  161646                TST     @RDSR           ;EXPECT READ DATA/STATUS TO BE 0
     65 020424  001007                        BNE     20$             ;BR IF NOT
     66 020426  022777  000004  161640        CMP     #4,@TXCSR       ;EXPECT TBE TO BE SET.
     67 020434  001003                        BNE     20$             ;BR IF NOT
     68 020436  005777  161634                TST     @TDSR           ;EXPECT XMIT. DATA/STATUS TO BE 0.
     69 020442  001404                        BEQ     30$             ;BRANCH IF OK.
     70 020444                          20$:
     71 020444                                ERRDF   11,EMG0,ERRG11  ;PRINT ERROR MESSAGE
        020444  104455                                                                    TRAP    C$ERDF
        020446  000013                                                                    .WORD   11
        020450  013246                                                                    .WORD   EMG0
        020452  007452                                                                    .WORD   ERRG11
     72 020454                          30$:
     73 020454                            ENDSUB
        020454                                                                  L10037:
        020454  104403                                                                    TRAP    C$ESUB
     74
     75 020456                          ENDTST
        020456                                                                  L10035:
        020456  104401                                                                    TRAP    C$ETST
     76
```

1

```
                                .SBTTL          TEST 3 - CSR READ/WRITE

                                ;*******************************************************************
                                ;*              TEST 3 - DPV-11
                                ;* WRITE/READ DATA PATTERNS
                                ;* THIS TEST IS INTENDED TO TEST THE READ/WRITE BITS IN THE CSRS. THERE
                                ;* IS NO INTENTION TO CHECK THE USYNR/T; IT IS DESIRED TO ONLY CHECK THE
                                ;* READING AND WRITING OF THE CSRS.  IN ALL THE SUBTESTS THE BITS ARE
                                ;* CHECKED TOGETHER AND INDIVIDUALLY.
                                ;* SUBTEST 1 - RXCSR (LOW BYTE CSR0)
                                ;*             CHECK BITS 0-6
                                ;* SUBTEST 2 - PCR (HIGH BYTE CSR4)
                                ;*             CHECK BITS 0-7
                                ;* SUBTEST 3 - TDSR (LOW BYTE OF CSR6) - TRANSMIT DATA BUFFER
                                ;*             BITS 0-7
                                ;* SUBTEST 4 - TDSR (HIGH BYTE OF CSR6) - TRANSMIT STATUS REGISTER.
                                ;*             BITS 0-3
                                ;* SUBTEST 5 - TDSR  - CHECK BYTE OP SIGNAL FOR USYNRT
                                ;*
                                ;*******************************************************************
020460                          BGNTST
020460                                                                          T3::
020460                                  CALL    $RESET          ;RESET THE DPV
020464                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
020464  104410                                                                          TRAP    C$ESCAPE
020466  000520                                                                          .WORD   L10040-.

020470                          BGNSUB
020470                                                                          T3.1:
020470  104402                                                                          TRAP    C$BSUB
020472  012701  000001                  MOV     #BIT0,R1        ;START ROTATE PATTERN
020476  012702  000007                  MOV     #7,R2           ;COUNTER - WRITE INTO BITS 0-6.
020502                          10$:
020502  150177  161562                  BISB    R1,@RXCSR       ;WRITE BIT.
020506  120177  161556                  CMPB    R1,@RXCSR       ;IS THE BIT WRITTEN?
020512  001022                          BNE     20$             ;IF NOT - REPORT IT.
020514  006101                          ROL     R1              ;ROTATE THE BIT PATTERN.
020516  105077  161546                  CLRB    @RXCSR          ;CLEAR REGISTER
020522  005302                          DEC     R2
020524  001366                          BNE     10$             ;CONTINUE UNTIL DONE.

020526  012701  000137                  MOV     #137,R1         ;WRITE ALL BITS EXCEPT MODEM CONTROL INT.
                                                                ;MODEM CONTROL NOT WRITTEN BECAUSE WE DON'T
                                                                ;WANT TO ACTUALLY GENERATE AN INTERRUPT.
020532  110177  161532                  MOVB    R1,@RXCSR       ;WRITE BITS.
020536  120177  161526                  CMPB    R1,@RXCSR       ;IS THE PATTERN WRITTEN?
020542  001006                          BNE     20$             ;IF NOT REPORT IT
020544  005001                          CLR     R1              ;REMEMBER DATA PATTERN
020546  105077  161516                  CLRB    @RXCSR          ;CLEAR THOSE BITS.
020552  105777  161512                  TSTB    @RXCSR          ;ARE THOSE BITS CLEARED?
020556  001404                          BEQ     30$             ;IF YES, OK.
020560                          20$:
020560                                  ERRDF   12,EMG4,ERRG4
020560  104455                                                                          TRAP    C$ERDF
020562  000014                                                                          .WORD   12
020564  013430                                                                          .WORD   EMG4
020566  006752                                                                          .WORD   ERRG4
```

```
020570                          30$:
020570  105077  161474                CLRB    @RXCSR          ;CLEAR THE REGISTER

020574                          ENDSUB
020574                                                                  L10041:
020574  104403                                                                  TRAP    C$ESUB

020576                          BGNSUB
020576                                                                  T3.2:
020576  104402                                                                  TRAP    C$BSUB
020600  012701  000377                MOV     #377,R1         ;WRITE DATA PATTERN
020604  110177  161474                MOVB    R1,@PCR         ;WRITE THE PATTERN.
020610  120177  161470                CMPB    R1,@PCR         ;IS THE PATTERN WRITTEN?
020614  001025                        BNE     20$             ;IF NOT REPORT IT
020616  005001                        CLR     R1              ;REMEMBER THE DATA PATTERN
020620  105077  161460                CLRB    @PCR            ;CLEAR THOSE BITS
020624  105777  161454                TSTB    @PCR            ;WERE THE BITS CLEARED?
020630  001017                        BNE     20$             ;IF NOT - REPORT IT
020632  012701  000001                MOV     #BIT0,R1        ;START ROTATE PATTERN
020636  012702  000006                MOV     #6,R2           ;ROTATE THE BIT 4 TIMES
020642                          10$:
020642  150177  161436                BISB    R1,@PCR         ;WRITE PATTERN
020646  120177  161432                CMPB    R1,@PCR         ;IS THE PATTERN WRITTEN?
020652  001006                        BNE     20$             ;IF NOT - REPORT IT.
020654  006101                        ROL     R1              ;ROTATE THE PATTERN
020656  105077  161422                CLRB    @PCR            ;CLEAR THE PCR.
020662  005302                        DEC     R2
020664  001366                        BNE     10$             ;CONTINUE UNTIL DONE.
020666  000404                        BR      30$             ;EXIT - WHEN DONE
020670                          20$:
020670                                ERRDF   13,EMG4,ERRG8
020670  104455                                                          TRAP    C$ERDF
020672  000015                                                          .WORD   13
020674  013430                                                          .WORD   EMG4
020676  007152                                                          .WORD   ERRG8
020700                          30$:
020700  105077  161400                CLRB    @PCR            ;CLEAR THE PCR

020704                          ENDSUB
020704                                                                  L10042:
020704  104403                                                                  TRAP    C$ESUB

020706                          BGNSUB
020706                                                                  T3.3:
020706  104402                                                                  TRAP    C$BSUB

020710  012701  000377                MOV     #377,R1         ;WRITE DATA PATTERN
020714  110177  161356                MOVB    R1,@TDSR        ;WRITE THE PATTERN.
020720  120177  161352                CMPB    R1,@TDSR        ;IS THE PATTERN WRITTEN?
020724  001025                        BNE     20$             ;IF NOT REPORT IT
020726  005001                        CLR     R1              ;REMEMBER DATA PATTERN
020730  105077  161342                CLRB    @TDSR           ;CLEAR THOSE BITS
020734  105777  161336                TSTB    @TDSR           ;IS THE DATA CLEAR?
020740  001017                        BNE     20$             ;IF NOT - REPORT IT.
020742  012701  000001                MOV     #BIT0,R1        ;START ROTATE PATTERN
020746  012702  000006                MOV     #6,R2           ;ROTATE THE BIT 4 TIMES
```

```
 94 020752                          10$:
 95 020752  150177  161320                 BISB    R1,@TDSR        ;WRITE PATTERN
 96 020756  120177  161314                 CMPB    R1,@TDSR        ;IS THE PATTERN WRITTEN?
 97 020762  001006                         BNE     20$             ;IF NOT - REPORT IT.
 98 020764  105077  161306                 CLRB    @TDSR           ;CLEAR THE DATA.
 99 020770  006101                         ROL     R1              ;ROTATE THE PATTERN
100 020772  005302                         DEC     R2
101 020774  001366                         BNE     10$             ;CONTINUE UNTIL DONE.
102 020776  000404                         BR      30$             ;EXIT - WHEN DONE
103 021000                          20$:
104 021000                                 ERRDF   14,EMG4,ERRG9
    021000  104455                                                                     TRAP    C$ERDF
    021002  000016                                                                     .WORD   14
    021004  013430                                                                     .WORD   EMG4
    021006  007252                                                                     .WORD   ERRG9
105 021010                          30$:
106 021010  105077  161262                 CLRB    @TDSR           ;CLEAR THE TDSR
107
108
109 021014                           ENDSUB
    021014                                                                     L10043:
    021014  104403                                                                     TRAP    C$ESUB
110
111 021016                           BGNSUB
    021016                                                                     T3.4:
    021016  104402                                                                     TRAP    C$BSUB
112 021020  012701  000017                 MOV     #17,R1          ;WRITE DATA PATTERN
113 021024  110177  161256                 MOVB    R1,@CSR7        ;WRITE THE PATTERN.
114 021030  120177  161252                 CMPB    R1,@CSR7        ;IS THE PATTERN WRITTEN?
115 021034  001025                         BNE     20$             ;IF NOT REPORT IT
116 021036  005001                         CLR     R1              ;REMEMBER DATA PATTERN.
117 021040  105077  161242                 CLRB    @CSR7           ;CLEAR THOSE BITS
118 021044  105777  161236                 TSTB    @CSR7           ;ARE THE STATUS BITS CLEAR?
119 021050  001017                         BNE     20$             ;IF NOT - REPORT IT.
120 021052  012701  000001                 MOV     #BIT0,R1        ;START ROTATE PATTERN
121 021056  012702  000003                 MOV     #3,R2           ;ROTATE THE BIT 4 TIMES
122 021062                          10$:
123 021062  150177  161220                 BISB    R1,@CSR7        ;WRITE PATTERN
124 021066  120177  161214                 CMPB    R1,@CSR7        ;IS THE PATTERN WRITTEN?
125 021072  001006                         BNE     20$             ;IF NOT - REPORT IT.
126 021074  105077  161206                 CLRB    @CSR7           ;CLEAR STATUS BITS.
127 021100  006101                         ROL     R1              ;ROTATE THE PATTERN
128 021102  005302                         DEC     R2
129 021104  001366                         BNE     10$             ;CONTINUE UNTIL DONE.
130 021106  000404                         BR      30$             ;EXIT - WHEN DONE
131 021110                          20$:
132 021110                                 ERRDF   15,EMG4,ERRG10
    021110  104455                                                                     TRAP    C$ERDF
    021112  000017                                                                     .WORD   15
    021114  013430                                                                     .WORD   EMG4
    021116  007352                                                                     .WORD   ERRG10
133 021120                          30$:
134 021120  105077  161162                 CLRB    @CSR7           ;CLEAR THE XMIT STATUS REG.
135
136 021124                           ENDSUB
    021124                                                                     L10044:
    021124  104403                                                                     TRAP    C$ESUB
```

```
 137
 138 021126                                BGNSUB
     021126                                                                                T3.5:
     021126  104402                                                                                TRAP    C$BSUB
 139 021130  012777  007777  161140          MOV     #7777,@TDSR       ;WRITE TO TDSR
 140 021136  105077  161144                  CLRB    @CSR7             ;CLEAR ONLY THE HIGH BYTE.
 141 021142  105777  161130                  TSTB    @CSR6             ;SEE IF THE LOW BYTE WAS ALSO CLEARED
 142 021146  001016                          BNE     10$               ;IF NOT, BYTE OP IS OK.
 143 021150  012701  000377                  MOV     #377,R1           ;DATA FOR ERROR PRINT OUT.
 144 021154                                  ERRDF   16,EMG4,ERRG9     ;PRINT ERROR
     021154  104455                                                                                TRAP    C$ERDF
     021156  000020                                                                                .WORD   16
     021160  013430                                                                                .WORD   EMG4
     021162  007252                                                                                .WORD   ERRG9
 145 021164                                  PRINTX  #FMG30            ;ALSO WARN THAT BYTE OP MAY BE STUCK LOW.
     021164  012746  013170                                                                        MOV     #FMG30,-(SP)
     021170  012746  000001                                                                        MOV     #1,-(SP)
     021174  010600                                                                                MOV     SP,R0
     021176  104415                                                                                TRAP    C$PNTX
     021200  062706  000004                                                                        ADD     #4,SP
 146 021204                            10$:
 147
 148 021204                              ENDSUB
     021204                                                                                L10045:
     021204  104403                                                                                TRAP    C$ESUB
 149
 150 021206                            ENDTST
     021206                                                                                L10040:
     021206  104401                                                                                TRAP    C$ETST
 151
 152
 153
```

```
                                .SBTTL          TEST 4 - TRANSMIT ENABLE

                                ;*******************************************************************
                                ;*              TEST 4 - DMR-11
                                ;* TRANSMIT ENABLE/ TRANSMIT ACTIVE
                                ;* AFTER A DEVICE RESET, SET TRANSMIT START OF MESSAGE (TSOM).  ENSURE
                                ;* THAT TRANSMIT ACTIVE (TXACT) IS SET.
                                ;*
                                ;* TXACT IS USED TO INDICATE THE CURRENT STATE OF THE TRANSMITTER
                                ;* DATA PATH.  THIS BIT WILL BE ASSERTED WHEN BOTH THE TRANSMITTER IS
                                ;* ENABLED AND TSOM ARE INTERNALLY SYNCHRONIZED.  TXACT WILL BE CLEARED
                                ;* UPON RESET OR WHEN THE TRANSMITTER ENTERS THE IDLE STATE.
                                ;*
                                ;*******************************************************************
021210                          BGNTST
021210                                                                                  T4::

021210                            BGNSUB
021210                                                                                  T4.1:
021210  104402                                                                                  TRAP    C$BSUB
021212                                  CALL    $RESET          ;RESET THE DPV
021216                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
021216  104410                                                                                  TRAP    C$ESCAPE
021220  000330                                                                                  .WORD   L10046-.
021222  005737  002310                  TST     TURN            ;TURNAROUND?
021226  001003                          BNE     5$              ;BR IF EXTERNAL.
021230  052777  000010  161036          BIS     #MM,@TXCSR      ;SET MAINTENANCE MODE.
021236                          5$:
021236  052777  000020  161030          BIS     #TXENA,@TXCSR   ;ENABLE THE TRANSMITTER.
021244  052777  000400  161024          BIS     #TSOM,@TDSR     ;TRANSMIT START OF MESSAGE.
021252                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.

                                                                ;******** MACRO EXPANSION ********
021252  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
021256  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
021260  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                ;**********************************

021262                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
021262  104410                                                                                  TRAP    C$ESCAPE
021264  000264                                                                                  .WORD   L10046-.
021266  032777  000002  161000          BIT     #TXACT,@TXCSR   ;IS THE TRANSMITTER ACTIVE?
021274  001011                          BNE     10$             ;IF YES - OK.
021276  017701  160772                  MOV     @TXCSR,R1       ;SAVE THE TRANSMIT STATUS
021302  052701  000020                  BIS     #TXENA,R1       ;EXPECT TXENA TO BE SET.
021306                                  ERRDF   17,EMG5,ERRG7
021306  104455                                                                                  TRAP    C$ERDF
021310  000021                                                                                  .WORD   17
021312  013455                                                                                  .WORD   EMG5
021314  007052                                                                                  .WORD   ERRG7
021316  000425                          BR      20$             ;SKIP THE REST OF THE SUBTEST.

021320                          10$:
021320  005077  160752                  CLR     @TDSR           ;CLEAR TSOM
021324  042777  000020  160742          BIC     #TXENA,@TXCSR   ;DISABLE THE TRANSMITTER
021332                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.
```

```
                                                                        ;******** MACRO EXPANSION ********
        021332  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
        021336  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
        021340  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                        ;**********************************

     39 021342                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
        021342  104410                                                                          TRAP    C$ESCAPE
        021344  000204                                                                          .WORD   L10046-.
     40 021346  032777  000002  160720          BIT     #TXACT,@TXCSR   ;IS THE TRANSMIITER INACTIVE?
     41 021354  001406                          BEQ     20$             ;IF YES - OK.
     42 021356  012701  000004                  MOV     #TBE,R1         ;EXPECT ONLY TBE TO BE SET.
     43 021362                                  ERRDF   18,EMG6,ERRG7
        021362  104455                                                                          TRAP    C$ERDF
        021364  000022                                                                          .WORD   18
        021366  013510                                                                          .WORD   EMG6
        021370  007052                                                                          .WORD   ERRG7
     44
     45 021372                          20$:
     46 021372                                  ESCAPE TST              ;IF ERROR, BRANCH TO END OF TEST
        021372  104410                                                                          TRAP    C$ESCAPE
        021374  000154                                                                          .WORD   L10046-.
     47
     48 021376                          ENDSUB
        021376                                                                          L10047:
        021376  104403                                                                          TRAP    C$ESUB
     49
     50
     51 021400                          BGNSUB
        021400                                                                          T4.2:
        021400  104402                                                                          TRAP    C$BSUB
     52 021402                                  CALL    $RESET          ;RESET THE DPV
     53 021406                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
        021406  104410                                                                          TRAP    C$ESCAPE
        021410  000140                                                                          .WORD   L10046-.
     54 021412  005737  002310                  TST     TURN            ;TURNAROUND?
     55 021416  001003                          BNE     5$              ;BR IF EXTERNAL.
     56 021420  052777  000010  160646          BIS     #MM,@TXCSR      ;SET MAINTENANCE MODE.
     57 021426                          5$:
     58 021426  052777  000020  160640          BIS     #TXENA,@TXCSR   ;ENABLE THE TRANSMITTER.
     59 021434  052777  000400  160634          BIS     #TSOM,@TDSR     ;TRANSMIT START OF MESSAGE.
     60 021442                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.

                                                                        ;******** MACRO EXPANSION ********
        021442  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
        021446  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
        021450  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                        ;**********************************

     61 021452                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
        021452  104410                                                                          TRAP    C$ESCAPE
        021454  000074                                                                          .WORD   L10046-.
     62 021456  032777  000002  160610          BIT     #TXACT,@TXCSR   ;IS THE TRANSMITTER ACTIVE?
     63 021464  001010                          BNE     10$             ;IF YES - OK.
     64 021466  017701  160602                  MOV     @TXCSR,R1       ;SAVE THE TRANSMIT STATUS
     65 021472  052701  000020                  BIS     #TXENA,R1       ;EXPECT TXENA TO BE SET.
     66 021476                                  ERRDF   19,EMG5,ERRG7
```

```
TEST 4 - TRANSMIT ENABLE
        021476  104455                                                                    TRAP    C$ERDF
        021500  000023                                                                    .WORD   19
        021502  013455                                                                    .WORD   EMG5
        021504  007052                                                                    .WORD   ERRG7
    67
    68 021506                       10$:
    69 021506                               CALL    $RESET          ;RESET THE DPV
    70 021512                               ESCAPE  TST             ;IF ERROR, EXIT THE TEST
        021512  104410                                                                    TRAP    C$ESCAPE
        021514  000034                                                                    .WORD   L10046-.
    71 021516  032777  000002  160550       BIT     #TXACT,@TXCSR   ;IS THE TRANSMIITER INACTIVE?
    72 021524  001406                       BEQ     20$             ;IF YES - OK.
    73 021526  012701  000004               MOV     #TBE,R1         ;EXPECT ONLY TBE TO BE SET.
    74 021532                               ERRDF   20,EMG6,ERRG7
        021532  104455                                                                    TRAP    C$ERDF
        021534  000024                                                                    .WORD   20
        021536  013510                                                                    .WORD   EMG6
        021540  007052                                                                    .WORD   ERRG7
    75
    76 021542                       20$:
    77 021542                               ESCAPE TST              ;IF ERROR, BRANCH TO END OF TEST
        021542  104410                                                                    TRAP    C$ESCAPE
        021544  000004                                                                    .WORD   L10046-.
    78
    79 021546                         ENDSUB
        021546                                                                    L10050:
        021546  104403                                                                    TRAP    C$ESUB
    80
    81
    82 021550                       ENDTST
        021550                                                                    L10046:
        021550  104401                                                                    TRAP    C$ETST
    83
    84
    85
```

```
                                .SBTTL          TEST 5 - TRANSMIT BUFFER EMPTY

                                ;*******************************************************************
                                ;*              TEST 5 - DPV-11
                                ;* TRANSMIT BUFFER EMPTY
                                ;* VERIFY THAT TBE (TRANSMIT BUFFER EMPTY) IS ASSERTED WHENEVER
                                ;* THE DEVICE IS RESET OR WHENEVER THE TDSR IS AVAILABLE FOR DATA.
                                ;* TBE IS CLEARED AFTER WRITING TO THE TDSR.
                                ;*
                                ;*******************************************************************

 021552                         BGNTST
 021552                                                                                  T5::

 021552                           BGNSUB
 021552                                                                                  T5.1:
 021552  104402                                                                                   TRAP    C$BSUB
 021554                                  CALL    $RESET          ;RESET THE DPV
 021560                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
 021560  104410                                                                                   TRAP    C$ESCAPE
 021562  000220                                                                                   .WORD   L10051-.
 021564  005077  160506                  CLR     @TDSR           ;WRITE TO THE TDSR.
 021570                                  DELAY   5               ;DELAY 500 MICROSECONDS.  THIS WILL
 021570  012727  000005                                                                           MOV     #5,(PC)+
 021574  000000                                                                                   .WORD   0
 021576  013727  002116                                                                           MOV     L$DLY,(PC)+
 021602  000000                                                                                   .WORD   0
 021604  005367  177772                                                                           DEC     -6(PC)
 021610  001375                                                                                   BNE     .-4
 021612  005367  177756                                                                           DEC     -22(PC)
 021616  001367                                                                                   BNE     .-20
                                                         ;US TO ENSURE THAT TBE IS NOT
                                                         ;REASSERTED.  BECAUSE THE TRANSMITTER
                                                         ;IS IDLE, TBE SHOULD STAY LOW.
 021620  032777  000004  160446          BIT     #TBE,@TXCSR     ;IS TBE CLEARED?
 021626  001410                          BEQ     10$             ;IF YES - OK
 021630  017701  160442                  MOV     @TDSR,R1        ;SAVE THE TRANSMIT DATA/STATUS REG.
 021634  042701  000004                  BIC     #TBE,R1         ;PUT EXPECTED RESULT IN R1 FOR MSG.
 021640                                  ERRDF   21,EMG7,ERRG7
 021640  104455                                                                                   TRAP    C$ERDF
 021642  000025                                                                                   .WORD   21
 021644  013545                                                                                   .WORD   EMG7
 021646  007052                                                                                   .WORD   ERRG7
 021650                         10$:
 021650                           ENDSUB
 021650                                                                                  L10052:
 021650  104403                                                                                   TRAP    C$ESUB

 021652                           BGNSUB
 021652                                                                                  T5.2:
 021652  104402                                                                                   TRAP    C$BSUB
 021654                                  CALL    $RESET          ;RESET THE DPV
 021660                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
 021660  104410                                                                                   TRAP    C$ESCAPE
 021662  000120                                                                                   .WORD   L10051-.
 021664  005737  002310                  TST     TURN            ;TURNAROUND?
```

```
021670  001003                          BNE     1$              ;BR IF EXTERNAL.
021672  052777  000010  160374          BIS     #MM,@TXCSR      ;SET MAINTENANCE MODE.
021700                          1$:
021700  052777  000020  160366          BIS     #TXENA,@TXCSR   ;ENABLE THE TRANSMITTER.
021706  012777  000400  160362          MOV     #TSOM,@TDSR     ;TRANSMIT START OF MESSAGE.
021714                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.

                                                                ;******** MACRO EXPANSION ********
021714  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
021720  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
021722  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                ;**********************************

021724                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
021724  104410                                                                          TRAP    C$ESCAPE
021726  000054                                                                          .WORD   L10051-.

021730  012777  000014  160340          MOV     #14,@TDSR       ;TRANSMIT 1ST CHARACTER.
021736                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.

                                                                ;******** MACRO EXPANSION ********
021736  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
021742  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
021744  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                ;**********************************

021746                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
021746  104410                                                                          TRAP    C$ESCAPE
021750  000032                                                                          .WORD   L10051-.
021752  012701  001000                  MOV     #1000,R1        ;SET UP COUNTER
021756                          5$:
021756  005777  160314                  TST     @TDSR           ;CHECK FOR TRANSMIT ERROR.
021762  100406                          BMI     10$             ;WHEN SET OK.
021764  005301                          DEC     R1              ;DECREMENT COUNTER.
021766  001373                          BNE     5$              ;CONTINUE UNTIL COUNTER 0
021770                                  ERRDF   22,EMG8,ERRG2
021770  104455                                                                          TRAP    C$ERDF
021772  000026                                                                          .WORD   22
021774  013563                                                                          .WORD   EMG8
021776  006560                                                                          .WORD   ERRG2
022000                          10$:
022000                            ENDSUB
022000                                                                          L10053:
022000  104403                                                                          TRAP    C$ESUB

022002                          ENDTST
022002                                                                          L10051:
022002  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 6 - TRANSMIT INTERRUPT

                                ;*******************************************************************
                                ;*              TEST 6 - DPV-11
                                ;* TRANSMIT INTERRUPT
                                ;* VERIFY THAT A TRANSMIT INTERRUPT IS RECEIVED WHEN TRANSMIT
                                ;* BUFFER EMPTY (TBE) IS ASSERTED.
                                ;*
                                ;*******************************************************************
022004                          BGNTST
022004                                                                                  T6::

022004                                  CALL    $RESET          ;RESET THE DPV
022010                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
022010  104410                                                                          TRAP    C$ESCAPE
022012  000146                                                                          .WORD   L10054-.
022014  005037  002424                  CLR     TFLAG           ;CLEAR THE FLAG USED IN THE INTERRUPT ROUTINE.

022020                                  SETVEC  XMTVEC,#XINT,#PRI04
022020  012746  000200                                                                  MOV     #PRI04,-(SP)
022024  012746  017050                                                                  MOV     #XINT,-(SP)
022030  013746  002266                                                                  MOV     XMTVEC,-(SP)
022034  012746  000003                                                                  MOV     #3,-(SP)
022040  104437                                                                          TRAP    C$SVEC
022042  062706  000010                                                                  ADD     #10,SP
022046                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
022046  012700  000000                                                                  MOV     #PRI00,R0
022052  104441                                                                          TRAP    C$SPRI
                                                        ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                        ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                        ;LEVEL 4-7.
                                                        ;SET UP INTERRUPT VECTOR

022054  052777  000120  160212          BIS     #TXENA!TXIE,@TXCSR ;SET THE INTERRUPT ENABLE AND ENABLE
                                                                   ;THE TRANSMITTER.
022062  005000                          CLR     R0              ;TIMER FOR LOOP
022064                          10$:
022064  005737  002424                  TST     TFLAG           ;WAS THE INTERRUPT RECEIVED?
022070  001006                          BNE     20$             ;IF YES - OK.
022072  005300                          DEC     R0              ;DECREMENT TIMER.
022074  001373                          BNE     10$             ;KEEP CHECKING UNTIL THE TIMER EXPIRES.
022076                                  ERRDF   23,EMG9,ERRG2   ;ERROR MESSAGE XMIT NOT RECEIVED.
022076  104455                                                                          TRAP    C$ERDF
022100  000027                                                                          .WORD   23
022102  013577                                                                          .WORD   EMG9
022104  006560                                                                          .WORD   ERRG2
022106                          20$:
022106  005037  002424                  CLR     TFLAG           ;CLEAR THE FLAG
022112  012777  000001  160154          MOV     #RESET,@TXCSR   ;RESET THE DPV
022120                                  $DELAY  1               ;WAIT FOR 100 MICROSECONDS.

                                                                ;******** MACRO EXPANSION ********
022120  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
022124  000001                                  .WORD   1       ;NUMBER OF DELAY LOOPS
                                                                ;*********************************
```

```
022126  005737  002336                TST     FLAG            ;WAS AN INTERRUPT RECEIVED
022132  001404                        BEQ     30$             ;IF NOT - OK. (RESET SHOULD CLEAR INT ENABLE)
022134                                ERRDF   24,EMG10,ERRG2  ;ERROR MESSAGE - TRANMSIT INT RECEIVED
022134  104455                                                                        TRAP    C$ERDF
022136  000030                                                                        .WORD   24
022140  013633                                                                        .WORD   EMG10
022142  006560                                                                        .WORD   ERRG2
022144                        30$:
022144                                SETPRI  #PRI07          ;SET PROCESSOR PRIORITY TO 7 (FOR
022144  012700  000340                                                                MOV     #PRI07,R0
022150  104441                                                                        TRAP    C$SPRI
                                                              ;LSI 11/03 THIS WILL DISABLE INTERRUPTS)
022152                                CLRVEC  XMTVEC          ;RESTORE THE XMIT INTERRUPT VECTOR
022152  013700  002266                                                                MOV     XMTVEC,R0
022156  104436                                                                        TRAP    C$CVEC

022160                        ENDTST
022160                                                                        L10054:
022160  104401                                                                        TRAP    C$ETST
```

```
                                .SBTTL          TEST 7 - RECEIVER ENABLE

                                ;*******************************************************************
                                ;*              TEST 7 - DPV-11
                                ;* RECEIVER ENABLE, RECEIVER ACTIVE AND RECEIVER DATA READY
                                ;*              MODE: BCP, 8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK
                                ;* ENABLE THE RECEIVER. AFTER TRANSMITTING A CHARACTER WAIT FOR
                                ;* RECEIVER DATA AVAILABLE AND CHECK THAT THE RECEIVER IS ACTIVE.
                                ;* AFTER CLEARING RECEIVER ENABLE, ENSURE THAT THE RECEIVER IS INACTIVE.
                                ;*
                                ;* RECEIVER ENABLE - CONTROLS THE OPERATION OF THE RECEIVER DATA PATH (RDP)
                                ;* RECEIVER ACTIVE - THIS OUTPUT IS ASSERTED WHEN THE RDP PRESENTS THE 1ST
                                ;*                   DATA CHARACTER OF A MESSAGE TO THE USYNRT.  IT REMAINS
                                ;*                   ASSERTED UNTIL THE RDP ENTERS THE IDLE STATE..
                                ;* RECEIVE DATA    - THIS OUTPUT IS SET WHEN THE RDP HAS ASSEMBLED A DATA
                                ;*                   CHARACTER THAT IS READY TO BE PRESENTED.
                                ;*******************************************************************
022162                          BGNTST
022162                                                                          T7::

022162                                  CALL    $RESET          ;RESET THE DPV
022166                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
022166  104410                                                                          TRAP    C$ESCAPE
022170  000222                                                                          .WORD   L10055-.
022172  012777  040252  160072          MOV     #40252,@PCSAR   ;SET BCP MODE AND SYNCH CHARACTER.
022200  012777  000020  160062          MOV     #RXENA,@RXCSR   ;ENABLE THE RECEIVER.
022206  012777  000030  160060          MOV     #TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER
                                                                ;SELECT THE MAINTENANCE LOOFBACK.
022214  052777  000400  160054          BIS     #TSOM,@TDSR     ;TRANSMIT START OF MESSAGE
022222                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.

                                                                ;******** MACRO EXPANSION ********
022222  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
022226  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
022230  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                ;***********************************

022232                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
022232  104410                                                                          TRAP    C$ESCAPE
022234  000156                                                                          .WORD   L10055-.
022236  032777  004200  160024          BIT     #RXACT!RDATRY,@RXCSR ;CHECK RECEIVER ACTIVE AND DATA READY.
022244  001056                          BNE     20$                     ;IF SET, REPORT ERROR.
022246  052777  000400  160022          BIS     #TSOM,@TDSR     ;RETRANSMIT START OF MESSAGE.
022254                                  WAIT    TBE             ;WAIT FOR TBE TO BE SET.

                                                                ;******** MACRO EXPANSION ********
022254  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
022260  000004                                  .WORD   TBE     ;WAIT FOR TBE TO BE SET
022262  002274                                  .WORD   TXCSR   ;IN TRANSMITTER  CSR.
                                                                ;***********************************

022264                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
022264  104410                                                                          TRAP    C$ESCAPE
022266  000124                                                                          .WORD   L10055-.
022270  032777  004200  157772          BIT     #RXACT!RDATRY,@RXCSR ;CHECK RECEIVER ACTIVE AND DATA READY.
022276  001041                          BNE     20$                     ;IF SET, REPORT ERROR.
022300  012777  000123  157770          MOV     #123,@TDSR      ;TRANSMIT THE FIRST DATA CHARACTER.
```

```
 37 022306                                  WAIT    RDATRY          ;WAIT FOR RECEIVE DATA.

                                                                    ;******** MACRO EXPANSION ********
    022306  004737  003724                  JSR     PC,$WAIT        ;CALL WAIT ROUTINE -
    022312  000200                                  .WORD   RDATRY  ;WAIT FOR BIT TO BE SET
    022314  002270                                  .WORD   RXCSR   ;IN RECEIVER  CSR.
                                                                    ;**********************************

 38 022316                                  ESCAPE  TST             ;IF ERROR, BRANCH TO END OF TEST.
    022316  104410                                                                          TRAP    C$ESCAPE
    022320  000072                                                                          .WORD   L10055-.
 39 022322  032777  004000  157740          BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
 40 022330  001005                          BNE     10$             ;IF YES - OK.
 41 022332                                  ERRDF   25,EMG12,ERRG2
    022332  104455                                                                          TRAP    C$ERDF
    022334  000031                                                                          .WORD   25
    022336  013736                                                                          .WORD   EMG12
    022340  006560                                                                          .WORD   ERRG2
 42 022342  000423                          BR      30$
 43 022344                          10$:
 44 022344  042777  000020  157716          BIC     #RXENA,@RXCSR   ;DISABLE THE RECEIVER
 45 022352                                  $DELAY  4               ;DELAY TO ALLOW DISABLE.

                                                                    ;******** MACRO EXPANSION ********
    022352  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
    022356  000004                                  .WORD   4       ;NUMBER OF DELAY LOOPS
                                                                    ;**********************************

 46 022360  032777  004200  157702          BIT     #RXACT!RDATRY,@RXCSR ;CHECK RECEIVER ACTIVE AND DATA READY.
 47 022366  001411                          BEQ     30$                  ;IF CLEAR OK
 48 022370                                  ERRDF   26,EMG13,ERRG2
    022370  104455                                                                          TRAP    C$ERDF
    022372  000032                                                                          .WORD   26
    022374  013762                                                                          .WORD   EMG13
    022376  006560                                                                          .WORD   ERRG2
 49 022400  000404                          BR      30$
 50 022402                          20$:
 51 022402                                  ERRDF   27,EMG14,ERRG2
    022402  104455                                                                          TRAP    C$ERDF
    022404  000033                                                                          .WORD   27
    022406  014043                                                                          .WORD   EMG14
    022410  006560                                                                          .WORD   ERRG2
 52 022412                          30$:
 53
 54 022412                          ENDTST
    022412                                                                      L10055:
    022412  104401                                                                          TRAP    C$ETST
 55
 56
 57
```

```
                                        .SBTTL          TEST 8 - RECEIVE DATA INTERRUPT

                                        ;*******************************************************************
                                        ;*              TEST 8 - DPV-11
                                        ;* RECEIVE DATA INTERRUPT
                                        ;*              MODE: BCP, 8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK
                                        ;* ENABLE THE RECEIVER AND SET RECEIVER INTERRUPT. TRANSMIT DATA.
                                        ;* CHECK THAT THE RECEIVE INTERUPT WAS GENERATED. AFTER THE INTERUPT
                                        ;* WAS GENERATED DISABLE THE RECEIVER. CHECK THAT THE RECEIVER BECOMES
                                        ;* INACTIVE.
                                        ;*
                                        ;*******************************************************************
 022414                                 BGNTST
 022414                                                                                         T8::

 022414                                         CALL    $RESET          ;RESET THE DPV
 022420                                         ESCAPE  TST             ;IF ERROR, EXIT THE TEST
 022420  104410                                                                                 TRAP    C$ESCAPE
 022422  000266                                                                                 .WORD   L10056-.
 022424  005037  002424                         CLR     TFLAG           ;CLEAR FLAGS USED IN THE INTERRUPT ROUTINES.
 022430  005037  002376                         CLR     RFLAG           ;
 022434  005037  002360                         CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
 022440  012737  000002  002414                 MOV     #2,START        ;SEND 2 START CHARACTERS.

 022446                                         SETVEC  XMTVEC,#XINT,#PRI04
 022446  012746  000200                                                                         MOV     #PRI04,-(SP)
 022452  012746  017050                                                                         MOV     #XINT,-(SP)
 022456  013746  002266                                                                         MOV     XMTVEC,-(SP)
 022462  012746  000003                                                                         MOV     #3,-(SP)
 022466  104437                                                                                 TRAP    C$SVEC
 022470  062706  000010                                                                         ADD     #10,SP
 022474                                         SETVEC  RCVEC,#RINT,#PRI04
 022474  012746  000200                                                                         MOV     #PRI04,-(SP)
 022500  012746  016414                                                                         MOV     #RINT,-(SP)
 022504  013746  002264                                                                         MOV     RCVEC,-(SP)
 022510  012746  000003                                                                         MOV     #3,-(SP)
 022514  104437                                                                                 TRAP    C$SVEC
 022516  062706  000010                                                                         ADD     #10,SP
 022522                                         SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
 022522  012700  000000                                                                         MOV     #PRI00,R0
 022526  104441                                                                                 TRAP    C$SPRI
                                                                        ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                                        ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                                        ;LEVEL 4-7.
                                                                        ;SET UP INTERRUPT VECTOR


 022530  012777  040252  157534                 MOV     #40252,@PCSAR   ;SET BCP MODE AND SYNCH CHARACTER.
 022536  012777  000120  157524                 MOV     #RXENA!RXITEN,@RXCSR ;ENABLE THE RECEIVER AND SET
                                                                        ;SET INTERRUPT ENABLE.
 022544  012777  000130  157522                 MOV     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE XMITTER AND INT.
                                                                        ;SELECT THE MAINTENANCE LOOPBACK.
 022552  005003                                 CLR     R3              ;CLEAR COUNTER
 022554                                 5$:
 022554  032737  000001  002376                 BIT     #1,RFLAG        ;WAS DATA RECEIVED
 022562  001007                                 BNE     10$             ;IF YES - OK.
```

```
022564  005303                          DEC     R3              ;DECREMENT COUNTER.
022566  001372                          BNE     5$

022570                                  ERRDF   28,EMG15,ERRG2
022570  104455                                                                          TRAP    C$ERDF
022572  000034                                                                          .WORD   28
022574  014117                                                                          .WORD   EMG15
022576  006560                                                                          .WORD   ERRG2
022600  000430                          BR      30$
022602                          10$:
022602  042777  000020  157460          BIC     #RXENA,@RXCSR   ;DISABLE THE RECEIVER
022610  005037  002376                  CLR     RFLAG           ;CLEAR THE FLAG.
022614                                  $DELAY  5               ;DELAY TO ALLOW DISABLE.

                                                                ;******** MACRO EXPANSION ********
022614  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
022620  000005                                  .WORD   5       ;NUMBER OF DELAY LOOPS
                                                                ;**********************************

022622  005737  002376                  TST     RFLAG           ;WAS AN INTERUPT RECEIVED?
022626  001011                          BNE     20$             ;IF YES - REPORT ERROR.
022630  032777  004200  157432          BIT     #RXACT!RDATRY,@RXCSR ;CHECK RECEIVER ACTIVE AND DATA READY.
022636  001411                          BEQ     30$                  ;IF CLEAR OK
022640                                  ERRDF   29,EMG13,ERRG2
022640  104455                                                                          TRAP    C$ERDF
022642  000035                                                                          .WORD   29
022644  013762                                                                          .WORD   EMG13
022646  006560                                                                          .WORD   ERRG2
022650  000404                          BR      30$
022652                          20$:
022652                                  ERRDF   30,EMG16,ERRG2
022652  104455                                                                          TRAP    C$ERDF
022654  000036                                                                          .WORD   30
022656  014152                                                                          .WORD   EMG16
022660  006560                                                                          .WORD   ERRG2
022662                          30$:
022662                                  CALL    $RESET          ;RESET THE DPV.
022666                                  SETPRI  #PRI07          ;SET THE PROCESSOR PRI TO 7
022666  012700  000340                                                                  MOV     #PRI07,R0
022672  104441                                                                          TRAP    C$SPRI
                                                                ;(THIS WILL DISABLE INTERRUPTS)
022674                                  CLRVEC  RCVEC           ;RESTORE THE RECV. VECTOR
022674  013700  002264                                                                  MOV     RCVEC,R0
022700  104436                                                                          TRAP    C$CVEC
022702                                  CLRVEC  XMTVEC          ;RESTORE THE XMIT. VECTOR
022702  013700  002266                                                                  MOV     XMTVEC,R0
022706  104436                                                                          TRAP    C$CVEC

022710                          ENDTST
022710                                                                          L10056:
022710  104401                                                                          TRAP    C$ETST
```

```
                                        .SBTTL          TEST 9 - RECEIVER STATUS

                                        ;*******************************************************************
                                        ;*              TEST 9 - DPV-11
                                        ;* THERE ARE 3 SUBTESTS IN THIS TEST WHICH ARE INTENDED TO CHECK
                                        ;* RECEIVER STATUS.
                                        ;* SUBTEST 1 -  REOM (RECEIVE END OF MESSAGE)
                                        ;*              THIS SUBTEST WILL TRANSMIT A DATA MESSAGE THAT IS
                                        ;*              ENDED WITH A TEOM (TRANSMIT END OF MESSAGE).  A
                                        ;*              CHECK WILL BE MADE THAT THE RECEIVER GETS THE DATA
                                        ;*              AND THAT THE REOM IS RECEIVED WHEN RECEIVE
                                        ;*              STATUS IS AVAILABLE.
                                        ;*
                                        ;* SUBTEST 2 -  RECEIVER OVERRUN
                                        ;*              THIS SUBTEST WILL TRANSMIT DATA CORRECTLY.  THE
                                        ;*              RECEIVER AFTER BECOMING ACTIVE WILL NOT SERVICE
                                        ;*              THE RECEIVE BUFFER CORRECTLY.  THIS SHOULD RESULT IN
                                        ;*              A RECEIVE OVERRUN.  THIS SUBTEST WILL ENSURE THAT
                                        ;*              WHEN RECEIVE STATUS IS AVAILABLE, THE RECEIVER OVERRUN
                                        ;*              IS SET.
                                        ;*
                                        ;* SUBTEST 3 -  RECEIVER ABORT
                                        ;*              THIS SUBTEST WILL TRANSMIT A DATA MESSAGE THAT IS ENDED
                                        ;*              WITH A TRANSMIT ABORT.  THE SUBTEST WILL ENSURE THAT
                                        ;*              RECEIVE STATUS AVAILABLE IS RECEIVED AND THAT THE
                                        ;*              ABORT IS RECEIVED.
                                        ;*
                                        ;*******************************************************************
022712                                  BGNTST
022712                                                                                          T9::

022712                                    BGNSUB
022712                                                                                          T9.1:
022712  104402                                                                                          TRAP    C$BSUB
022714                                          CALL    $RESET          ;RESET THE DPV
022720                                          ESCAPE  TST             ;IF ERROR, EXIT THE TEST
022720  104410                                                                                          TRAP    C$ESCAPE
022722  000774                                                                                          .WORD   L10057-.
022724  005037  002424                          CLR     TFLAG           ;CLEAR TRANSMIT INTERRUPT FLAG.
022730  012737  000001  002414                  MOV     #1,START        ;# OF START OF MESSAGES.

022736                                          SETVEC  XMTVEC,#XINT,#PRI04
022736  012746  000200                                                                                  MOV     #PRI04,-(SP)
022742  012746  017050                                                                                  MOV     #XINT,-(SP)
022746  013746  002266                                                                                  MOV     XMTVEC,-(SP)
022752  012746  000003                                                                                  MOV     #3,-(SP)
022756  104437                                                                                          TRAP    C$SVEC
022760  062706  000010                                                                                  ADD     #10,SP
022764                                          SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
022764  012700  000000                                                                                  MOV     #PRI00,R0
022770  104441                                                                                          TRAP    C$SPRI
                                                                        ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                                        ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                                        ;LEVEL 4-7.
                                                                        ;SET UP INTERRUPT VECTOR

022772  052777  000130  157274                  BIS     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND SELECT
```

```
                                                                                ;MAINTENANCE MODE LOOPBACK.
023000  052777  000020  157262          BIS     #RXENA,@RXCSR   ;ENABLE THE RECEIVER

023006  005003                          CLR     R3              ;INITIALIZE THE COUNTER
023010                          5$:
023010  032777  004000  157252          BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
023016  001007                          BNE     10$             ;BR IF YES
023020  005303                          DEC     R3              ;DECREMENT THE COUNTER
023022  001372                          BNE     5$
023024                                  ERRDF   31,EMG12,ERRG2
023024  104455                                                                  TRAP    C$ERDF
023026  000037                                                                  .WORD   31
023030  013736                                                                  .WORD   EMG12
023032  006560                                                                  .WORD   ERRG2
023034  000444                          BR      45$
023036                          10$:
023036  005003                          CLR     R3              ;INITIALIZE THE COUNTER.
023040                          12$:
023040  032777  002200  157222          BIT     #RSTARY!RDATRY,@RXCSR   ;IS DATA OR STATUS READY?
023046  001407                          BEQ     15$                     ;BR IF NOT
023050  017737  157216  002400          MOV     @RDSR,RSAVE     ;SAVE THE CHARACTER
023056  032737  001000  002400          BIT     #REOM,RSAVE     ;WAS THE RECEIVE END OF MESSAGE RECEIVED?
023064  001007                          BNE     20$
023066                          15$:
023066  005303                          DEC     R3              ;DECREMENT THE COUNTER
023070  001363                          BNE     12$
023072                                  ERRDF   32,EMG17,ERRG2
023072  104455                                                                  TRAP    C$ERDF
023074  000040                                                                  .WORD   32
023076  014221                                                                  .WORD   EMG17
023100  006560                                                                  .WORD   ERRG2
023102  000421                          BR      45$
023104                          20$:
023104  032777  002000  157156          BIT     #RSTARY,@RXCSR  ;IS THE STATUS DROPPED?
023112  001405                          BEQ     25$
023114                                  ERRDF   33,EMG18,ERRG2
023114  104455                                                                  TRAP    C$ERDF
023116  000041                                                                  .WORD   33
023120  014261                                                                  .WORD   EMG18
023122  006560                                                                  .WORD   ERRG2
023124  000410                          BR      45$
023126                          25$:
023126  032777  004000  157134          BIT     #RXACT,@RXCSR   ;IS THE RECEIVER INACTIVE?
023134  001404                          BEQ     45$             ;BR IF YES
023136                                  ERRDF   34,EMG11,ERRG2
023136  104455                                                                  TRAP    C$ERDF
023140  000042                                                                  .WORD   34
023142  013705                                                                  .WORD   EMG11
023144  006560                                                                  .WORD   ERRG2

023146                          45$:

023146                          ENDSUB
023146                                                          L10060:
023146  104403                                                                  TRAP    C$ESUB

023150                          BGNSUB
```

```
        023150                                                                          T9.2:
        023150  104402                                                                          TRAP    C$BSUB
     84 023152                                  CALL    $RESET          ;RESET THE DPV
     85 023156                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
        023156  104410                                                                          TRAP    C$ESCAPE
        023160  000536                                                                          .WORD   L10057-.
     86
     87 023162  005037  002424                  CLR     TFLAG           ;CLEAR TRANSMIT INTERRUPT FLAG.
     88 023166  012737  000001  002414          MOV     #1,START        ;# OF START OF MESSAGES.
     89
     90 023174                                  SETVEC  XMTVEC,#XINT,#PRI04
        023174  012746  000200                                                                  MOV     #PRI04,-(SP)
        023200  012746  017050                                                                  MOV     #XINT,-(SP)
        023204  013746  002266                                                                  MOV     XMTVEC,-(SP)
        023210  012746  000003                                                                  MOV     #3,-(SP)
        023214  104437                                                                          TRAP    C$SVEC
        023216  062706  000010                                                                  ADD     #10,SP
     91 023222                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
        023222  012700  000000                                                                  MOV     #PRI00,R0
        023226  104441                                                                          TRAP    C$SPRI
     92                                                                 ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
     93                                                                 ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
     94                                                                 ;LEVEL 4-7.
     95                                                                 ;SET UP INTERRUPT VECTOR
     96
     97 023230  052777  000130  157036          BIS     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND SELECT
     98                                                                 ;MAINTENANCE MODE LOOPBACK.
     99 023236  052777  000020  157024          BIS     #RXENA,@RXCSR   ;ENABLE THE RECEIVER
    100
    101 023244  005003                          CLR     R3              ;INITIALIZE THE COUNTER
    102 023246                          5$:
    103 023246  032777  004000  157014          BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
    104 023254  001007                          BNE     10$             ;BR IF YES
    105 023256  005303                          DEC     R3              ;DECREMENT THE COUNTER
    106 023260  001372                          BNE     5$
    107 023262                                  ERRDF   35,EMG12,ERRG2
        023262  104455                                                                          TRAP    C$ERDF
        023264  000043                                                                          .WORD   35
        023266  013736                                                                          .WORD   EMG12
        023270  006560                                                                          .WORD   ERRG2
    108 023272  000464                          BR      55$
    109 023274                          10$:
    110 023274  005003                          CLR     R3              ;INITIALIZE THE COUNTER.
    111 023276                          12$:
    112 023276  032777  002000  156764          BIT     #RSTARY,@RXCSR  ;IS THE STATUS READY?
    113 023304  001007                          BNE     20$
    114 023306  005303                          DEC     R3              ;DECREMENT THE COUNTER
    115 023310  001372                          BNE     12$
    116
    117 023312                                  ERRDF   36,EMG1,ERRG2   ;TIME OUT
        023312  104455                                                                          TRAP    C$ERDF
        023314  000044                                                                          .WORD   36
        023316  013336                                                                          .WORD   EMG1
        023320  006560                                                                          .WORD   ERRG2
    118 023322  000450                          BR      55$
    119
    120 023324                          20$:
```

```
023324  032777  004000  156740          BIT     #ROVER,@RDSR     ;WAS THE RECEIVE OVERRUN RECEIVED?
023332  001005                          BNE     40$              ;IF YES OK.
023334                                  ERRDF   37,EMG19,ERRG2
023334  104455                                                                          TRAP    C$ERDF
023336  000045                                                                          .WORD   37
023340  014310                                                                          .WORD   EMG19
023342  006560                                                                          .WORD   ERRG2
023344  000437                          BR      55$
023346                          40$:
023346  032777  002000  156714          BIT     #RSTARY,@RXCSR   ;WAS THE STATUS CLEARED
023354  001405                          BEQ     42$              ;IF YES OK
023356                                  ERRDF   38,EMG18,ERRG2
023356  104455                                                                          TRAP    C$ERDF
023360  000046                                                                          .WORD   38
023362  014261                                                                          .WORD   EMG18
023364  006560                                                                          .WORD   ERRG2
023366  000426                          BR      55$
023370                          42$:
023370  032777  002000  156672          BIT     #RSTARY,@RXCSR   ;IS THE STATUS READY?
023376  001007                          BNE     47$
023400  005303                          DEC     R3               ;DECREMENT THE COUNTER
023402  001372                          BNE     42$

023404                                  ERRDF   39,EMG1,ERRG2    ;TIME OUT
023404  104455                                                                          TRAP    C$ERDF
023406  000047                                                                          .WORD   39
023410  013336                                                                          .WORD   EMG1
023412  006560                                                                          .WORD   ERRG2
023414  000413                          BR      55$


023416                          47$:
023416  042777  000020  156644          BIC     #RXENA,@RXCSR    ;DISABLE THE RECEIVER.

023424  032777  002000  156636          BIT     #RSTARY,@RXCSR   ;IS THE STATUS DROPPED?
023432  001404                          BEQ     55$
023434                          50$:
023434                                  ERRDF   40,EMG18,ERRG2
023434  104455                                                                          TRAP    C$ERDF
023436  000050                                                                          .WORD   40
023440  014261                                                                          .WORD   EMG18
023442  006560                                                                          .WORD   ERRG2
023444                          55$:

023444                            ENDSUB
023444                                                                          L10061:
023444  104403                                                                          TRAP    C$ESUB


023446                            BGNSUB
023446                                                                          T9.3:
023446  104402                                                                          TRAP    C$BSUB
023450                                  CALL    $RESET           ;RESET THE DPV
023454                                  ESCAPE  TST              ;IF ERROR, EXIT THE TEST
```

```
        023454  104410                                                                          TRAP    C$ESCAPE
        023456  000240                                                                          .WORD   L10057-.
    158 023460  005037  002424                  CLR     TFLAG           ;CLEAR TRANSMIT INTERRUPT FLAG.
    159 023464  012737  000001  002414          MOV     #1,START        ;# OF START OF MESSAGES.
    160 023472  012737  000001  002322          MOV     #1,ABORT        ;SEND AN ABORT
    161
    162 023500                                  SETVEC  XMTVEC,#XINT,#PRI04
        023500  012746  000200                                                                  MOV     #PRI04,-(SP)
        023504  012746  017050                                                                  MOV     #XINT,-(SP)
        023510  013746  002266                                                                  MOV     XMTVEC,-(SP)
        023514  012746  000003                                                                  MOV     #3,-(SP)
        023520  104437                                                                          TRAP    C$SVEC
        023522  062706  000010                                                                  ADD     #10,SP
    163 023526                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
        023526  012700  000000                                                                  MOV     #PRI00,R0
        023532  104441                                                                          TRAP    C$SPRI
    164                                                                 ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
    165                                                                 ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
    166                                                                 ;LEVEL 4-7.
    167                                                                 ;SET UP INTERRUPT VECTOR
    168
    169 023534  052777  000130  156532          BIS     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND SELECT
    170                                                                 ;MAINTENANCE MODE LOOPBACK.
    171 023542  052777  000020  156520          BIS     #RXENA,@RXCSR   ;ENABLE THE RECEIVER
    172
    173 023550  005003                          CLR     R3              ;INITIALIZE THE COUNTER
    174 023552                          5$:
    175 023552  032777  004000  156510          BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
    176 023560  001007                          BNE     10$             ;BR IF YES
    177 023562  005303                          DEC     R3              ;DECREMENT THE COUNTER
    178 023564  001372                          BNE     5$
    179 023566                                  ERRDF   41,EMG12,ERRG2
        023566  104455                                                                          TRAP    C$ERDF
        023570  000051                                                                          .WORD   41
        023572  013736                                                                          .WORD   EMG12
        023574  006560                                                                          .WORD   ERRG2
    180 023576  000444                          BR      45$
    181 023600                          10$:
    182 023600  005003                          CLR     R3              ;INITIALIZE THE COUNTER.
    183 023602                          12$:
    184 023602  032777  002000  156460          BIT     #RSTARY,@RXCSR  ;IS THE STATUS READY?
    185 023610  001016                          BNE     20$
    186 023612  032777  000200  156450          BIT     #RDATRY,@RXCSR
    187 023620  001403                          BEQ     15$
    188 023622                                  $DELAY  5               ;DELAY .5 MSEC.

                                                                        ;******** MACRO EXPANSION ********
        023622  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
        023626  000005                                  .WORD   5       ;NUMBER OF DELAY LOOPS
                                                                        ;**********************************

    189 023630                          15$:
    190 023630  005303                          DEC     R3              ;DECREMENT THE COUNTER
    191 023632  001363                          BNE     12$
    192 023634                                  ERRDF   42,EMG1,ERRG2   ;TIME OUT
        023634  104455                                                                          TRAP    C$ERDF
        023636  000052                                                                          .WORD   42
```

```
        023640  013336                                                                    .WORD   EMG1
        023642  006560                                                                    .WORD   ERRG2
    193 023644  000421                          BR      45$
    194
    195 023646                          20$:
    196
    197 023646  032777  002000  156416          BIT     #RABORT,@RDSR   ;WAS THE RECEIVE ABORT RECEIVED?
    198 023654  001005                          BNE     40$             ;IF YES OK.
    199 023656                                  ERRDF   43,EMG20,ERRG2
        023656  104455                                                                    TRAP    C$ERDF
        023660  000053                                                                    .WORD   43
        023662  014341                                                                    .WORD   EMG20
        023664  006560                                                                    .WORD   ERRG2
    200 023666  000410                          BR      45$
    201 023670                          40$:
    202 023670  032777  002000  156372          BIT     #RSTARY,@RXCSR  ;IS THE STATUS DROPPED?
    203 023676  001404                          BEQ     45$
    204
    205 023700                                  ERRDF   44,EMG18,ERRG2
        023700  104455                                                                    TRAP    C$ERDF
        023702  000054                                                                    .WORD   44
        023704  014261                                                                    .WORD   EMG18
        023706  006560                                                                    .WORD   ERRG2
    206 023710                          45$:
    207 023710  005037  002322                  CLR     ABORT           ;CLEAR THE ABORT FLAG.
    208 023714                            ENDSUB
        023714                                                                    L10062:
        023714  104403                                                                    TRAP    C$ESUB
    209
    210
    211
    212 023716                          ENDTST
        023716                                                                    L10057:
        023716  104401                                                                    TRAP    C$ETST
    213
    214
```

```
                                .SBTTL          TEST 10 - RECEIVE STATUS INTERRUPT

                                ;*******************************************************************
                                ;*              TEST 10 - DPV-11
                                ;* THIS TEST WILL ENSURE THAT INTERRUPTS MAY BE GENERATED WHEN
                                ;* RECEIVE STATUS IS AVAILABLE. EACH OF THE FOLLOWING SUBTESTS
                                ;* WILL GENERATE THE STATUS AS FOLLOWS:
                                ;* SUBTEST 1 -  REOM
                                ;* SUBTEST 2 -  RECEIVER OVERRUN
                                ;* SUBTEST 3 -  RECEIVER ABORT
                                ;*
                                ;*******************************************************************
023720                          BGNTST
023720                                                                                  T10::

023720                            BGNSUB
023720                                                                                  T10.1:
023720  104402                                                                                  TRAP    C$BSUB
023722                                  CALL    $RESET          ;RESET THE DPV
023726                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
023726  104410                                                                                  TRAP    C$ESCAPE
023730  001102                                                                                  .WORD   L10063-.
023732  005037  002376                  CLR     RFLAG           ;CLEAR RECEIVE INTERRUPT
023736  005037  002424                  CLR     TFLAG           ;CLEAR TRANSMIT INTERRUPT FLAG.
023742  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
023746  012737  000001  002414          MOV     #1,START        ;# OF START OF MESSAGES.

023754                                  SETVEC  XMTVEC,#XINT,#PRI04
023754  012746  000200                                                                          MOV     #PRI04,-(SP)
023760  012746  017050                                                                          MOV     #XINT,-(SP)
023764  013746  002266                                                                          MOV     XMTVEC,-(SP)
023770  012746  000003                                                                          MOV     #3,-(SP)
023774  104437                                                                                  TRAP    C$SVEC
023776  062706  000010                                                                          ADD     #10,SP
024002                                  SETVEC  RCVEC,#RINT,#PRI04
024002  012746  000200                                                                          MOV     #PRI04,-(SP)
024006  012746  016414                                                                          MOV     #RINT,-(SP)
024012  013746  002264                                                                          MOV     RCVEC,-(SP)
024016  012746  000003                                                                          MOV     #3,-(SP)
024022  104437                                                                                  TRAP    C$SVEC
024024  062706  000010                                                                          ADD     #10,SP
024030                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
024030  012700  000000                                                                          MOV     #PRI00,R0
024034  104441                                                                                  TRAP    C$SPRI
                                                                ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                                ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                                ;LEVEL 4-7.
                                                                ;SET UP INTERRUPT VECTOR

024036  052777  000130  156230          BIS     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND SELECT
                                                                      ;MAINTENANCE MODE LOOPBACK.
024044  052777  000120  156216          BIS     #RXITEN!RXENA,@RXCSR  ;ENABLE THE RECEIVER

024052  005003                          CLR     R3              ;INITIALIZE THE COUNTER
024054                          5$:
024054  032777  004000  156206          BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
```

```
024062  001007                          BNE     10$             ;BR IF YES
024064  005303                          DEC     R3              ;DECREMENT THE COUNTER
024066  001372                          BNE     5$
024070                                  ERRDF   45,EMG12,ERRG2
024070  104455                                                                          TRAP    C$ERDF
024072  000055                                                                          .WORD   45
024074  013736                                                                          .WORD   EMG12
024076  006560                                                                          .WORD   ERRG2
024100  000434                          BR      45$
024102                          10$:
024102  005003                          CLR     R3              ;INITIALIZE THE COUNTER.
024104                          12$:
024104  032737  000002  002376          BIT     #2,RFLAG        ;WAS STATUS RECEIVED?
024112  001007                          BNE     20$
024114  005303                          DEC     R3              ;DECREMENT THE COUNTER
024116  001372                          BNE     12$
024120                                  ERRDF   46,EMG21,ERRG2
024120  104455                                                                          TRAP    C$ERDF
024122  000056                                                                          .WORD   46
024124  014370                                                                          .WORD   EMG21
024126  006560                                                                          .WORD   ERRG2
024130  000420                          BR      45$

024132                          20$:
024132  032737  001000  002400          BIT     #REOM,RSAVE     ;WAS THE RECEIVE END OF MESSAGE RECEIVED?
024140  001004                          BNE     40$             ;IF YES OK.
024142                                  ERRDF   47,EMG17,ERRG2
024142  104455                                                                          TRAP    C$ERDF
024144  000057                                                                          .WORD   47
024146  014221                                                                          .WORD   EMG17
024150  006560                                                                          .WORD   ERRG2
024152                          40$:
024152  032777  002000  156110          BIT     #RSTARY,@RXCSR  ;IS THE STATUS DROPPED?
024160  001404                          BEQ     45$
024162                                  ERRDF   48,EMG18,ERRG2
024162  104455                                                                          TRAP    C$ERDF
024164  000060                                                                          .WORD   48
024166  014261                                                                          .WORD   EMG18
024170  006560                                                                          .WORD   ERRG2
024172                          45$:
024172                                  SETPRI  #PRI07          ;SET PROCESSOR PRI TO 7
024172  012700  000340                                                                  MOV     #PRI07,R0
024176  104441                                                                          TRAP    C$SPRI
                                                                ;(DISABLE INTERRUPT)
024200                                  CLRVEC  RCVEC           ;RESTORE THE INTERRUPT VECTOR.
024200  013700  002264                                                                  MOV     RCVEC,R0
024204  104436                                                                          TRAP    C$CVEC
024206                                  CLRVEC  XMTVEC          ;RESORE THE VECTOR.
024206  013700  002266                                                                  MOV     XMTVEC,R0
024212  104436                                                                          TRAP    C$CVEC

024214                          ENDSUB
024214                                                                          L10064:
024214  104403                                                                          TRAP    C$ESUB

024216                          BGNSUB
024216                                                                          T10.2:
```

```
     024216  104402                                                                    TRAP    C$BSUB
  71 024220                          CALL    $RESET          ;RESET THE DPV
  72 024224                          ESCAPE  TST             ;IF ERROR, EXIT THE TEST
     024224  104410                                                                    TRAP    C$ESCAPE
     024226  000604                                                                    .WORD   L10063-.
  73
  74 024230  005037  002376          CLR     RFLAG           ;CLEAR RECEIVE INTERRUPT
  75 024234  005037  002424          CLR     TFLAG           ;CLEAR TRANSMIT INTERRUPT FLAG.
  76 024240  005037  002360          CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
  77 024244  012737  000001  002414  MOV     #1,START        ;# OF START OF MESSAGES.
  78 024252  012737  000001  002370  MOV     #1,OVER         ;FLAG TO CREATE RECEIVE OVERRUN.
  79
  80 024260                          SETVEC  XMTVEC,#XINT,#PRI04
     024260  012746  000200                                                            MOV     #PRI04,-(SP)
     024264  012746  017050                                                            MOV     #XINT,-(SP)
     024270  013746  002266                                                            MOV     XMTVEC,-(SP)
     024274  012746  000003                                                            MOV     #3,-(SP)
     024300  104437                                                                    TRAP    C$SVEC
     024302  062706  000010                                                            ADD     #10,SP
  81 024306                          SETVEC  RCVEC,#RINT,#PRI04
     024306  012746  000200                                                            MOV     #PRI04,-(SP)
     024312  012746  016414                                                            MOV     #RINT,-(SP)
     024316  013746  002264                                                            MOV     RCVEC,-(SP)
     024322  012746  000003                                                            MOV     #3,-(SP)
     024326  104437                                                                    TRAP    C$SVEC
     024330  062706  000010                                                            ADD     #10,SP
  82 024334                          SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
     024334  012700  000000                                                            MOV     #PRI00,R0
     024340  104441                                                                    TRAP    C$SPRI
  83                                                         ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
  84                                                         ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
  85                                                         ;LEVEL 4-7.
  86                                                         ;SET UP INTERRUPT VECTOR
  87
  88 024342  052777  000130  155724  BIS     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND SELECT
  89                                                             ;MAINTENANCE MODE LOOPBACK.
  90 024350  052777  000120  155712  BIS     #RXITEN!RXENA,@RXCSR  ;ENABLE THE RECEIVER
  91
  92 024356  005003                  CLR     R3              ;INITIALIZE THE COUNTER
  93 024360                     5$:
  94 024360  032777  004000  155702  BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
  95 024366  001007                  BNE     10$             ;BR IF YES
  96 024370  005303                  DEC     R3              ;DECREMENT THE COUNTER
  97 024372  001372                  BNE     5$
  98 024374                          ERRDF   49,EMG12,ERRG2
     024374  104455                                                                    TRAP    C$ERDF
     024376  000061                                                                    .WORD   49
     024400  013736                                                                    .WORD   EMG12
     024402  006560                                                                    .WORD   ERRG2
  99 024404  000434                  BR      45$
 100 024406                     10$:
 101 024406  005003                  CLR     R3              ;INITIALIZE THE COUNTER.
 102 024410                     12$:
 103 024410  032737  000002  002376  BIT     #2,RFLAG        ;WAS STATUS RECEIVED?
 104 024416  001007                  BNE     20$
 105 024420  005303                  DEC     R3              ;DECREMENT THE COUNTER
 106 024422  001372                  BNE     12$
```

```
024424                                  ERRDF   50,EMG21,ERRG2
024424  104455                                                                  TRAP    C$ERDF
024426  000062                                                                  .WORD   50
024430  014370                                                                  .WORD   EMG21
024432  006560                                                                  .WORD   ERRG2
024434  000420                          BR      45$
                                20$:
024436  032737  004000  002400          BIT     #ROVER,RSAVE    ;WAS THE RECEIVE OVERRUN RECEIVED?
024444  001004                          BNE     40$             ;IF YES OK.
024446                                  ERRDF   51,EMG19,ERRG2
024446  104455                                                                  TRAP    C$ERDF
024450  000063                                                                  .WORD   51
024452  014310                                                                  .WORD   EMG19
024454  006560                                                                  .WORD   ERRG2
024456                          40$:
024456  032777  002000  155604          BIT     #RSTARY,@RXCSR  ;IS THE STATUS DROPPED?
024464  001404                          BEQ     45$
024466                                  ERRDF   52,EMG18,ERRG2
024466  104455                                                                  TRAP    C$ERDF
024470  000064                                                                  .WORD   52
024472  014261                                                                  .WORD   EMG18
024474  006560                                                                  .WORD   ERRG2
024476                          45$:
024476                                  SETPRI  #PRI07          ;SET PROCESSOR PRI TO 7
024476  012700  000340                                                          MOV     #PRI07,R0
024502  104441                                                                  TRAP    C$SPRI
                                                                ;(DISABLE INTERRUPT)
024504                                  CLRVEC  RCVEC           ;RESTORE THE INTERRUPT VECTOR.
024504  013700  002264                                                          MOV     RCVEC,R0
024510  104436                                                                  TRAP    C$CVEC
024512                                  CLRVEC  XMTVEC
024512  013700  002266                                                          MOV     XMTVEC,R0
024516  104436                                                                  TRAP    C$CVEC
024520  005037  002370                  CLR     OVER            ;CLEAR OVERRUN FLAG.

024524                          ENDSUB
024524                                                                  L10065:
024524  104403                                                                  TRAP    C$ESUB


024526                          BGNSUB
024526                                                                  T10.3:
024526  104402                                                                  TRAP    C$BSUB
024530                                  CALL    $RESET          ;RESET THE DPV
024534                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
024534  104410                                                                  TRAP    C$ESCAPE
024536  000274                                                                  .WORD   L10063-.

024540  005037  002376                  CLR     RFLAG           ;CLEAR RECEIVE INTERRUPT
024544  005037  002424                  CLR     TFLAG           ;CLEAR TRANSMIT INTERRUPT FLAG.
024550  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
024554  012737  000001  002414          MOV     #1,START        ;# OF START OF MESSAGES.
024562  012737  000001  002322          MOV     #1,ABORT        ;FLAG TO SEND ABORT
```

```
140 024570                          SETVEC  XMTVEC,#XINT,#PRI04
    024570  012746  000200                                                  MOV     #PRI04,-(SP)
    024574  012746  017050                                                  MOV     #XINT,-(SP)
    024600  013746  002266                                                  MOV     XMTVEC,-(SP)
    024604  012746  000003                                                  MOV     #3,-(SP)
    024610  104437                                                          TRAP    C$SVEC
    024612  062706  000010                                                  ADD     #10,SP
141 024616                          SETVEC  RCVEC,#RINT,#PRI04
    024616  012746  000200                                                  MOV     #PRI04,-(SP)
    024622  012746  016414                                                  MOV     #RINT,-(SP)
    024626  013746  002264                                                  MOV     RCVEC,-(SP)
    024632  012746  000003                                                  MOV     #3,-(SP)
    024636  104437                                                          TRAP    C$SVEC
    024640  062706  000010                                                  ADD     #10,SP
142 024644                          SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
    024644  012700  000000                                                  MOV     #PRI00,R0
    024650  104441                                                          TRAP    C$SPRI
143                                                         ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
144                                                         ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
145                                                         ;LEVEL 4-7.
146                                                         ;SET UP INTERRUPT VECTOR
147
148 024652  052777  000130  155414  BIS     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND SELECT
149                                                         ;MAINTENANCE MODE LOOPBACK.
150 024660  052777  000120  155402  BIS     #RXITEN!RXENA,@RXCSR  ;ENABLE THE RECEIVER
151
152 024666  005003                  CLR     R3              ;INITIALIZE THE COUNTER
153 024670                      5$:
154 024670  032777  004000  155372  BIT     #RXACT,@RXCSR   ;IS THE RECEIVER ACTIVE?
155 024676  001007                  BNE     10$             ;BR IF YES
156 024700  005303                  DEC     R3              ;DECREMENT THE COUNTER
157 024702  001372                  BNE     5$
158 024704                          ERRDF   53,EMG12,ERRG2
    024704  104455                                                          TRAP    C$ERDF
    024706  000065                                                          .WORD   53
    024710  013736                                                          .WORD   EMG12
    024712  006560                                                          .WORD   ERRG2
159 024714  000435                  BR      45$
160 024716                      10$:
161 024716  005003                  CLR     R3              ;INITIALIZE THE COUNTER.
162 024720                      12$:
163 024720  032737  000002  002376  BIT     #2,RFLAG        ;WAS STATUS RECEIVED?
164 024726  001007                  BNE     20$
165 024730  005303                  DEC     R3              ;DECREMENT THE COUNTER
166 024732  001372                  BNE     12$
167 024734                          ERRDF   54,EMG21,ERRG2
    024734  104455                                                          TRAP    C$ERDF
    024736  000066                                                          .WORD   54
    024740  014370                                                          .WORD   EMG21
    024742  006560                                                          .WORD   ERRG2
168 024744  000421                  BR      45$
169
170 024746                      20$:
171 024746  032737  002000  002400  BIT     #RABORT,RSAVE   ;WAS THE RECEIVE ABORT RECEIVED?
172 024754  001005                  BNE     40$             ;IF YES OK.
173 024756                          ERRDF   55,EMG20,ERRG2
    024756  104455                                                          TRAP    C$ERDF
```

```
        024760  000067                                                                  .WORD   55
        024762  014341                                                                  .WORD   EMG20
        024764  006560                                                                  .WORD   ERRG2
    174 024766  000410                          BR      45$
    175 024770                          40$:
    176 024770  032777  002000  155272          BIT     #RSTARY,@RXCSR  ;IS THE STATUS DROPPED?
    177 024776  001404                          BEQ     45$
    178
    179 025000                                  ERRDF   56,EMG18,ERRG2
        025000  104455                                                                  TRAP    C$ERDF
        025002  000070                                                                  .WORD   56
        025004  014261                                                                  .WORD   EMG18
        025006  006560                                                                  .WORD   ERRG2
    180 025010                          45$:
    181 025010                                  SETPRI  #PRI07          ;SET PROCESSOR PRI TO 7
        025010  012700  000340                                                          MOV     #PRI07,R0
        025014  104441                                                                  TRAP    C$SPRI
    182                                                                 ;(DISABLE INTERRUPT)
    183 025016                                  CLRVEC  RCVEC           ;RESTORE THE INTERRUPT VECTOR.
        025016  013700  002264                                                          MOV     RCVEC,R0
        025022  104436                                                                  TRAP    C$CVEC
    184 025024  005037  002322                  CLR     ABORT           ;CLEAR THE ABORT FLAG.
    185
    186
    187 025030                          ENDSUB
        025030                                                                  L10066:
        025030  104403                                                                  TRAP    C$ESUB
    188
    189
    190 025032                          ENDTST
        025032                                                                  L10063:
        025032  104401                                                                  TRAP    C$ETST
    191
    192
    193
    194
    195
    196
    197
```

```
                                .SBTTL          TEST 11 - RECEIVE AND TRANSMIT INTERRUPT

                                ;*******************************************************************
                                ;*              TEST 11 - DPV-11
                                ;* RECEIVE AND TRANSMIT INTERRUPT
                                ;* TRANSMIT AND RECEIVE DATA USING INTERRUPT ROUTINES. THIS TEST
                                ;* WILL TRANSMIT 4 DATA CHARACTERS. AFTER ENSURING THAT A TRANSMIT
                                ;* INTERRUPT WAS COMPLETED, THE TEST WILL CHECK TO MAKE SURE THAT AT
                                ;* LEAST 1 RECEIVE INTERRUPT WAS GENERATED.
                                ;*
                                ;*******************************************************************
 025034                         BGNTST
 025034                                                                                  T11::

 025034                                 CALL    $RESET          ;RESET THE DPV
 025040                                 ESCAPE  TST             ;IF ERROR, EXIT THE TEST
 025040  104410                                                                          TRAP    C$ESCAPE
 025042  000234                                                                          .WORD   L10067-.
 025044  005037  002424                 CLR     TFLAG           ;CLEAR THE FLAGS USED IN THE ISRS.
 025050  005037  002376                 CLR     RFLAG
 025054  005037  002360                 CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
 025060                                 SETVEC  RCVEC,#RINT,#PRI04
 025060  012746  000200                                                                  MOV     #PRI04,-(SP)
 025064  012746  016414                                                                  MOV     #RINT,-(SP)
 025070  013746  002264                                                                  MOV     RCVEC,-(SP)
 025074  012746  000003                                                                  MOV     #3,-(SP)
 025100  104437                                                                          TRAP    C$SVEC
 025102  062706  000010                                                                  ADD     #10,SP
 025106                                 SETVEC  XMTVEC,#XINT,#PRI04
 025106  012746  000200                                                                  MOV     #PRI04,-(SP)
 025112  012746  017050                                                                  MOV     #XINT,-(SP)
 025116  013746  002266                                                                  MOV     XMTVEC,-(SP)
 025122  012746  000003                                                                  MOV     #3,-(SP)
 025126  104437                                                                          TRAP    C$SVEC
 025130  062706  000010                                                                  ADD     #10,SP
 025134                                 SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
 025134  012700  000000                                                                  MOV     #PRI00,R0
 025140  104441                                                                          TRAP    C$SPRI
                                                                ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                                ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                                ;LEVEL 4-7.
                                                                ;SET UP INTERRUPT VECTOR


 025142  012777  043652  155122         MOV     #43652,@PCSAR   ;SET BCP MODE, NO ERROR AND SYNCH CHARACTER.
 025150  012737  000002  002414         MOV     #2,START        ;# OF STARTS TO SEND.
 025156  012777  000120  155104         MOV     #RXITEN!RXENA,@RXCSR ;ENABLE THE RECEIVER AND SET
                                                                ;SET INTERRUPT ENABLE.
 025164  012777  000130  155102         MOV     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND INT.
                                                                ;SELECT THE MAINTENANCE LOOPBACK.
 025172  005001                         CLR     R1              ;LOOP COUNTER
 025174                         10$:
 025174  022737  000004  002330         CMP     #4,DATA         ;ARE THE 4 DATA CHARACTERS RECEIVED?
 025202  001412                         BEQ     20$             ;IF YES - CHECK RECEIVE INTERRUPT.
 025204  005301                         DEC     R1              ;DECREMENT COUNTER
 025206  001372                         BNE     10$
```

```
025210  005737  002424                  TST     TFLAG           ;WERE ANY XMIT INTERRUPTS RECEIVED
025214  001005                          BNE     20$             ;IF YES, KEEP CHECKING
025216                                  ERRDF   57,EMG9,ERRG2
025216  104455                                                                          TRAP    C$ERDF
025220  000071                                                                          .WORD   57
025222  013577                                                                          .WORD   EMG9
025224  006560                                                                          .WORD   ERRG2
025226  000410                          BR      30$

025230                          20$:
025230  032737  000001  002376          BIT     #1,RFLAG        ;WAS ANY DATA RECEIVED?
025236  001004                          BNE     30$             ;IF YES - OK.
025240                                  ERRDF   58,EMG15,ERRG2
025240  104455                                                                          TRAP    C$ERDF
025242  000072                                                                          .WORD   58
025244  014117                                                                          .WORD   EMG15
025246  006560                                                                          .WORD   ERRG2

025250                          30$:
025250                                  CALL    $RESET          ;RESET THE DPV
025254                                  SETPRI  #PRI07          ;SET THE PROCESSOR PRI TO 7
025254  012700  000340                                                                  MOV     #PRI07,R0
025260  104441                                                                          TRAP    C$SPRI
                                                                ;(THIS WILL DISABLE INTERRUPTS)
025262                                  CLRVEC  RCVEC           ;RESTORE THE RECV. VECTOR
025262  013700  002264                                                                  MOV     RCVEC,R0
025266  104436                                                                          TRAP    C$CVEC
025270                                  CLRVEC  XMTVEC          ;RESTORE THE XMIT. VECTOR
025270  013700  002266                                                                  MOV     XMTVEC,R0
025274  104436                                                                          TRAP    C$CVEC

025276                          ENDTST
025276                                                                  L10067:
025276  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 12 - MODEM STATUS

                                ;*******************************************************************
                                ;*              TEST 12 - DPV-11
                                ;* MODEM STATUS
                                ;* IF A PROPER TURNAROUND (H3259 OR H3260) IS ON, THIS TEST WILL
                                ;* CHECK THAT THE FOLLOWING MODEM SIGNALS ARE TURNED AROUND
                                ;* 1. RTS (REQUEST TO SEND)     TURNED AROUND TO CTS (CLEAR TO SEND)
                                ;*                                            & RR  (RECEIVER READY)
                                ;* 2. DTR (DATA TERMINAL READY) TURNED AROUND TO IC  (INCOMING CALL OR RING)
                                ;* 3. SF  (SELECT FREQUENCY)    TURNED AROUND TO SQ  (SIGNAL QUALITY)
                                ;* 4. LL  (LOCAL LOOPBACK)      TURNED AROUND TO DM  (DATA MODE)
                                ;*
                                ;*******************************************************************
 025300                         BGNTST
 025300                                                                          T12::
 025300                                 CALL    $TURN           ;CHECK THE TURNAROUND.
 025304  103530                         BCS     40$             ;SKIP TEST IF NO TURNAROUND.
 025306                         5$:
 025306                                 CALL    $RESET          ;RESET THE DPV
 025312                                 ESCAPE  TST             ;IF ERROR, EXIT THE TEST
 025312  104410                                                                  TRAP    C$ESCAPE
 025314  000252                                                                  .WORD   L10070-.
 025316  012702  000004                 MOV     #RTS,R2         ;SAVE RTS IN REGISTER (FOR ERROR REPORT).
 025322  010277  154742                 MOV     R2,@RXCSR       ;SET RTS
 025326                                 $DELAY  1               ;DELAY 100 MICROSECONDS

                                                                ;******** MACRO EXPANSION ********
 025326  004737  006464                 JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
 025332  000001                                 .WORD   1       ;NUMBER OF DELAY LOOPS
                                                                ;***********************************

 025334  032777  020000  154726         BIT     #CTS,@RXCSR     ;IS CTS ON?
 025342  001445                         BEQ     10$             ;IF NOT - REPORT.
 025344  032777  010000  154716         BIT     #RR,@RXCSR      ;IS RR (CD) ON
 025352  001441                         BEQ     10$             ;IF NOT - ERROR.
 025354  012702  000002                 MOV     #DTR,R2         ;SAVE DTR IN REGISTER (FOR ERROR REPORT).
 025360  010277  154704                 MOV     R2,@RXCSR       ;SET DTR.
 025364                                 $DELAY  1               ;DELAY 100 MICROSECONDS

                                                                ;******** MACRO EXPANSION ********
 025364  004737  006464                 JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
 025370  000001                                 .WORD   1       ;NUMBER OF DELAY LOOPS
                                                                ;***********************************

 025372  032777  040000  154670         BIT     #IC,@RXCSR      ;IS RING (IC) SET?
 025400  001426                         BEQ     10$             ;IF NOT - ERROR.
 025402  012702  000001                 MOV     #SF,R2          ;SAVE SF IN REGISTER (FOR ERROR REPORT).
 025406  010277  154656                 MOV     R2,@RXCSR       ;SET REMOTE LOOP/ SEC FREQ
 025412                                 $DELAY  1               ;DELAY 100 MICROSECONDS

                                                                ;******** MACRO EXPANSION ********
 025412  004737  006464                 JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
 025416  000001                                 .WORD   1       ;NUMBER OF DELAY LOOPS
                                                                ;***********************************

 025420  032777  000040  154646         BIT     #SQ,@TXCSR      ;IS SIGNAL QUALITY SET?
```

```
025426  001413                          BEQ     10$             ;IF NOT - ERROR.
025430  012702  000010                  MOV     #LL,R2          ;SAVE LL IN REGISTER (FOR ERROR REPORT).
025434  010277  154630                  MOV     R2,@RXCSR       ;SET LOCAL LOOP
025440                                  $DELAY  1               ;DELAY 100 MICROSECONDS

                                                                ;******** MACRO EXPANSION ********
025440  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
025444  000001                                  .WORD   1       ;NUMBER OF DELAY LOOPS
                                                                ;**********************************

025446  032777  001000  154614          BIT     #DM,@RXCSR      ;IS DATA MODE SET?
025454  001004                          BNE     20$

025456                          10$:
025456                                  ERRDF   59,EMG22,ERRG13
025456  104455                                                                          TRAP    C$ERDF
025460  000073                                                                          .WORD   59
025462  014432                                                                          .WORD   EMG22
025464  010152                                                                          .WORD   ERRG13

025466                          20$:

                                                                ;CLEAR ALL THOSE BITS
025466  042777  000017  154574          BIC     #RTS!DTR!SF!LL,@RXCSR
025474                                  $DELAY  1               ;DELAY 100 MICRO SECONDS

                                                                ;******** MACRO EXPANSION ********
025474  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
025500  000001                                  .WORD   1       ;NUMBER OF DELAY LOOPS
                                                                ;**********************************

025502  012702  000004                  MOV     #RTS,R2         ;CHECK RTS.
025506  030277  154556                  BIT     R2,@RXCSR       ;IS IT SET?
025512  001021                          BNE     30$             ;IF YES, ERROR.
025514  012702  000002                  MOV     #DTR,R2         ;CHECK DTR.
025520  030277  154544                  BIT     R2,@RXCSR       ;IS IT SET?
025524  001014                          BNE     30$             ;IF YES, ERROR.
025526  012777  000001  154534          MOV     #SF,@RXCSR      ;CHECK SF.
025534  030277  154530                  BIT     R2,@RXCSR       ;IS IT SET?
025540  001006                          BNE     30$             ;IF YES, ERROR.
025542  012777  000010  154520          MOV     #LL,@RXCSR      ;CHECK LL
025550  030277  154514                  BIT     R2,@RXCSR       ;IS IT SET?
025554  001404                          BEQ     40$             ;IF NOT, OK
025556                          30$:
025556                                  ERRDF   60,EMG22,ERRG15
025556  104455                                                                          TRAP    C$ERDF
025560  000074                                                                          .WORD   60
025562  014432                                                                          .WORD   EMG22
025564  010724                                                                          .WORD   ERRG15
025566                          40$:
025566                          ENDTST
025566                                                                          L10070:
025566  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 13 - MODEM STATUS INTERRUPT

                                ;*******************************************************************
                                ;*              TEST 13 - DPV-11
                                ;* MODEM STATUS INTERRUPT
                                ;* IF A PROPER TURNAROUND (H3259 OR H3260) IS ON, THIS TEST WILL CHECK
                                ;* THAT THE FOLLOWING SUBTESTS WORK CORRECTLY.
                                ;* SUBTEST 1 -  SET DTR (DATA TERMINAL READY), LOCAL LOOP (LL), RTS (REQUEST
                                ;*              TO SEND) WITH ONLY RECEIVE INTERRUPT ENABLED. ENSURE THAT AN
                                ;*              INTERRUPT IS NOT RECEIVED.
                                ;* SUBTEST 2 -  SET DTR, LL AND RTS WITH ONLY DATA SET INTERRUPT ENABLED.
                                ;*              ENSURE THAT AN INTERRUPT IS NOT RECEIVED.
                                ;* SUBTEST 3 -  SET DTR, LL AND RTS WITHOUT ANY INTERRUPTS ENABLED.  ENSURE
                                ;*              THAT AN INTERRUPT IS NOT RECEIVED.
                                ;* SUBTEST 4 -  SET RTS WITH RECEIVE AND DATA SET INTERRUPT ENABLED.  ENSURE
                                ;*              THAT AN INTERRUPT IS RECEIVED.
                                ;* SUBTEST 5 -  SET DTR WITH RECEIVE AND DATA SET INTERRUPT ENABLED.  ENSURE
                                ;*              THAT AN INTERRUPT IS RECEIVED.
                                ;* SUBTEST 6 -  SET LL WITH RECEIVE AND DATA SET INTERRUPT ENABLED.  ENSURE
                                ;*              THAT AN INTERRUPT IS RECEIVED.
                                ;*
                                ;*******************************************************************
025570                          BGNTST
025570                                                                          T13::
025570                                  CALL    $TURN           ;CHECK THE TURNAROUND.
025574  103002                          BCC     1$              ;PROCEED IF TURNAROUND.
025576                                  EXIT    TST
025576  104432                                                                          TRAP    C$EXIT
025600  000676                                                                          .WORD   L10071-.
025602                          1$:

025602                                  SETVEC  RCVEC,#RINT,#PRI04
025602  012746  000200                                                                  MOV     #PRI04,-(SP)
025606  012746  016414                                                                  MOV     #RINT,-(SP)
025612  013746  002264                                                                  MOV     RCVEC,-(SP)
025616  012746  000003                                                                  MOV     #3,-(SP)
025622  104437                                                                          TRAP    C$SVEC
025624  062706  000010                                                                  ADD     #10,SP
025630                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
025630  012700  000000                                                                  MOV     #PRI00,R0
025634  104441                                                                          TRAP    C$SPRI
                                                                ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                                ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                                ;LEVEL 4-7.
                                                                ;SET UP INTERRUPT VECTOR

025636                          BGNSUB
025636                                                                          T13.1:
025636  104402                                                                          TRAP    C$BSUB
025640                                  CALL    $RESET          ;RESET THE DPV
025644                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
025644  104410                                                                          TRAP    C$ESCAPE
025646  000630                                                                          .WORD   L10071-.
025650  005037  002376                  CLR     RFLAG           ;CLEAR THE FLAG USED IN THE ISR
025654  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
```

```
                                                                        ;ENABLE RCV INT AND SET RTS, DTR AND L. LOOP
025660  012777  000116  154402          MOV     #RXITEN!LL!DTR!RTS,@RXCSR

025666                          10$:
025666                                  $DELAY  10                      ;WAIT 1 MS

                                                                        ;******** MACRO EXPANSION ********
025666  004737  006464                  JSR     PC,$DLAY                ;CALL DELAY SUBROUTINE
025672  000010                                  .WORD   10              ;NUMBER OF DELAY LOOPS
                                                                        ;**********************************

025674  005737  002360                  TST     MCFLAG                  ;WAS AN MODEM CONTROL INTERRUPT RECEIVED?
025700  001404                          BEQ     30$                     ;IF NOT OK.
025702                                  ERRDF   61,EMG23,ERRG2
025702  104455                                                                          TRAP    C$ERDF
025704  000075                                                                          .WORD   61
025706  014457                                                                          .WORD   EMG23
025710  006560                                                                          .WORD   ERRG2

025712                          30$:

025712                            ENDSUB
025712                                                                          L10072:
025712  104403                                                                          TRAP    C$ESUB

025714                            BGNSUB
025714                                                                          T13.2:
025714  104402                                                                          TRAP    C$BSUB
025716                                  CALL    $RESET                  ;RESET THE DPV
025722                                  ESCAPE  TST                     ;IF ERROR, EXIT THE TEST
025722  104410                                                                          TRAP    C$ESCAPE
025724  000552                                                                          .WORD   L10071-.
025726  005037  002376                  CLR     RFLAG                   ;CLEAR THE FLAG USED IN THE ISR
025732  005037  002360                  CLR     MCFLAG                  ;CLEAR MODEM CONTROL FLAG.

                                                                        ;ENABLE DS. INT, SET RTS, DTR AND LL
025736  012777  000056  154324          MOV     #DSITEN!LL!RTS!DTR,@RXCSR

025744                          10$:
025744                                  $DELAY  10                      ;WAIT 1 MS

                                                                        ;******** MACRO EXPANSION ********
025744  004737  006464                  JSR     PC,$DLAY                ;CALL DELAY SUBROUTINE
025750  000010                                  .WORD   10              ;NUMBER OF DELAY LOOPS
                                                                        ;**********************************

025752  005737  002360                  TST     MCFLAG                  ;WAS AN MODEM CONTROL INTERRUPT RECEIVED?
025756  001404                          BEQ     30$                     ;IF NOT OK.
025760                                  ERRDF   62,EMG23,ERRG2
025760  104455                                                                          TRAP    C$ERDF
025762  000076                                                                          .WORD   62
025764  014457                                                                          .WORD   EMG23
025766  006560                                                                          .WORD   ERRG2

025770                          30$:
```

```
 74 025770                          ENDSUB
    025770                                                                  L10073:
    025770  104403                                                                  TRAP    C$ESUB
 75
 76
 77
 78 025772                          BGNSUB
    025772                                                                  T13.3:
    025772  104402                                                                  TRAP    C$BSUB
 79 025774                                CALL    $RESET          ;RESET THE DPV
 80 026000                                ESCAPE  TST             ;IF ERROR, EXIT THE TEST
    026000  104410                                                                  TRAP    C$ESCAPE
    026002  000474                                                                  .WORD   L10071-.
 81 026004  005037  002376                CLR     RFLAG           ;CLEAR THE FLAG USED IN THE ISR
 82 026010  005037  002360                CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
 83
 84                                                               ;SET LOCAL LOOP, DTR AND RTS.
 85 026014  012777  000016  154246        MOV     #LL!RTS!DTR,@RXCSR
 86 026022                          10$:
 87 026022                                $DELAY  10              ;WAIT 1 MS

                                                                  ;******** MACRO EXPANSION ********
    026022  004737  006464                JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
    026026  000010                                .WORD   10      ;NUMBER OF DELAY LOOPS
                                                                  ;**********************************

 88 026030  005737  002360                TST     MCFLAG          ;WAS AN INTERRUPT RECEIVED?
 89 026034  001404                        BEQ     30$             ;IF NOT OK.
 90 026036                                ERRDF   63,EMG23,ERRG2
    026036  104455                                                                  TRAP    C$ERDF
    026040  000077                                                                  .WORD   63
    026042  014457                                                                  .WORD   EMG23
    026044  006560                                                                  .WORD   ERRG2
 91
 92 026046                          30$:
 93
 94 026046                          ENDSUB
    026046                                                                  L10074:
    026046  104403                                                                  TRAP    C$ESUB
 95
 96
 97 026050                          BGNSUB
    026050                                                                  T13.4:
    026050  104402                                                                  TRAP    C$BSUB
 98 026052                                CALL    $RESET          ;RESET THE DPV
 99 026056                                ESCAPE  TST             ;IF ERROR, EXIT THE TEST
    026056  104410                                                                  TRAP    C$ESCAPE
    026060  000416                                                                  .WORD   L10071-.
100 026062  005037  002376                CLR     RFLAG           ;CLEAR THE FLAG USED IN THE ISR
101 026066  005037  002360                CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
102
103                                                               ;ENABLE INTERRUPTS AND SET RTS.
104 026072  012777  000144  154170        MOV     #RXITEN!DSITEN!RTS,@RXCSR
105
106 026100                          10$:
107 026100                                $DELAY  10              ;WAIT 1 MS
```

```
                                                                        ;******** MACRO EXPANSION ********
        026100  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
        026104  000010                                  .WORD   10      ;NUMBER OF DELAY LOOPS
                                                                        ;**********************************

    108 026106  005737  002360                  TST     MCFLAG          ;WAS AN INTERRUPT RECEIVED?
    109 026112  001015                          BNE     20$             ;IF YES - CHECK FOR MULTIPLE INTERRUPTS.
    110 026114                                  ERRDF   64,EMG24,ERRG2
        026114  104455                                                                          TRAP    C$ERDF
        026116  000100                                                                          .WORD   64
        026120  014535                                                                          .WORD   EMG24
        026122  006560                                                                          .WORD   ERRG2
    111 026124                                  PRINTB  #FMG26
        026124  012746  012575                                                                  MOV     #FMG26,-(SP)
        026130  012746  000001                                                                  MOV     #1,-(SP)
        026134  010600                                                                          MOV     SP,R0
        026136  104414                                                                          TRAP    C$PNTB
        026140  062706  000004                                                                  ADD     #4,SP
    112 026144  000410                          BR      30$
    113 026146                          20$:
    114 026146  022737  000001  002360          CMP     #1,MCFLAG       ;WAS ONLY 1 RECEIVED?
    115 026154  001404                          BEQ     30$             ;IF YES - OK
    116 026156                                  ERRDF   65,EMG40        ;REPORT MULTIPLE INTERRUPTS
        026156  104455                                                                          TRAP    C$ERDF
        026160  000101                                                                          .WORD   65
        026162  015175                                                                          .WORD   EMG40
        026164  000000                                                                          .WORD   0
    117 026166                          30$:
    118
    119 026166                            ENDSUB
        026166                                                                          L10075:
        026166  104403                                                                          TRAP    C$ESUB
    120
    121
    122 026170                            BGNSUB
        026170                                                                          T13.5:
        026170  104402                                                                          TRAP    C$BSUB
    123 026172                                  CALL    $RESET          ;RESET THE DPV
    124 026176                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
        026176  104410                                                                          TRAP    C$ESCAPE
        026200  000276                                                                          .WORD   L10071-.
    125 026202  005037  002376                  CLR     RFLAG           ;CLEAR THE FLAG USED IN THE ISR
    126 026206  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
    127
    128                                                                 ;ENABLE INTERRUPTS AND SET DTR.
    129 026212  012777  000142  154050          MOV     #RXITEN!DSITEN!DTR,@RXCSR
    130
    131 026220                          10$:
    132 026220                                  $DELAY  10              ;WAIT 1 MS

                                                                        ;******** MACRO EXPANSION ********
        026220  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
        026224  000010                                  .WORD   10      ;NUMBER OF DELAY LOOPS
                                                                        ;**********************************

    133 026226  005737  002360                  TST     MCFLAG          ;WAS AN INTERRUPT RECEIVED?
    134 026232  001015                          BNE     20$             ;IF YES - CHECK FOR MULTIPLE INTERRUPTS.
```

```
    135 026234                                  ERRDF   66,EMG24,ERRG2
        026234  104455                                                                  TRAP    C$ERDF
        026236  000102                                                                  .WORD   66
        026240  014535                                                                  .WORD   EMG24
        026242  006560                                                                  .WORD   ERRG2
    136 026244                                  PRINTB  #FMG26
        026244  012746  012575                                                          MOV     #FMG26,-(SP)
        026250  012746  000001                                                          MOV     #1,-(SP)
        026254  010600                                                                  MOV     SP,R0
        026256  104414                                                                  TRAP    C$PNTB
        026260  062706  000004                                                          ADD     #4,SP
    137 026264  000410                          BR      30$
    138 026266                          20$:
    139 026266  022737  000001  002360          CMP     #1,MCFLAG       ;WAS ONLY 1 RECEIVED?
    140 026274  001404                          BEQ     30$             ;IF YES - OK
    141 026276                                  ERRDF   67,EMG40        ;REPORT MULTIPLE INTERRUPTS
        026276  104455                                                                  TRAP    C$ERDF
        026300  000103                                                                  .WORD   67
        026302  015175                                                                  .WORD   EMG40
        026304  000000                                                                  .WORD   0
    142 026306                          30$:
    143
    144 026306                            ENDSUB
        026306                                                          L10076:
        026306  104403                                                                  TRAP    C$ESUB
    145
    146
    147 026310                            BGNSUB
        026310                                                          T13.6:
        026310  104402                                                                  TRAP    C$BSUB
    148 026312                                  CALL    $RESET          ;RESET THE DPV
    149 026316                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
        026316  104410                                                                  TRAP    C$ESCAPE
        026320  000156                                                                  .WORD   L10071-.
    150 026322  005037  002376                  CLR     RFLAG           ;CLEAR THE FLAG USED IN THE ISR
    151 026326  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
    152
    153                                                                 ;ENABLE INTERRUPTS AND SET LL.
    154 026332  012777  000150  153730          MOV     #RXITEN!DSITEN!LL,@RXCSR
    155
    156 026340                          10$:
    157 026340                                  $DELAY  10              ;WAIT 1 MS

                                                                        ;******** MACRO EXPANSION ********
        026340  004737  006464                  JSR     PC,$DLAY        ;CALL DELAY SUBROUTINE
        026344  000010                                  .WORD   10      ;NUMBER OF DELAY LOOPS
                                                                        ;**********************************

    158 026346  005737  002360                  TST     MCFLAG          ;WAS AN INTERRUPT RECEIVED?
    159 026352  001025                          BNE     20$             ;IF YES - CHECK FOR MULTIPLE INTERRUPTS.
    160 026354                                  ERRDF   68,EMG24,ERRG2
        026354  104455                                                                  TRAP    C$ERDF
        026356  000104                                                                  .WORD   68
        026360  014535                                                                  .WORD   EMG24
        026362  006560                                                                  .WORD   ERRG2
    161 026364                                  PRINTB  #FMG26
        026364  012746  012575                                                          MOV     #FMG26,-(SP)
```

```
        026370  012746  000001                                                          MOV     #1,-(SP)
        026374  010600                                                                  MOV     SP,R0
        026376  104414                                                                  TRAP    C$PNTB
        026400  062706  000004                                                          ADD     #4,SP
    162 026404                          PRINTB  #FMG29
        026404  012746  013075                                                          MOV     #FMG29,-(SP)
        026410  012746  000001                                                          MOV     #1,-(SP)
        026414  010600                                                                  MOV     SP,R0
        026416  104414                                                                  TRAP    C$PNTB
        026420  062706  000004                                                          ADD     #4,SP
    163 026424  000410                  BR      30$
    164 026426                      20$:
    165 026426  022737  000001  002360  CMP     #1,MCFLAG       ;WAS ONLY 1 RECEIVED?
    166 026434  001404                  BEQ     30$             ;IF YES - OK
    167 026436                          ERRDF   69,EMG40        ;REPORT MULTIPLE INTERRUPTS
        026436  104455                                                                  TRAP    C$ERDF
        026440  000105                                                                  .WORD   69
        026442  015175                                                                  .WORD   EMG40
        026444  000000                                                                  .WORD   0
    168 026446                      30$:
    169
    170 026446                        ENDSUB
        026446                                                                  L10077:
        026446  104403                                                                  TRAP    C$ESUB
    171
    172
    173
    174 026450                          CALL    $RESET          ;RESET THE DPV
    175 026454                          SETPRI  #PRI07          ;SET THE PROCESSOR PRI TO 7
        026454  012700  000340                                                          MOV     #PRI07,R0
        026460  104441                                                                  TRAP    C$SPRI
    176                                                         ;(THIS WILL DISABLE INTERRUPTS)
    177 026462                          CLRVEC  RCVEC           ;RESTORE THE RECV. VECTOR
        026462  013700  002264                                                          MOV     RCVEC,R0
        026466  104436                                                                  TRAP    C$CVEC
    178 026470                          CLRVEC  XMTVEC          ;RESTORE THE XMIT. VECTOR
        026470  013700  002266                                                          MOV     XMTVEC,R0
        026474  104436                                                                  TRAP    C$CVEC
    179
    180
    181 026476                      ENDTST
        026476                                                                  L10071:
        026476  104401                                                                  TRAP    C$ETST
    182
    183
    184
```

```
                                .SBTTL          TEST 14 - RECEIVE AND MODEM STATUS INTERRUPTS

                                ;*******************************************************************
                                ;*              TEST 14 - DPV-11
                                ;* RECEIVE AND MODEM STATUS INTERRUPTS
                                ;* CHANGE THE MODEM STATUS WHILE HANDLING A RECEIVE INTERRUPT.
                                ;* ENSURE THAT THE MODEM STATUS INTERRUPT IS RECEIVED.
                                ;* SUBTEST 1 -  CHANGE RTS DURING THE RECEIVE INTERRUPT.  ENSURE THAT
                                ;*              THE DATA SET INTERRUPT WAS RECEIVED.
                                ;* SUBTEST 2 -  CHANGE DTR DURING THE RECEIVE INTERRUPT.  ENSURE THAT
                                ;*              THE DATA SET INTERRUPT WAS RECEIVED.
                                ;* SUBTEST 3 -  CHANGE LL DURING THE RECEIVE INTERRUPT.  ENSURE THAT
                                ;*              THE DATA SET INTERRUPT WAS RECEIVED.
                                ;*
                                ;*******************************************************************
026500                          BGNTST
026500                                                                          T14::
026500                                  CALL    $TURN           ;CHECK THE TURNAROUND.
026504  103002                          BCC     1$              ;PROCEED, IF TURNAROUND ON.
026506                                  EXIT    TST             ;IF NO TURNAROUND, EXIT.
026506  104432                                                                  TRAP    C$EXIT
026510  001072                                                                  .WORD   L10100-.
026512                          1$:
026512                            BGNSUB
026512                                                                          T14.1:
026512  104402                                                                  TRAP    C$BSUB
026514                                  CALL    $RESET          ;RESET THE DPV
026520                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
026520  104410                                                                  TRAP    C$ESCAPE
026522  001060                                                                  .WORD   L10100-.
026524  005037  002424                  CLR     TFLAG           ;CLEAR THE FLAGS USED IN THE ISRS.
026530  005037  002376                  CLR     RFLAG
026534  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
026540  012737  000004  002432          MOV     #RTS,TOGGLE     ;TOGGLE RTS

026546                                  SETVEC  RCVEC,#RINT,#PRI04
026546  012746  000200                                                          MOV     #PRI04,-(SP)
026552  012746  016414                                                          MOV     #RINT,-(SP)
026556  013746  002264                                                          MOV     RCVEC,-(SP)
026562  012746  000003                                                          MOV     #3,-(SP)
026566  104437                                                                  TRAP    C$SVEC
026570  062706  000010                                                          ADD     #10,SP
026574                                  SETVEC  XMTVEC,#XINT,#PRI04
026574  012746  000200                                                          MOV     #PRI04,-(SP)
026600  012746  017050                                                          MOV     #XINT,-(SP)
026604  013746  002266                                                          MOV     XMTVEC,-(SP)
026610  012746  000003                                                          MOV     #3,-(SP)
026614  104437                                                                  TRAP    C$SVEC
026616  062706  000010                                                          ADD     #10,SP
026622                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
026622  012700  000000                                                          MOV     #PRI00,R0
026626  104441                                                                  TRAP    C$SPRI
                                                                ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
                                                                ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
                                                                ;LEVEL 4-7.
                                                                ;SET UP INTERRUPT VECTOR
```

```
026630  012777  043652  153434          MOV     #43652,@PCSAR   ;SET BCP MODE, NO ERROR AND SYNCH CHARACTER.
026636  012737  000002  002414          MOV     #2,START        ;# OF START CHARACTERS.
026644  012777  000160  153416          MOV     #RXITEN!DSITEN!RXENA,@RXCSR ;ENABLE THE RECEIVER AND INT.
026652  012777  000130  153414          MOV     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND INT.
                                                                        ;SELECT THE MAINTENANCE LOOPBACK.
026660  005001                          CLR     R1              ;LOOP COUNTER
026662                          10$:
026662  005737  002360                  TST     MCFLAG          ;WAS A MODEM CHANGE INTERRUPT RECEIVED?
026666  001017                          BNE     20$             ;IF YES, EXIT.
026670  005301                          DEC     R1              ;DECREMENT COUNTER
026672  001373                          BNE     10$

026674                                  ERRDF   70,EMG24,ERRG2
026674  104455                                                                          TRAP    C$ERDF
026676  000106                                                                          .WORD   70
026700  014535                                                                          .WORD   EMG24
026702  006560                                                                          .WORD   ERRG2

026704                                  PRINTB  #FMG26          ;NOTIFY THAT INTERRUPT MAY BE DISABLED BY
026704  012746  012575                                                                  MOV     #FMG26,-(SP)
026710  012746  000001                                                                  MOV     #1,-(SP)
026714  010600                                                                          MOV     SP,R0
026716  104414                                                                          TRAP    C$PNTB
026720  062706  000004                                                                  ADD     #4,SP
                                                                        ;REMOVING THE WIRE WRAP.
026724  000410                          BR      30$
026726                          20$:
026726  022737  000001  002360          CMP     #1,MCFLAG       ;WAS ONLY 1 RECEIVED?
026734  001404                          BEQ     30$             ;IF YES - OK
026736                                  ERRDF   71,EMG40        ;REPORT MULTIPLE INTERRUPTS
026736  104455                                                                          TRAP    C$ERDF
026740  000107                                                                          .WORD   71
026742  015175                                                                          .WORD   EMG40
026744  000000                                                                          .WORD   0
026746                          30$:
026746                                  CALL    $RESET          ;RESET THE DPV
026752                                  SETPRI  #PRI07          ;SET THE PROCESSOR PRI TO 7
026752  012700  000340                                                                  MOV     #PRI07,R0
026756  104441                                                                          TRAP    C$SPRI
                                                                        ;(THIS WILL DISABLE INTERRUPTS)
026760                                  CLRVEC  RCVEC           ;RESTORE THE RECV. VECTOR
026760  013700  002264                                                                  MOV     RCVEC,R0
026764  104436                                                                          TRAP    C$CVEC
026766                                  CLRVEC  XMTVEC          ;RESTORE THE XMIT. VECTOR
026766  013700  002266                                                                  MOV     XMTVEC,R0
026772  104436                                                                          TRAP    C$CVEC
026774                                  ESCAPE  TST             ;IF ERROR, ESCAPE
026774  104410                                                                          TRAP    C$ESCAPE
026776  000604                                                                          .WORD   L10100-.

027000                          ENDSUB
027000                                                                          L10101:
027000  104403                                                                          TRAP    C$ESUB

027002                          BGNSUB
027002                                                                          T14.2:
```

```
        027002  104402                                                          TRAP    C$BSUB
     70 027004                          CALL    $RESET          ;RESET THE DPV
     71 027010                          ESCAPE  TST             ;IF ERROR, EXIT THE TEST
        027010  104410                                                          TRAP    C$ESCAPE
        027012  000570                                                          .WORD   L10100-.
     72 027014  005037  002424          CLR     TFLAG           ;CLEAR THE FLAGS USED IN THE ISRS.
     73 027020  005037  002376          CLR     RFLAG
     74 027024  005037  002360          CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
     75 027030  012737  000002  002432  MOV     #DTR,TOGGLE     ;TOGGLE DTR.
     76
     77 027036                          SETVEC  RCVEC,#RINT,#PRI04
        027036  012746  000200                                                  MOV     #PRI04,-(SP)
        027042  012746  016414                                                  MOV     #RINT,-(SP)
        027046  013746  002264                                                  MOV     RCVEC,-(SP)
        027052  012746  000003                                                  MOV     #3,-(SP)
        027056  104437                                                          TRAP    C$SVEC
        027060  062706  000010                                                  ADD     #10,SP
     78 027064                          SETVEC  XMTVEC,#XINT,#PRI04
        027064  012746  000200                                                  MOV     #PRI04,-(SP)
        027070  012746  017050                                                  MOV     #XINT,-(SP)
        027074  013746  002266                                                  MOV     XMTVEC,-(SP)
        027100  012746  000003                                                  MOV     #3,-(SP)
        027104  104437                                                          TRAP    C$SVEC
        027106  062706  000010                                                  ADD     #10,SP
     79 027112                          SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
        027112  012700  000000                                                  MOV     #PRI00,R0
        027116  104441                                                          TRAP    C$SPRI
     80                                                         ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
     81                                                         ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
     82                                                         ;LEVEL 4-7.
     83                                                         ;SET UP INTERRUPT VECTOR
     84
     85
     86 027120  012777  043652  153144  MOV     #43652,@PCSAR   ;SET BCP MODE, NO ERROR AND SYNCH CHARACTER.
     87 027126  012737  000002  002414  MOV     #2,START        ;# OF START CHARACTERS.
     88 027134  012777  000160  153126  MOV     #RXITEN!DSITEN!RXENA,@RXCSR ;ENABLE THE RECEIVER AND INT.
     89 027142  012777  000130  153124  MOV     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND INT.
     90                                                                 ;SELECT THE MAINTENANCE LOOPBACK.
     91 027150  005001                  CLR     R1              ;LOOP COUNTER
     92 027152                  10$:
     93 027152  005737  002360          TST     MCFLAG          ;WAS A MODEM CHANGE INTERRUPT RECEIVED?
     94 027156  001017                  BNE     20$             ;IF YES, EXIT.
     95 027160  005301                  DEC     R1              ;DECREMENT COUNTER
     96 027162  001373                  BNE     10$
     97
     98 027164                          ERRDF   72,EMG24,ERRG2
        027164  104455                                                          TRAP    C$ERDF
        027166  000110                                                          .WORD   72
        027170  014535                                                          .WORD   EMG24
        027172  006560                                                          .WORD   ERRG2
     99
    100 027174                          PRINTB  #FMG26          ;NOTIFY THAT INTERRUPT MAY BE DISABLED BY
        027174  012746  012575                                                  MOV     #FMG26,-(SP)
        027200  012746  000001                                                  MOV     #1,-(SP)
        027204  010600                                                          MOV     SP,R0
        027206  104414                                                          TRAP    C$PNTB
        027210  062706  000004                                                  ADD     #4,SP
```

```
                                                                ;REMOVING THE WIRE WRAP.
027214  000410                          BR      30$
027216                          20$:
027216  022737  000001  002360          CMP     #1,MCFLAG       ;WAS ONLY 1 RECEIVED?
027224  001404                          BEQ     30$             ;IF YES - OK
027226                                  ERRDF   73,EMG40        ;REPORT MULTIPLE INTERRUPTS
                                                                                        TRAP    C$ERDF
027226  104455                                                                          .WORD   73
027230  000111                                                                          .WORD   EMG40
027232  015175                                                                          .WORD   0
027234  000000
027236                          30$:
027236                                  CALL    $RESET          ;RESET THE DPV
027242                                  SETPRI  #PRI07          ;SET THE PROCESSOR PRI TO 7
027242  012700  000340                                                                  MOV     #PRI07,R0
027246  104441                                                                          TRAP    C$SPRI
                                                                ;(THIS WILL DISABLE INTERRUPTS)
027250                                  CLRVEC  RCVEC           ;RESTORE THE RECV. VECTOR
027250  013700  002264                                                                  MOV     RCVEC,R0
027254  104436                                                                          TRAP    C$CVEC
027256                                  CLRVEC  XMTVEC          ;RESTORE THE XMIT. VECTOR
027256  013700  002266                                                                  MOV     XMTVEC,R0
027262  104436                                                                          TRAP    C$CVEC
027264                                  ESCAPE  TST             ;IF ERROR, ESCAPE
027264  104410                                                                          TRAP    C$ESCAPE
027266  000314                                                                          .WORD   L10100-.

027270                          ENDSUB
027270                                                                          L10102:
027270  104403                                                                          TRAP    C$ESUB

027272                          BGNSUB
027272                                                                          T14.3:
027272  104402                                                                          TRAP    C$BSUB
027274                                  CALL    $RESET          ;RESET THE DPV
027300                                  ESCAPE  TST             ;IF ERROR, EXIT THE TEST
027300  104410                                                                          TRAP    C$ESCAPE
027302  000300                                                                          .WORD   L10100-.
027304  005037  002424                  CLR     TFLAG           ;CLEAR THE FLAGS USED IN THE ISRS.
027310  005037  002376                  CLR     RFLAG
027314  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.
027320  012737  000010  002432          MOV     #LL,TOGGLE      ;TOGGLE LL

027326                                  SETVEC  RCVEC,#RINT,#PRI04
027326  012746  000200                                                                  MOV     #PRI04,-(SP)
027332  012746  016414                                                                  MOV     #RINT,-(SP)
027336  013746  002264                                                                  MOV     RCVEC,-(SP)
027342  012746  000003                                                                  MOV     #3,-(SP)
027346  104437                                                                          TRAP    C$SVEC
027350  062706  000010                                                                  ADD     #10,SP
027354                                  SETVEC  XMTVEC,#XINT,#PRI04
027354  012746  000200                                                                  MOV     #PRI04,-(SP)
027360  012746  017050                                                                  MOV     #XINT,-(SP)
027364  013746  002266                                                                  MOV     XMTVEC,-(SP)
027370  012746  000003                                                                  MOV     #3,-(SP)
027374  104437                                                                          TRAP    C$SVEC
027376  062706  000010                                                                  ADD     #10,SP
027402                                  SETPRI  #PRI00          ;SET PROCESSOR PRIORITY.  FOR LSI 11/03
```

```
TEST 14 - RECEIVE AND MODEM STATUS INTERRUPTS
        027402  012700  000000                                                                    MOV     #PRI00,R0
        027406  104441                                                                            TRAP    C$SPRI
    128                                                         ;THIS WILL ENABLE INTERRUPTS.  FOR 11/23
    129                                                         ;THIS WILL ALLOW ACKNOWLEDGMENT OF INTERRUPTS
    130                                                         ;LEVEL 4-7.
    131                                                         ;SET UP INTERRUPT VECTOR
    132
    133
    134 027410  012777  043652  152654          MOV     #43652,@PCSAR   ;SET BCP MODE, NO ERROR AND SYNCH CHARACTER.
    135 027416  012737  000002  002414          MOV     #2,START        ;# OF START CHARACTERS.
    136 027424  012777  000160  152636          MOV     #RXITEN!DSITEN!RXENA,@RXCSR ;ENABLE THE RECEIVER AND INT.
    137 027432  012777  000130  152634          MOV     #TXIE!TXENA!MM,@TXCSR ;ENABLE THE TRANSMITTER AND INT.
    138                                                                       ;SELECT THE MAINTENANCE LOOPBACK.
    139 027440  005001                          CLR     R1              ;LOOP COUNTER
    140 027442                          10$:
    141 027442  005737  002360                  TST     MCFLAG          ;WAS A MODEM CHANGE INTERRUPT RECEIVED?
    142 027446  001027                          BNE     20$             ;IF YES, EXIT.
    143 027450  005301                          DEC     R1              ;DECREMENT COUNTER
    144 027452  001373                          BNE     10$
    145
    146 027454                                  ERRDF   74,EMG24,ERRG2
        027454  104455                                                                            TRAP    C$ERDF
        027456  000112                                                                            .WORD   74
        027460  014535                                                                            .WORD   EMG24
        027462  006560                                                                            .WORD   ERRG2
    147
    148 027464                                  PRINTB  #FMG26          ;NOTIFY THAT INTERRUPT MAY BE DISABLED BY
        027464  012746  012575                                                                    MOV     #FMG26,-(SP)
        027470  012746  000001                                                                    MOV     #1,-(SP)
        027474  010600                                                                            MOV     SP,R0
        027476  104414                                                                            TRAP    C$PNTB
        027500  062706  000004                                                                    ADD     #4,SP
    149                                                         ;REMOVING THE WIRE WRAP.
    150 027504                                  PRINTB  #FMG29
        027504  012746  013075                                                                    MOV     #FMG29,-(SP)
        027510  012746  000001                                                                    MOV     #1,-(SP)
        027514  010600                                                                            MOV     SP,R0
        027516  104414                                                                            TRAP    C$PNTB
        027520  062706  000004                                                                    ADD     #4,SP
    151 027524  000410                          BR      30$
    152 027526                          20$:
    153 027526  022737  000001  002360          CMP     #1,MCFLAG       ;WAS ONLY 1 RECEIVED?
    154 027534  001404                          BEQ     30$             ;IF YES - OK
    155 027536                                  ERRDF   75,EMG40        ;REPORT MULTIPLE INTERRUPTS
        027536  104455                                                                            TRAP    C$ERDF
        027540  000113                                                                            .WORD   75
        027542  015175                                                                            .WORD   EMG40
        027544  000000                                                                            .WORD   0
    156 027546                          30$:
    157 027546                                  CALL    $RESET          ;RESET THE DPV
    158 027552                                  SETPRI  #PRI07          ;SET THE PROCESSOR PRI TO 7
        027552  012700  000340                                                                    MOV     #PRI07,R0
        027556  104441                                                                            TRAP    C$SPRI
    159                                                         ;(THIS WILL DISABLE INTERRUPTS)
    160 027560                                  CLRVEC  RCVEC           ;RESTORE THE RECV. VECTOR
        027560  013700  002264                                                                    MOV     RCVEC,R0
        027564  104436                                                                            TRAP    C$CVEC
```

```
    161 027566                          CLRVEC  XMTVEC          ;RESTORE THE XMIT. VECTOR
        027566  013700  002266                                                          MOV     XMTVEC,R0
        027572  104436                                                                  TRAP    C$CVEC
    162 027574                          ESCAPE  TST             ;IF ERROR, ESCAPE
        027574  104410                                                                  TRAP    C$ESCAPE
        027576  000004                                                                  .WORD   L10100-.
    163
    164 027600                      ENDSUB
        027600                                                                  L10103:
        027600  104403                                                                  TRAP    C$ESUB
    165
    166 027602                    ENDTST
        027602                                                                  L10100:
        027602  104401                                                                  TRAP    C$ETST
    167
```

```
                                .SBTTL          TEST 15 - SECONDARY & ALL PARTIES ADDRESSING

                                ;*******************************************************************
                                ;*              TEST 15 - DPV-11
                                ;* SUBTEST 1 - SECONDARY ADDRESS
                                ;*      SEGMENT 1 -     SELECT SECONDARY ADDRESS AND SEND THE CORRECT
                                ;*                      ADDRESS.  CHECK THE DATA IS PROPERLY RECEIVED.
                                ;*      SEGMENT 2 -     SELECT SECONDARY ADDRESS AND SEND A MESSAGE WITHOUT
                                ;*                      SENDING USING THE SECONDARY ADDRESS.  CHECK THAT A
                                ;*                      TIME OUT IS RECEIVED.
                                ;*
                                ;* SUBTEST 2 - ALL PARTIES ADDRESSING
                                ;*      SEGMENT 1 -     SELECT ALL PARTIES AND SECONDARY ADDRESS.  SEND A
                                ;*                      MESSAGE USING THE ALL PARTIES ADDRESS.  ENSURE THAT
                                ;*                      THE MESSAGE IS CORRECTLY RECEIVED.
                                ;*      SEGMENT 2 -     SELECT ALL PARTIES AND SECONDARY ADDRESS.  SEND A
                                ;*                      MESSAGE WITHOUT ALL PARTIES OR SECONDARY ADDRESS.
                                ;*                      CHECK THAT A TIME OUT IS RECEIVED.
                                ;*      SEGMENT 3 -     SELECT ALL PARTIES AND SECONDARY ADDRESS.  SEND A
                                ;*                      MESSAGE WITH A SECONDARY ADDRESS.  CHECK THAT A
                                ;*                      TIME OUT IS RECEIVED.
                                ;*
                                ;*******************************************************************
027604                          BGNTST
027604                                                                          T15::

027604                            BGNSUB
027604                                                                          T15.1:
027604  104402                                                                          TRAP    C$BSUB
027606                              BGNSEG
027606  104404                                                                          TRAP    C$BSEG
027610                                  CALL    $RESET          ;RESET THE DPV
027614                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
027614  104410                                                                          TRAP    C$ESCAPE
027616  000674                                                                          .WORD   L10104-.
027620  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
027626  012737  000000  002344          MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
027634  052737  010120  002344          BIS     #SECADR!120,IPCSAR ;SECONDARY ADDRESS
027642  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
027650  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
027656  012737  000003  002352          MOV     #3,LENGTH       ;CHARACTER LENGTH OF 3 BITS.
027664  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
027672  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
027700  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
027706  012737  000012  002472          MOV     #10.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
027714  013777  002344  152350          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
027722  112737  000143  002342          MOVB    #143,IPCR       ;SET UP CHARACTER LENGTH


027730                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
027734  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
027742  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
027746                                  CALL    $DATA           ;
027752                                  ESCAPE  TST             ;IF ERROR - EXIT
027752  104410                                                                          TRAP    C$ESCAPE
027754  000536                                                                          .WORD   L10104-.
```

```
027756                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
027762                                  ESCAPE  TST             ;IF ERROR - EXIT
027762  104410                                                                                  TRAP    C$ESCAPE
027764  000526                                                                                  .WORD   L10104-.
027766                          ENDSEG
027766                                                                                  10000$:
027766  104405                                                                                  TRAP    C$ESEG

027770                          BGNSEG
027770  104404                                                                                  TRAP    C$BSEG
027772                                  CALL    $RESET          ;RESET THE DPV
027776                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
027776  104410                                                                                  TRAP    C$ESCAPE
030000  000512                                                                                  .WORD   L10104-.
030002  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
030010  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
                                                                ;
030016  013777  002344  152246          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
030024  112737  000143  002342          MOVB    #143,IPCR       ;SET UP CHARACTER LENGTH

030032  012737  000001  002430          MOV     #1,TIMER        ;CHANGE TIMEOUT VALUE
030040  012737  000001  002334          MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
030046  105037  002673                  CLRB    XMTBUF          ;CLEAR SECONDARY ADDRESS FROM XMIT BUFFER.
030052                                  CALL    $DATA           ;
030056  013737  002412  002430          MOV     SAVTIM,TIMER    ;RESTORE THE TIMER
030064  005737  002426                  TST     TIMEO           ;DID THE RECEIVER TIME OUT?
030070  001004                          BNE     1$              ;IF YES - OK.
030072                                  ERRDF   76,EMG35
030072  104455                                                                                  TRAP    C$ERDF
030074  000114                                                                                  .WORD   76
030076  015011                                                                                  .WORD   EMG35
030100  000000                                                                                  .WORD   0
030102                          1$:
030102                          ENDSEG
030102                                                                                  10001$:
030102  104405                                                                                  TRAP    C$ESEG
030104                          ENDSUB
030104                                                                                  L10105:
030104  104403                                                                                  TRAP    C$ESUB


030106                          BGNSUB
030106                                                                                  T15.2:
030106  104402                                                                                  TRAP    C$BSUB
030110                          BGNSEG
030110  104404                                                                                  TRAP    C$BSEG
030112                                  CALL    $RESET          ;RESET THE DPV
030116                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
030116  104410                                                                                  TRAP    C$ESCAPE
030120  000372                                                                                  .WORD   L10104-.
030122  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
030130  012737  000400  002344          MOV     #CCITTO,IPCSAR  ;SET CRC-CCITT PRESET TO ZERO
030136  052737  110231  002344          BIS     #APA!SECADR!231,IPCSAR  ;ALL PARTIES ADDRESS AND
                                                                        ;SECONDARY ADDRESS
030144  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
030152  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
```

```
 87 030160  012737  000004  002352          MOV     #4,LENGTH        ;CHARACTER LENGTH OF 5 BITS.
 88 030166  012737  000400  002434          MOV     #TSOM,TSTART     ;START OF MESSAGE.
 89 030174  012737  001000  002422          MOV     #TEOM,TEND       ;END OF MESSAGE
 90 030202  012737  002502  002470          MOV     #$CCITT,XTYPE    ;USE CCITT DATA PATTERN
 91 030210  012737  000012  002472          MOV     #10.,XCOUNT      ;# OF CHARACTERS TO TRANSMIT
 92                                                                  ;
 93 030216  013777  002344  152046          MOV     IPCSAR,@PCSAR    ;SET UP PARAMETERS AND ADDRESS
 94 030224  112737  000204  002342          MOVB    #204,IPCR        ;SET UP CHARACTER LENGTH
 95
 96
 97 030232                                  CALL    $BUFRS           ;SET UP TRANSMIT AND RECEIVE BUFFERS.
 98 030236  012737  000001  002356          MOV     #1,MAINT         ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
 99 030244  005037  002334                  CLR     EXERR            ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
100 030250                                  CALL    $DATA            ;
101 030254                                  ESCAPE  TST              ;IF ERROR - EXIT
    030254  104410                                                                      TRAP    C$ESCAPE
    030256  000234                                                                      .WORD   L10104-.
102
103 030260                                  CALL    $CHECK           ;CHECK THAT THE DATA WAS CORRECT.
104 030264                                  ESCAPE  TST              ;IF ERROR - EXIT
    030264  104410                                                                      TRAP    C$ESCAPE
    030266  000224                                                                      .WORD   L10104-.
105 030270                              ENDSEG
    030270                                                                      10000$:
    030270  104405                                                                      TRAP    C$ESEG
106
107 030272                              BGNSEG
    030272  104404                                                                      TRAP    C$BSEG
108 030274                                  CALL    $RESET           ;RESET THE DPV
109 030300                                  ESCAPE  TST              ;IF ERROR, BR TO THE END.
    030300  104410                                                                      TRAP    C$ESCAPE
    030302  000210                                                                      .WORD   L10104-.
110 030304  012737  000001  002414          MOV     #1,START         ;SEND 1 FLAG
111 030312  012737  000002  002340          MOV     #2,HEADER        ;SEND 2 HEADER CHARACTERS
112                                                                  ;
113 030320  013777  002344  151744          MOV     IPCSAR,@PCSAR    ;SET UP PARAMETERS AND ADDRESS
114 030326  112737  000204  002342          MOVB    #204,IPCR        ;SET UP CHARACTER LENGTH
115
116 030334  012737  000001  002430          MOV     #1,TIMER         ;CHANGE TIME OUT VALUE
117 030342  012737  000001  002334          MOV     #1,EXERR         ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
118 030350  105037  002673                  CLRB    XMTBUF           ;CLEAR SECONDARY ADDRESS FROM XMIT BUFFER.
119 030354                                  CALL    $DATA            ;
120 030360  013737  002412  002430          MOV     SAVTIM,TIMER     ;RESTORE THE TIME OUT VALUE.
121 030366  005737  002426                  TST     TIMEO            ;DID THE RECEIVER TIME OUT?
122 030372  001006                          BNE     1$               ;IF YES - OK.
123 030374                                  ERRDF   77,EMG35
    030374  104455                                                                      TRAP    C$ERDF
    030376  000115                                                                      .WORD   77
    030400  015011                                                                      .WORD   EMG35
    030402  000000                                                                      .WORD   0
124 030404                                  ESCAPE  TST
    030404  104410                                                                      TRAP    C$ESCAPE
    030406  000104                                                                      .WORD   L10104-.
125 030410                          1$:
126 030410                              ENDSEG
    030410                                                                      10001$:
    030410  104405                                                                      TRAP    C$ESEG
```

```
    127
    128 030412                                  BGNSEG
        030412  104404                                                                                  TRAP    C$BSEG
    129 030414                                      CALL    $RESET          ;RESET THE DPV
    130 030420                                      ESCAPE  TST             ;IF ERROR, BR TO THE END.
        030420  104410                                                                                  TRAP    C$ESCAPE
        030422  000070                                                                                  .WORD   L10104-.
    131 030424  012737  000001  002414              MOV     #1,START        ;SEND 1 FLAG
    132 030432  012737  000002  002340              MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
    133                                                                     ;
    134 030440  013777  002344  151624              MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
    135 030446  112737  000204  002342              MOVB    #204,IPCR       ;SET UP CHARACTER LENGTH
    136
    137 030454  112737  000231  002673              MOVB    #231,XMTBUF     ;CHANGE FIRST XMIT CHARACTER.
    138 030462  005037  002334                      CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
    139 030466                                      CALL    $DATA           ;
    140 030472                                      ESCAPE  TST             ;IF ERROR - EXIT
        030472  104410                                                                                  TRAP    C$ESCAPE
        030474  000016                                                                                  .WORD   L10104-.
    141
    142 030476                                      CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
    143 030502                                      ESCAPE  TST             ;IF ERROR - EXIT
        030502  104410                                                                                  TRAP    C$ESCAPE
        030504  000006                                                                                  .WORD   L10104-.
    144 030506                                  ENDSEG
        030506                                                                                  10002$:
        030506  104405                                                                                  TRAP    C$ESEG
    145 030510                              ENDSUB
        030510                                                                                  L10106:
        030510  104403                                                                                  TRAP    C$ESUB
    146
    147
    148 030512                          ENDTST
        030512                                                                                  L10104:
        030512  104401                                                                                  TRAP    C$ETST
```

```
                                        .SBTTL          TEST 16 - ABORT TEST

                                        ;*******************************************************************
                                        ;*              TEST 16 - DPV-11
                                        ;* ABORT TEST
                                        ;* SUBTEST 1 -  ABORT WITH IDLE CLEAR. ABORT CHARACTERS TRANSMITTED WHEN
                                        ;*              THE ABORT BIT IS ASSERTED.
                                        ;*              SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1,
                                        ;*                                5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                        ;*
                                        ;* SUBTEST 2 -  ABORT WITH IDLE SET. FLAGS TRANSMITTED WHEN THE ABORT BIT
                                        ;*              IS ASSERTED.
                                        ;*              SELECTED OPTIONS: BOP MODE, NO ERROR CHECKING, IDLE SET,
                                        ;*                                5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                        ;*
                                        ;*******************************************************************
030514                                  BGNTST
030514                                                                                  T16::
030514                                    BGNSUB
030514                                                                                  T16.1:
030514  104402                                                                                  TRAP    C$BSUB
030516                                          CALL    $RESET          ;RESET THE DPV
030522                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
030522  104410                                                                                  TRAP    C$ESCAPE
030524  000312                                                                                  .WORD   L10107-.
030526  012737  100000  002362                  MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
030534  012737  000000  002344                  MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
030542  012737  000001  002414                  MOV     #1,START        ;SEND 1 FLAG
030550  012737  000002  002340                  MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
030556  012737  000005  002352                  MOV     #5,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
030564  012737  000400  002434                  MOV     #TSOM,TSTART    ;START OF MESSAGE.
030572  012737  002000  002422                  MOV     #TXABO,TEND     ;END OF MESSAGE
030600  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
030606  012737  000014  002472                  MOV     #12.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
030614  013777  002344  151450                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
030622  112737  000245  002342                  MOVB    #245,IPCR       ;SET UP CHARACTER LENGTH


030630                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
030634  012737  000001  002356                  MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
030642  012737  000001  002334                  MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
030650                                          CALL    $DATA           ;
030654  032737  002000  002350                  BIT     #RABORT,IRDSR   ;WAS AN ABORT RECEIVED?
030662  001004                                  BNE     20$             ;IF YES - OK.
030664                                          ERRDF   78,EMG32        ;ABORT NOT RECEIVED.
030664  104455                                                                                  TRAP    C$ERDF
030666  000116                                                                                  .WORD   78
030670  014677                                                                                  .WORD   EMG32
030672  000000                                                                                  .WORD   0
030674                                  20$:
030674                                    ENDSUB
030674                                                                                  L10110:
030674  104403                                                                                  TRAP    C$ESUB

030676                                    BGNSUB
030676                                                                                  T16.2:
```

```
TEST 16 - ABORT TEST
        030676  104402                                                                    TRAP    C$BSUB
    46  030700                          CALL    $RESET          ;RESET THE DPV
    47  030704                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
        030704  104410                                                                    TRAP    C$ESCAPE
        030706  000130                                                                    .WORD   L10107-.
    48  030710  012737  001000  002344  MOV     #NONE1,IPCSAR   ;NO ERROR CHECKING.
    49  030716  052737  004000  002344  BIS     #IDLE,IPCSAR    ;SET THE IDLE BIT.
    50  030724  012737  000001  002414  MOV     #1,START        ;SEND 1 FLAG
    51  030732  012737  000002  002340  MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
    52  030740  012737  002502  002470  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
    53  030746  012737  000014  002472  MOV     #12.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
    54                                                          ;
    55  030754  013777  002344  151310  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
    56  030762  112737  000245  002342  MOVB    #245,IPCR       ;SET UP CHARACTER LENGTH
    57
    58
    59  030770                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
    60  030774  012737  000001  002356  MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
    61  031002  012737  000001  002334  MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
    62  031010                          CALL    $DATA           ;
    63  031014  032737  002000  002350  BIT     #RABORT,IRDSR   ;WAS AN ABORT RECEIVED?
    64  031022  001404                  BEQ     20$             ;IF NOT - OK.
    65  031024                          ERRDF   79,EMG33        ;ABORT NOT RECEIVED.
        031024  104455                                                                    TRAP    C$ERDF
        031026  000117                                                                    .WORD   79
        031030  014722                                                                    .WORD   EMG33
        031032  000000                                                                    .WORD   0
    66  031034                      20$:
    67  031034                        ENDSUB
        031034                                                          L10111:
        031034  104403                                                                    TRAP    C$ESUB
    68
    69  031036                      ENDTST
        031036                                                          L10107:
        031036  104401                                                                    TRAP    C$ETST
```

```
                                        .SBTTL          TEST 17 - EXTENDED CONTROL AND ADDRESSING

                                        ;*******************************************************************
                                        ;*              TEST 17 - DPV-11
                                        ;* EXTENDED CONTROL AND ADDRESSING TEST
                                        ;* CHECK THAT THE RECEIVER CAN RECOGNIZE EXTENDED ADDRESSING AND CONTROL
                                        ;* CHARACTERS.
                                        ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1,
                                        ;*                        3 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK,
                                        ;*                        EXTENDED CONTROL AND ADDRESSING SELECTED
                                        ;*
                                        ;*******************************************************************
031040                                  BGNTST
031040                                                                                          T17::

031040                                          CALL    $RESET          ;RESET THE DPV
031044                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
031044  104410                                                                                  TRAP    C$ESCAPE
031046  000142                                                                                  .WORD   L10112-.
031050  012737  100000  002362                  MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
031056  012737  000000  002344                  MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
031064  012737  000001  002414                  MOV     #1,START        ;SEND 1 FLAG
031072  012737  000004  002340                  MOV     #4,HEADER       ;SEND 2 HEADER CHARACTERS
031100  012737  000003  002352                  MOV     #3,LENGTH       ;CHARACTER LENGTH OF 3 BITS.
031106  012737  000400  002434                  MOV     #TSOM,TSTART    ;START OF MESSAGE.
031114  012737  001000  002422                  MOV     #TEOM,TEND      ;END OF MESSAGE
031122  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
031130  012737  000100  002472                  MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
031136  013777  002344  151126                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
031144  112737  000173  002342                  MOVB    #173,IPCR       ;SET UP CHARACTER LENGTH AND EXTENDED
                                                                        ;ADDRESS AND CONTROL BITS.
031152  112777  000030  151124                  MOVB    #30,@PCR        ;SET THE EXTENDED ADDRESS AND CONTROL BITS.


031160                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
031164  012737  000001  002356                  MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
031172  005037  002334                          CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
031176                                          CALL    $DATA           ;
031202  103402                                  BCS     20$             ;IF ERROR SKIP DATA CHECK.

031204                                          CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
031210                                  20$:


031210                                  ENDTST
031210                                                                                          L10112:
031210  104401                                                                                          TRAP    C$ETST

```

```
                                .SBTTL          TEST 18 - TRANSMIT GO AHEAD

                                ;*******************************************************************
                                ;*              TEST 18 - DPV-11
                                ;* TRANSMIT GO AHEAD
                                ;* TERMINATE A MESSAGE USING TRANSMIT GO AHEAD.  CHECK THAT THE RECEIVE
                                ;* ABORT BIT IS SET WHEN THE END OF MESSAGE IS RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1, LOOP SET,
                                ;*                        5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*******************************************************************

031212                          BGNTST
031212                                                                                  T18::

031212                                  CALL    $RESET          ;RESET THE DPV
031216                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
031216  104410                                                                          TRAP    C$ESCAPE
031220  000200                                                                          .WORD   L10113-.
031222  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
031230  012737  000000  002344          MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
031236  052737  020000  002344          BIS     #LOOP,IPCSAR    ;SET LOOP MODE TO RECOGNIZE GO AHEAD
031244  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
031252  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
031260  012737  000005  002352          MOV     #5,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
031266  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
031274  012737  005000  002422          MOV     #TGA!TEOM,TEND  ;TRANSMIT GO AHEAD AT THE END OF MESSAGE
031302  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
031310  012737  000012  002472          MOV     #10.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
031316  013777  002344  150746          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
031324  112737  000245  002342          MOVB    #245,IPCR       ;SET UP CHARACTER LENGTH


031332                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
031336  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
031344  012737  000001  002334          MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
031352                                  CALL    $DATA           ;
031356  103420                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

031360                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
031364                                  ESCAPE  TST             ;IF ERROR - EXIT
031364  104410                                                                          TRAP    C$ESCAPE
031366  000032                                                                          .WORD   L10113-.

031370  032737  001000  002350          BIT     #REOM,IRDSR     ;WAS END OF MESSAGE RECEIVED?
031376  001404                          BEQ     10$             ;IF NOT ERROR
031400  032737  002000  002350          BIT     #RABORT,IRDSR   ;WAS AN GO AHEAD RECEIVED?
031406  001004                          BNE     20$             ;IF YES - OK.
031410                          10$:
031410                                  ERRDF   80,EMG33        ;GO AHEAD NOT RECEIVED
031410  104455                                                                          TRAP    C$ERDF
031412  000120                                                                          .WORD   80
031414  014722                                                                          .WORD   EMG33
031416  000000                                                                          .WORD   0
031420                          20$:
```

```
     49 031420                          ENDTST
        031420                                                    L10113:
        031420  104401                                                    TRAP    C$ETST
     50
     51
```

```
                                        .SBTTL          TEST 19 - ASSEMBLED BIT COUNT

                                        ;*******************************************************************
                                        ;*              TEST 19 - DPV-11
                                        ;* ASSEMBLED BIT COUNT
                                        ;* TRANSMIT VARIOUS BIT LENGTHS WHILE RECEIVING AN 8 BIT CHARACTER.
                                        ;* ENSURE THAT THE ASSEMBLED BIT COUNT (ABC) IS CORRECT UPON THE END
                                        ;* OF MESSAGE.
                                        ;*      SELECTED OPTIONS: BOP MODE, NO ERROR CHECKING, VARIOUS BIT
                                        ;*                        LENGTH CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                        ;*
                                        ;*******************************************************************
031422                                  BGNTST
031422                                                                                          T19::

031422  012737  100000  002362                  MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
031430  012737  003400  002344                  MOV     #NOERR,IPCSAR   ;NO ERROR CHECKING

031436  012737  000007  002352                  MOV     #7,LENGTH       ;CHARACTER LENGTH.

031444  012737  000400  002434                  MOV     #TSOM,TSTART    ;START OF MESSAGE.
031452  012737  001000  002422                  MOV     #TEOM,TEND      ;ABORT MESSAGE
031460  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
031466  012737  000001  002472                  MOV     #1,XCOUNT       ;# OF CHARACTERS TO TRANSMIT
031474                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
031500  012737  000001  002352                  MOV     #1,LENGTH       ;CHANGE THE LENGTH
031506                                  7$:                             ;
031506                                          CALL    $RESET          ;RESET THE DPV
031512                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
031512  104410                                                                          TRAP    C$ESCAPE
031514  000132                                                                          .WORD   L10114-.
031516  012737  000001  002414                  MOV     #1,START        ;SEND 1 FLAG
031524  012737  000002  002340                  MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
031532  013777  002344  150532                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
031540  013701  002352                          MOV     LENGTH,R1       ;GET CHARACTER LENGTH
031544  116137  031650  002342                  MOVB    CHLEN(R1),IPCR  ;SET UP CHARACTER LENGTH.


031552  012737  000001  002356                  MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
031560  012737  000001  002334                  MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
031566                                          CALL    $DATA           ;
031572                                          ESCAPE  TST             ;IF ERROR - EXIT
031572  104410                                                                          TRAP    C$ESCAPE
031574  000052                                                                          .WORD   L10114-.


031576  013701  002352                          MOV     LENGTH,R1       ;GET CHARACTER LENGTH
031602  142737  000217  002351                  BICB    #217,IRDSR+1    ;CLEAR ALL BUT ABC FROM LAST RDSR.
031610  126137  031661  002351                  CMPB    ABC(R1),IRDSR+1 ;IS THE ABC THE EXPECTED VALUE?
031616  001405                                  BEQ     10$
031620                                          ERRDF   81,EMG36
031620  104455                                                                          TRAP    C$ERDF
031622  000121                                                                          .WORD   81
031624  015050                                                                          .WORD   EMG36
031626  000000                                                                          .WORD   0
031630  000406                                  BR      20$
031632                                  10$:
```

```
031632  005237  002352                    INC     LENGTH          ;THE NEXT CHARACTER LENGTH
031636  022737  000011  002352            CMP     #9.,LENGTH      ;8 BITS?
031644  001320                            BNE     7$              ;IF NOT - CONTINUE

031646                          20$:

031646                          ENDTST                                          L10114:
031646                                                                                  TRAP    C$ETST
031646  104401
031650     000     040     100  CHLEN:   .BYTE   0,40,100,140,200,240,300,340,0
031653     140     200     240
031656     300     340     000
031661     000     020     040  ABC:     .BYTE   0,20,40,60,100,120,140,160,0
031664     060     100     120
031667     140     160     000
                                         .EVEN
```

```
                                        .SBTTL          TEST 20 - SPECIAL SPACE SEQUENCING

                                        ;*******************************************************************
                                        ;*              TEST 20 - DPV-11
                                        ;* SPECIAL SPACE SEQUENCE
                                        ;* START A MESSAGE USING A SPECIAL SPACE SEQUENCE.  CHECK THAT THE
                                        ;* MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
                                        ;* NOTE: CERTAIN USYNRTS ONLY TRANSMIT A SPECIAL START SEQUENCE WHEN
                                        ;*       TRANSMIT START AND END OF MESSAGE ARE SET BY A BYTE OPERATION.
                                        ;*
                                        ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1,
                                        ;*                        5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                        ;*
                                        ;*******************************************************************
031672                                  BGNTST
031672                                                                                          T20::

031672                                          CALL    $RESET          ;RESET THE DPV
031676                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
031676  104410                                                                                  TRAP    C$ESCAPE
031700  000136                                                                                  .WORD   L10115-.
031702  012737  100000  002362                  MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
031710  012737  000000  002344                  MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
031716  012737  000002  002414                  MOV     #2,START        ;SEND 1 FLAG
031724  012737  000002  002340                  MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
031732  012737  000005  002352                  MOV     #5,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
031740  012737  000003  002434                  MOV     #3,TSTART       ;SET TSOM AND TEOM IN BYTE MODE.
031746  012737  001000  002422                  MOV     #TEOM,TEND      ;END OF MESSAGE
031754  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
031762  012737  000100  002472                  MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
031770  013777  002344  150274                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
031776  112737  000245  002342                  MOVB    #245,IPCR       ;SET UP CHARACTER LENGTH


032004                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
032010  012737  000001  002356                  MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
032016  005037  002334                          CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
032022                                          CALL    $DATA           ;
032026                                          ESCAPE  TST             ;IF ERROR, ESCAPE TEST
032026  104410                                                                                  TRAP    C$ESCAPE
032030  000006                                                                                  .WORD   L10115-.

032032                                          CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
032036                                  20$:


032036                                  ENDTST
032036                                                                                  L10115:
032036  104401                                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 21 - SYNCH CHARACTER

                                ;*******************************************************************
                                ;*              TEST 21 - DPV-11
                                ;* SYNCH CHARACTER
                                ;* CHECK THAT A SYNCH CHARACTER OF 271 CAN BE USED TO COMMENCE A MESSAGE.
                                ;* VERIFY THAT THE MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, VRC-EVEN PARITY,
                                ;*                        7 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*******************************************************************
032040                          BGNTST
032040                                                                          T21::

032040                                  CALL    $RESET          ;RESET THE DPV
032044                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
032044  104410                                                                          TRAP    C$ESCAPE
032046  000154                                                                          .WORD   L10116-.
032050  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
032054  012737  002400  002344          MOV     #VRCE,IPCSAR    ;SET VRC EVEN
032062  112737  000271  002344          MOVB    #271,IPCSAR     ;SYNCH CHARACTER
032070  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
032076  012737  000002  002414          MOV     #2,START        ;SEND 2 FLAGS
032104  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
032112  012737  000007  002352          MOV     #7,LENGTH       ;CHARACTER LENGTH OF 7 BITS.
032120  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
032126  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
032134  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
032142  012737  000017  002472          MOV     #15.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;

032150  112737  000347  002342          MOVB    #347,IPCR       ;CHARACTER LENGTH
032156  013777  002344  150106          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
032164  113777  002342  150112          MOVB    IPCR,@PCR       ;SET UP CHARACTER LENGTH


032172                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
032176  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
032204  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
032210                                  CALL    $DATA           ;
032214  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

032216                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
032222                          20$:


032222                          ENDTST
032222                                                                          L10116:
032222  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 22 - SYNCH FROM TRANSMIT DATA PATH

                                ;*******************************************************************
                                ;*              TEST 22 - DPV-11
                                ;* SYNCH FROM TRANSMIT DATA PATH
                                ;* TRANSMIT A MESSAGE USING THE SYNCH FROM THE TRANSMIT DATA PATH.
                                ;* VERIFY THAT THE MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, IDLE SET
                                ;*                        5 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*******************************************************************
032224                          BGNTST
032224                                                                                  T22::

032224                                  CALL    $RESET          ;RESET THE DPV
032230                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
032230  104410                                                                          TRAP    C$ESCAPE
032232  000154                                                                          .WORD   L10117-.
032234  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
032240  012737  002000  002344          MOV     #VRCO,IPCSAR    ;VRC ODD
032246  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
032254  052737  004000  002344          BIS     #IDLE,IPCSAR    ;SET THE IDLE BIT
032262  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
032270  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
032276  012737  000005  002352          MOV     #5,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
032304  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
032312  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
032320  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
032326  012737  000021  002472          MOV     #17.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;

032334  112737  000245  002342          MOVB    #245,IPCR       ;CHARACTER LENGTH
032342  113777  002342  147734          MOVB    IPCR,@PCR       ;SET UP CHARACTER LENGTH
032350  013777  002344  147714          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


032356                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
032362  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
032370  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
032374                                  CALL    $DATA           ;
032400  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

032402                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
032406                          20$:


032406                          ENDTST
032406                                                                                  L10117:
032406  104401                                                                          TRAP    C$ETST
```

```
                                        .SBTTL          TEST 23 - STRIP SYNCHS

                                        ;*******************************************************************
                                        ;*              TEST 23 - DPV-11
                                        ;* STRIP SYNCHS
                                        ;* SEND MORE THAN 2 SYNCHS WITH THE STRIP SYNCH BIT SET. CHECK THAT
                                        ;* THE MESSAGE IS CORRECTLY TRANSMITTED AND RECEIVED.
                                        ;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, STRIP SYNCH SET
                                        ;*                        6 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                        ;*
                                        ;*******************************************************************
032410                                  BGNTST
032410                                                                                          T23::

032410                                          CALL    $RESET          ;RESET THE DPV
032414                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
032414  104410                                                                                  TRAP    C$ESCAPE
032416  000154                                                                                  .WORD   L10120-.
032420  005037  002362                          CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
032424  012737  002000  002344                  MOV     #VRCO,IPCSAR    ;VRC ODD
032432  052737  020014  002344                  BIS     #SSYNCH!14,IPCSAR ;SYNCH + STRIP SYNCHS
032440  052737  040000  002344                  BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
032446  012737  000010  002414                  MOV     #8.,START       ;SEND 8 SYNCHS
032454  012737  000001  002340                  MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
032462  012737  000006  002352                  MOV     #6,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
032470  012737  000400  002434                  MOV     #TSOM,TSTART    ;START OF MESSAGE.
032476  012737  001000  002422                  MOV     #TEOM,TEND      ;END OF MESSAGE
032504  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
032512  012737  000015  002472                  MOV     #13.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
032520  112737  000306  002342                  MOVB    #306,IPCR       ;CHARACTER LENGTH
032526  113777  002342  147550                  MOVB    IPCR,@PCR       ;SET UP CHARACTER LENGTH
032534  013777  002344  147530                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS

032542                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
032546  012737  000001  002356                  MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
032554  005037  002334                          CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
032560                                          CALL    $DATA           ;
032564  103402                                  BCS     20$             ;IF ERROR SKIP DATA CHECK.

032566                                          CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
032572                                  20$:

032572                                  ENDTST
032572                                                                                          L10120:
032572  104401                                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 24 - CRC-CCITT PRESET TO ONES

                                ;*******************************************************************
                                ;*              TEST 24 - DPV-11
                                ;* CRC-CCITT PRESET TO ONES.
                                ;* CHECK TO ENSURE THAT THE ERROR CHECK BIT (BIT 15 OF RDSR) IS
                                ;* SET WHEN AN ABORT IS RECEIVED.  IN BOP MODE THIS BIT IS SET WHEN THE
                                ;* CRC IS IN ERROR.  THE ERROR CHECK BIT SHOULD BE ZERO WHEN REOM=1,
                                ;* IF THE CRC WERE CORRECTLY RECEIVED. BY FORCING AN ABORT WE INTENTIONALLY
                                ;* LOOK AT THE ERROR BIT WHEN IT SHOULD BE IN AN ERROR STATE.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 1, LOOP SET,
                                ;*                        4 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*******************************************************************
032574                          BGNTST
032574                                                                                  T24::

032574                                  CALL    $RESET          ;RESET THE DPV
032600                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
032600  104410                                                                          TRAP    C$ESCAPE
032602  000160                                                                          .WORD   L10121-.
032604  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
032612  012737  000000  002344          MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
032620  052737  020000  002344          BIS     #LOOP,IPCSAR    ;SET LOOP MODE TO RECOGNIZE GO AHEAD.
032626  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
032634  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
032642  012737  000004  002352          MOV     #4,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
032650  012737  000400  002434          MOV     #TSOM,TSTART    ;START MESSAGE
032656  012737  002000  002422          MOV     #TXABO,TEND     ;ABORT MESSAGE
032664  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
032672  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
032700  013777  002344  147364          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
032706  112737  000204  002342          MOVB    #204,IPCR       ;SET UP CHARACTER LENGTH


032714                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
032720  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
032726  012737  000001  002334          MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
032734                                  CALL    $DATA           ;
032740                                  ESCAPE  TST             ;IF ERROR - EXIT TEST
032740  104410                                                                          TRAP    C$ESCAPE
032742  000020                                                                          .WORD   L10121-.
032744  005737  002350                  TST     IRDSR           ;IS THE ERR BIT SET
032750  100404                          BMI     20$             ;IF YES - OK
032752                                  ERRDF   82,EMG38
032752  104455                                                                          TRAP    C$ERDF
032754  000122                                                                          .WORD   82
032756  015114                                                                          .WORD   EMG38
032760  000000                                                                          .WORD   0
032762                          20$:

032762                          ENDTST
032762                                                                          L10121:
032762  104401                                                                          TRAP    C$ETST

```

```
                                        .SBTTL          TEST 25 - CRC-CCITT PRESET TO ZERO

                                        ;*******************************************************************
                                        ;*              TEST 25 - DPV-11
                                        ;* CRC-CCITT PRESET TO ZERO.
                                        ;* CHECK TO ENSURE THAT THE ERROR CHECK BIT (BIT 15 OF RDSR) IS
                                        ;* SET WHEN AN ABORT IS RECEIVED.  IN BOP MODE THIS BIT IS SET WHEN THE
                                        ;* CRC IS IN ERROR.  THE ERROR CHECK BIT SHOULD BE ZERO WHEN REOM=1,
                                        ;* IF THE CRC WERE CORRECTLY RECEIVED. BY FORCING AN ABORT WE INTENTIONALLY
                                        ;* LOOK AT THE ERROR BIT WHEN IT SHOULD BE IN AN ERROR STATE.
                                        ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO 0, LOOP SET,
                                        ;*                        8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                        ;*
                                        ;*******************************************************************
 032764                                 BGNTST
 032764                                                                                          T25::

 032764                                         CALL    $RESET          ;RESET THE DPV
 032770                                         ESCAPE  TST             ;IF ERROR, BR TO THE END.
 032770  104410                                                                                  TRAP    C$ESCAPE
 032772  000156                                                                                  .WORD   L10122-.
 032774  012737  100000  002362                 MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
 033002  012737  000400  002344                 MOV     #CCITT0,IPCSAR  ;SET CRC-CCITT PRESET TO ZERO
 033010  052737  020000  002344                 BIS     #LOOP,IPCSAR    ;SET LOOP MODE TO RECOGNIZE GO AHEAD.
 033016  012737  000001  002414                 MOV     #1,START        ;SEND 1 FLAG
 033024  012737  000002  002340                 MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
 033032  012737  000010  002352                 MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
 033040  012737  000400  002434                 MOV     #TSOM,TSTART    ;START MESSAGE
 033046  012737  002000  002422                 MOV     #TXABO,TEND     ;ABORT MESSAGE
 033054  012737  002502  002470                 MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
 033062  012737  000100  002472                 MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
 033070  013777  002344  147174                 MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
 033076  105037  002342                         CLRB    IPCR            ;SET UP CHARACTER LENGTH

 033102                                         CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
 033106  012737  000001  002356                 MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
 033114  012737  000001  002334                 MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
 033122                                         CALL    $DATA           ;
 033126                                         ESCAPE  TST             ;IF ERROR - EXIT TEST
 033126  104410                                                                                  TRAP    C$ESCAPE
 033130  000020                                                                                  .WORD   L10122-.
 033132  005737  002350                         TST     IRDSR           ;IS THE ERR BIT SET
 033136  100404                                 BMI     20$             ;IF YES - OK
 033140                                         ERRDF   83,EMG38
 033140  104455                                                                                  TRAP    C$ERDF
 033142  000123                                                                                  .WORD   83
 033144  015114                                                                                  .WORD   EMG38
 033146  000000                                                                                  .WORD   0
 033150                                 20$:

 033150                                 ENDTST
 033150                                                                                  L10122:
 033150  104401                                                                                  TRAP    C$ETST
```

TEST 25 - CRC-CCITT PRESET TO ZERO
47
48
49

```
                                .SBTTL          TEST 26 - CRC-16 PRESET TO 0

                                ;*******************************************************************
                                ;*              TEST 26 - DPV-11
                                ;* CRC-16 PRESET TO 0
                                ;*
                                ;* SUBTEST 1 - CRC-16 ERROR
                                ;* CHECK TO ENSURE THAT THE ERROR CHECK BIT (BIT 15 OF RDSR) IS
                                ;* CLEAR IF THE RECEIVER IS SHUTDOWN BEFORE THE CRC IS RECEIVED.
                                ;* IN BCP MODE THIS BIT IS CLEAR WHEN THE CRC IS IN ERROR.
                                ;* THE ERROR CHECK BIT SHOULD BE SET WHEN THE LAST CHARACTER IS RECEIVED,
                                ;* IF THE CRC WERE GOOD.
                                ;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO 0, LOOP SET,
                                ;*                        8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;* SUBTEST 2 -  CRC-16 CHECK
                                ;* CHECK THAT THE CORRECT CRC-16 IS RECEIVED FOR THE DATA MESSAGE.
                                ;* THE CRC FOR THIS DATA MESSAGE WAS PREDETERMINED.
                                ;*
                                ;*******************************************************************
033152                          BGNTST
033152                                                                          T26::

033152                            BGNSUB
033152                                                                          T26.1:
033152  104402                                                                          TRAP    C$BSUB
033154                                  CALL    $RESET          ;RESET THE DPV
033160                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
033160  104410                                                                          TRAP    C$ESCAPE
033162  000404                                                                          .WORD   L10123-.
033164  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
033170  012737  001400  002344          MOV     #CRC16,IPCSAR   ;SET CRC 16
033176  112737  000271  002344          MOVB    #271,IPCSAR     ;SYNCH CHARACTER
033204  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
033212  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
033220  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
033226  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
033234  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
033242  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
033250  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
033256  012737  000017  002472          MOV     #15.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
033264  105037  002342                  CLRB    IPCR            ;CHARACTER LENGTH.
033270  013777  002344  146774          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


033276                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
033302  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
033310  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
033314  005337  002474                  DEC     ECOUNT          ;CHANGE THE END COUNT
033320                                  CALL    $DATA           ;
033324                                  ESCAPE  TST             ;IF ERROR - EXIT TEST
033324  104410                                                                          TRAP    C$ESCAPE
033326  000240                                                                          .WORD   L10123-.
033330  005737  002350                  TST     IRDSR           ;IS THE ERR BIT SET
033334  100004                          BPL     20$             ;IF YES - OK
033336                                  ERRDF   84,EMG38
```

```
        033336  104455                                                                  TRAP    C$ERDF
        033340  000124                                                                  .WORD   84
        033342  015114                                                                  .WORD   EMG38
        033344  000000                                                                  .WORD   0
     51 033346                          20$:
     52 033346                            ENDSUB
        033346                                                                  L10124:
        033346  104403                                                                  TRAP    C$ESUB
     53
     54 033350                            BGNSUB
        033350                                                                  T26.2:
        033350  104402                                                                  TRAP    C$BSUB
     55 033352                                  CALL    $RESET          ;RESET THE DPV
     56 033356                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
        033356  104410                                                                  TRAP    C$ESCAPE
        033360  000206                                                                  .WORD   L10123-.
     57 033362  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
     58 033366  012737  001400  002344          MOV     #CRC16,IPCSAR   ;SET VRC EVEN
     59 033374  112737  000271  002344          MOVB    #271,IPCSAR     ;SYNCH CHARACTER
     60 033402  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
     61 033410  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
     62 033416  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
     63 033424  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
     64 033432  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
     65 033440  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
     66 033446  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
     67 033454  012737  000017  002472          MOV     #15.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
     68                                                                 ;
     69 033462  013777  002344  146602          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
     70 033470  105037  002342                  CLRB    IPCR            ;SET UP CHARACTER LENGTH
     71
     72 033474                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
     73
     74 033500  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
     75 033506  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
     76
     77 033512  062737  000002  002474          ADD     #2,ECOUNT       ;CHANGE END COUNT TO GET CRC
     78
     79 033520                                  CALL    $DATA           ;
     80 033524                                  ESCAPE  TST             ;IF ERROR - EXIT TEST
        033524  104410                                                                  TRAP    C$ESCAPE
        033526  000040                                                                  .WORD   L10123-.
     81 033530  012701  003273                  MOV     #RCVBUF,R1      ;ADDRESS OF RECEIVE BUFFER
     82 033534  063701  002472                  ADD     XCOUNT,R1       ;CALCULATE ADDRESS OF CRC
     83 033540  122127  000332                  CMPB    (R1)+,#CRCLO    ;CHECK LO BYTE OF THE CRC
     84 033544  001003                          BNE     10$             ;IF ERROR - REPORT
     85 033546  122127  000266                  CMPB    (R1)+,#CRCHI    ;CHECK HI BYTE OF THE CRC
     86 033552  001404                          BEQ     20$             ;IF NOT ERROR - OK
     87 033554                          10$:
     88 033554                                  ERRDF   85,EMG37        ;CRC ERROR.
        033554  104455                                                                  TRAP    C$ERDF
        033556  000125                                                                  .WORD   85
        033560  015102                                                                  .WORD   EMG37
        033562  000000                                                                  .WORD   0
     89 033564                          20$:
     90 033564                            ENDSUB
        033564                                                                  L10125:
```

TEST 26 - CRC-16 PRESET TO 0

```
        033564  104403                                                  TRAP    C$ESUB
     91
     92 033566                          ENDTST
        033566                                                  L10123:
        033566  104401                                                  TRAP    C$ETST
     93
     94
     95
```

```
                                .SBTTL          TEST 27 - VRC ODD PARITY ERROR

                                ;*********************************************************************
                                ;*              TEST 27 - DPV-11
                                ;* VRC ODD PARITY ERROR
                                ;* BY SELECTING DIFFERENT CHARACTER LENGTHS IN THE RECEIVER AND
                                ;* TRANSMITTER, CAUSE A PARITY ERROR TO OCCUR.
                                ;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, XMIT=7 &
                                ;*                        RCV=6 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*********************************************************************
033570                          BGNTST
033570                                                                                          T27::

033570                                  CALL    $RESET          ;RESET THE DPV
033574                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
033574  104410                                                                                  TRAP    C$ESCAPE
033576  000160                                                                                  .WORD   L10126-.
033600  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
033604  012737  002000  002344          MOV     #VRCO,IPCSAR    ;SET VRC ODD
033612  112737  000271  002344          MOVB    #271,IPCSAR     ;SYNCH CHARACTER
033620  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
033626  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
033634  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
033642  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
033650  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
033656  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
033664  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
033672  012737  000017  002472          MOV     #15.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
033700  112737  000346  002342          MOVB    #346,IPCR       ;SET UP A XMIT CHARACTER = 7
                                                                ;AND A RECEIVE CHARACTER = 6
033706  013777  002344  146356          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


033714                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
033720  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
033726  012737  000001  002334          MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
033734                                  CALL    $DATA           ;
033740  005737  002350                  TST     IRDSR           ;IS THE ERROR BIT SET (BIT 15)?
033744  100404                          BMI     20$             ;IF SET OK
033746                                  ERRDF   86,EMG39
033746  104455                                                                                  TRAP    C$ERDF
033750  000126                                                                                  .WORD   86
033752  015143                                                                                  .WORD   EMG39
033754  000000                                                                                  .WORD   0
033756                          20$:


033756                          ENDTST
033756                                                                                          L10126:
033756  104401                                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 28 - VRC EVEN PARITY ERROR

                                ;*********************************************************************
                                ;*              TEST 28 - DPV-11
                                ;* VRC EVEN PARITY ERROR
                                ;* BY SELECTING DIFFERENT CHARACTER LENGTHS IN THE RECEIVER AND
                                ;* TRANSMITTER, CAUSE A PARITY ERROR TO OCCUR.
                                ;*      SELECTED OPTIONS: BCP MODE, VRC-EVEN PARITY, XMIT=5 &
                                ;*                        RCV=4 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*********************************************************************
033760                          BGNTST
033760                                                                                  T28::

033760                                  CALL    $RESET          ;RESET THE DPV
033764                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
033764  104410                                                                          TRAP    C$ESCAPE
033766  000160                                                                          .WORD   L10127-.
033770  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
033774  012737  002400  002344          MOV     #VRCE,IPCSAR    ;SET VRC EVEN
034002  112737  000271  002344          MOVB    #271,IPCSAR     ;SYNCH CHARACTER
034010  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
034016  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
034024  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
034032  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
034040  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
034046  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
034054  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
034062  012737  000017  002472          MOV     #15.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
034070  112737  000244  002342          MOVB    #244,IPCR       ;SET UP A XMIT CHARACTER = 5
                                                                ;AND A RECEIVE CHARACTER = 4
034076  013777  002344  146166          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


034104                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
034110  012737  000001  002356          MOV     #1,MAINT        ;FLAG TO USE MAINTENANCE MODE LOOPBACK.
034116  012737  000001  002334          MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
034124                                  CALL    $DATA           ;
034130  005737  002350                  TST     IRDSR           ;IS THE ERROR BIT SET (BIT 15)?
034134  100404                          BMI     20$             ;IF SET OK
034136                                  ERRDF   87,EMG39
034136  104455                                                                          TRAP    C$ERDF
034140  000127                                                                          .WORD   87
034142  015143                                                                          .WORD   EMG39
034144  000000                                                                          .WORD   0
034146                          20$:


034146                          ENDTST
034146                                                                          L10127:
034146  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 29 - DATA TEST

                                ;*******************************************************************
                                ;*              TEST 29 - DPV-11
                                ;* DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE WITHOUT THE USE OF INTERRUPT
                                ;* SERVICE ROUTINES. CHECK THAT THE DATA IS  CORRECT.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
                                ;*                        8 BIT CHARACTERS, MAINTENANCE MODE LOOPBACK.
                                ;*
                                ;*******************************************************************
034150                          BGNTST
034150                                                                          T29::
034150                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
034154  103573                          BCS     50$             ;IF NOT, SKIP THE TEST.
034156                                  CALL    $RESET          ;RESET THE DPV
034162                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
034162  104410                                                                  TRAP    C$ESCAPE
034164  000360                                                                  .WORD   L10130-.
034166  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT MODE IS BOP.
034174  005037  002344                  CLR     IPCSAR          ;IMAGE OF PCSAR = 0.
034200  012737  000000  002344          MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
034206  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS
034214  012737  002602  002470          MOV     #ALPHA,XTYPE    ;USE ALPHANUMERIC DATA PATTERN
034222  012737  000045  002472          MOV     #ACOUNT,XCOUNT  ;# OF CHARACTERS TO TRANSMIT
                                                                ;


034230                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.

034234  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
034240  012702  002673                  MOV     #XMTBUF,R2      ;TRANSMIT BUFFER
034244  013703  002472                  MOV     XCOUNT,R3       ;TRANSMIT COUNT
034250  005037  002500                  CLR     RCOUNT          ;CLEAR THE RECEIVE COUNTER.
034254  013704  002430                  MOV     TIMER,R4        ;SET UP THE TIMER.

034260  013777  002402  146002          MOV     RXINI,@RXCSR    ;ENABLE THE RECEIVER
034266  013777  002436  146000          MOV     TXINI,@TXCSR    ;ENABLE THE RECEIVER

034274  012777  000400  145774          MOV     #TSOM,@TDSR     ;TRANSMIT START OF MESSAGE
034302                          9$:
034302  005005                          CLR     R5              ;INNER TIMER LOOP COUNTER.
034304                          10$:
034304  005777  145766                  TST     @TDSR           ;IS THERE A TRANSMIT ERROR?
034310  100005                          BPL     12$             ;IF NOT PROCEED.
034312                                  ERRDF   88,EMG30        ;TRANSMIT UNDERRUN.
034312  104455                                                                  TRAP    C$ERDF
034314  000130                                                                  .WORD   88
034316  014642                                                                  .WORD   EMG30
034320  000000                                                                  .WORD   0
034322  000510                          BR      50$
034324                          12$:


034324  032777  000004  145742          BIT     #TBE,@TXCSR     ;IS TRANSMIT BUFFER EMPTY?
034332  001057                          BNE     20$             ;IF YES - SEND A CHARACTER.
```

```
034334  005305                          DEC     R5              ;DECREMENT LOOP COUNTER
034336  001011                          BNE     15$             ;IF NOT ZERO OK.
034340  005304                          DEC     R4              ;IS OUTER LOOP 0?
034342  001402                          BEQ     13$             ;IF YES - TIME OUT
034344  005005                          CLR     R5              ;CLEAR INNER LOOP TIMER
034346  000405                          BR      15$
034350                          13$:
034350                                  ERRDF   89,EMG1
034350  104455                                                                          TRAP    C$ERDF
034352  000131                                                                          .WORD   89
034354  013336                                                                          .WORD   EMG1
034356  000000                                                                          .WORD   0
034360  000471                          BR      50$

034362                          15$:
034362  032777  002200  145700           BIT     #RSTARY!RDATRY,@RXCSR ;IS STATUS OR DATA READY
034370  001745                          BEQ     10$             ;IF NOT CHECK TBE
034372  017737  145672  002346           MOV     @RXCSR,IRXCSR   ;SAVE RXCSR
034400  017737  145666  002350           MOV     @RDSR,IRDSR     ;SAVE RDSR
034406  032737  000200  002346           BIT     #RDATRY,IRXCSR  ;IS DATA READY?
034414  001404                          BEQ     17$
034416  113721  002350                  MOVB    IRDSR,(R1)+     ;SAVE THE DATA
034422  005237  002500                  INC     RCOUNT          ;INCREMENT COUNT
034426                          17$:
034426  032737  002000  002346           BIT     #RSTARY,IRXCSR  ;IS STATUS READY?
034434  001723                          BEQ     10$             ;IF NOT CHECK TBE
034436  032737  106000  002350           BIT     #ERR!ROVER!RABORT,IRDSR ;ANY ERRORS?
034444  001005                          BNE     18$             ;IF YES, REPORT.
034446  032737  001000  002350           BIT     #REOM,IRDSR     ;END OF MESSAGE.
034454  001031                          BNE     30$
034456  000712                          BR      10$
034460                          18$:
034460                                  ERRDF   90,EMG31
034460  104455                                                                          TRAP    C$ERDF
034462  000132                                                                          .WORD   90
034464  014660                                                                          .WORD   EMG31
034466  000000                                                                          .WORD   0
034470  000425                          BR      50$


034472                          20$:
034472  032777  000400  145576           BIT     #TSOM,@TDSR     ;IS START OF MESSAGE SENT.
034500  001405                          BEQ     25$             ;IF NOT, CONTINUE.
034502  005037  002476                  CLR     XMITD           ;CLEAR XMIT COUNTER
034506  042777  000400  145562           BIC     #TSOM,@TDSR     ;CLEAR START OF MESSAGE.
034514                          25$:
034514  112277  145556                  MOVB    (R2)+,@TDSR     ;TRANSMIT A CHARACTER.
034520  005237  002476                  INC     XMITD           ;COUNT CHARACTER ACTUALLY TRANSMITTED.
034524  005303                          DEC     R3              ;DECREMENT COUNTER
034526  001315                          BNE     15$             ;IF NOT DONE LOOP
034530  052777  001000  145540           BIS     #TEOM,@TDSR     ;SEND END OF MESSAGE.
034536  000711                          BR      15$

034540                          30$:
034540                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
```

```
034544                          50$:
034544                          ENDTST
034544                                                          L10130:
034544  104401                                                          TRAP    C$ETST
```

```
                                        .SBTTL          TEST 30 - BOP DATA TEST

                                        ;*******************************************************************
                                        ;*              TEST 30 - DPV-11
                                        ;* BOP DATA TEST
                                        ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                        ;* DATA IS CORRECTLY RECEIVED.
                                        ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZERO,
                                        ;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                        ;*
                                        ;*******************************************************************
034546                                  BGNTST
034546                                                                                          T30::
034546                                          CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
034552  103462                                  BCS     50$             ;IF NOT, SKIP THE TEST.
034554                                          CALL    $RESET          ;RESET THE DPV
034560                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
034560  104410                                                                                  TRAP    C$ESCAPE
034562  000136                                                                                  .WORD   L10131-.
034564  012737  100000  002362                  MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
034572  012737  000400  002344                  MOV     #CCITT0,IPCSAR  ;SET CRC-CCITT PRESET TO ZERO
034600  012737  000001  002414                  MOV     #1,START        ;SEND 1 FLAG
034606  012737  000002  002340                  MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
034614  012737  000006  002352                  MOV     #6,LENGTH       ;CHARACTER LENGTH OF 6 BITS.
034622  012737  000400  002434                  MOV     #TSOM,TSTART    ;START OF MESSAGE.
034630  012737  001000  002422                  MOV     #TEOM,TEND      ;END OF MESSAGE
034636  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
034644  012737  000100  002472                  MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
034652  013777  002344  145412                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
034660  112737  000306  002342                  MOVB    #306,IPCR       ;SET UP CHARACTER LENGTH


034666                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
034672  005037  002356                          CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
034676  005037  002334                          CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
034702                                          CALL    $DATA           ;
034706  103402                                  BCS     20$             ;IF ERROR SKIP DATA CHECK.

034710                                          CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
034714                                  20$:
034714                                          CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
034720                                  50$:

034720                                  ENDTST
034720                                                                                          L10131:
034720  104401                                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 31 - BOP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 31 - DPV-11
                                ;* BOP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
                                ;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
034722                          BGNTST
034722                                                                          T31::
034722                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
034726  103462                          BCS     50$             ;IF NOT, SKIP THE TEST.
034730                                  CALL    $RESET          ;RESET THE DPV
034734                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
034734  104410                                                                  TRAP    C$ESCAPE
034736  000136                                                                  .WORD   L10132-.
034740  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
034746  012737  000000  002344          MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
034754  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
034762  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
034770  012737  000006  002352          MOV     #6,LENGTH       ;CHARACTER LENGTH OF 6 BITS.
034776  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
035004  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
035012  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
035020  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
035026  013777  002344  145236          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
035034  112737  000306  002342          MOVB    #306,IPCR       ;SET UP CHARACTER LENGTH


035042                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
035046  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
035052  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
035056                                  CALL    $DATA           ;
035062  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

035064                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
035070                          20$:
035070                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
035074                          50$:

035074                          ENDTST
035074                                                                  L10132:
035074  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 32 - BOP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 32 - DPV-11
                                ;* BOP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZERO,
                                ;*                        7 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
035076                          BGNTST
035076                                                                          T32::
035076                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
035102  103470                          BCS     50$             ;IF NOT, SKIP THE TEST.
035104                                  CALL    $RESET          ;RESET THE DPV
035110                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
035110  104410                                                                  TRAP    C$ESCAPE
035112  000152                                                                  .WORD   L10133-.
035114  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
035122  012737  000400  002344          MOV     #CCITT0,IPCSAR  ;SET CRC-CCITT PRESET TO ZERO
035130  052737  010000  002344          BIS     #SECADR,IPCSAR  ;SET SECONDARY ADDRESS.
035136  112737  000123  002344          MOVB    #123,IPCSAR     ;SECONDARY ADDRESS.
035144  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
035152  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
035160  012737  000007  002352          MOV     #7,LENGTH       ;CHARACTER LENGTH OF 7 BITS.
035166  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
035174  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
035202  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
035210  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
035216  013777  002344  145046          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
035224  112737  000347  002342          MOVB    #347,IPCR       ;SET UP CHARACTER LENGTH

035232                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
035236  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
035242  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
035246                                  CALL    $DATA           ;
035252  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

035254                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
035260                          20$:
035260                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
035264                          50$:

035264                          ENDTST
035264                                                                  L10133:
035264  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 33 - BOP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 33 - DPV-11
                                ;* BOP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
                                ;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
035266                          BGNTST
035266                                                                                  T33::
035266                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
035272  103461                          BCS     50$             ;IF NOT, SKIP THE TEST.
035274                                  CALL    $RESET          ;RESET THE DPV
035300                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
035300  104410                                                                          TRAP    C$ESCAPE
035302  000134                                                                          .WORD   L10134-.
035304  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
035312  012737  000000  002344          MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
035320  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
035326  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
035334  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
035342  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE.
035350  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
035356  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
035364  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
035372  013777  002344  144672          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
035400  105037  002342                  CLRB    IPCR            ;SET UP CHARACTER LENGTH


035404                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
035410  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
035414  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
035420                                  CALL    $DATA           ;
035424  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

035426                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
035432                          20$:
035432                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
035436                          50$:

035436                          ENDTST
035436                                                                          L10134:
035436  104401                                                                          TRAP    C$ETST
```

```
                                        .SBTTL          TEST 34 - BOP DATA TEST

                                        ;*******************************************************************
                                        ;*              TEST 34 - DPV-11
                                        ;* BOP DATA TEST
                                        ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                        ;* DATA IS CORRECTLY RECEIVED.
                                        ;* NOTE: CERTAIN USYNRTS ONLY TRANSMIT A SPECIAL START SEQUENCE WHEN
                                        ;*       TRANSMIT START AND END OF MESSAGE ARE SET BY A BYTE OPERATION.
                                        ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
                                        ;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                        ;*
                                        ;*******************************************************************
035440                                  BGNTST
035440                                                                                          T34::
035440                                          CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
035444  103462                                  BCS     50$             ;IF NOT, SKIP THE TEST.
035446                                          CALL    $RESET          ;RESET THE DPV
035452                                          ESCAPE  TST             ;IF ERROR, BR TO THE END.
035452  104410                                                                                  TRAP    C$ESCAPE
035454  000136                                                                                  .WORD   L10135-.
035456  012737  100000  002362                  MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
035464  012737  000000  002344                  MOV     #CCITT1,IPCSAR  ;SET CRC-CCITT PRESET TO ONE
035472  012737  000002  002414                  MOV     #2,START        ;SEND 1 FLAG
035500  012737  000002  002340                  MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
035506  012737  000006  002352                  MOV     #6,LENGTH       ;CHARACTER LENGTH OF 6 BITS.
035514  012737  000003  002434                  MOV     #3,TSTART       ;SET TSOM AND TEOM IN BYTE MODE.
035522  012737  001000  002422                  MOV     #TEOM,TEND      ;END OF MESSAGE
035530  012737  002502  002470                  MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
035536  012737  000100  002472                  MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                        ;
035544  013777  002344  144520                  MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
035552  112737  000306  002342                  MOVB    #306,IPCR       ;SET UP CHARACTER LENGTH


035560                                          CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
035564  005037  002356                          CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
035570  005037  002334                          CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
035574                                          CALL    $DATA           ;
035600  103402                                  BCS     20$             ;IF ERROR SKIP DATA CHECK.

035602                                          CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
035606                                  20$:
035606                                          CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
035612                                  50$:
035612                                  ENDTST
035612                                                                                  L10135:
035612  104401                                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 35 - BOP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 35 - DPV-11
                                ;* BOP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZEROS,
                                ;*                        7 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
035614                          BGNTST
035614                                                                          T35::
035614                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
035620  103465                          BCS     50$             ;IF NOT, SKIP THE TEST.
035622                                  CALL    $RESET          ;RESET THE DPV
035626                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
035626  104410                                                                          TRAP    C$ESCAPE
035630  000144                                                                          .WORD   L10136-.
035632  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
035640  012737  000400  002344          MOV     #CCITT0,IPCSAR  ;SET CRC-CCITT PRESET TO ZERO
035646  012737  100000  002344          MOV     #APA,IPCSAR     ;ALL PARTIES ADDRESS.
035654  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
035662  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
035670  012737  000007  002352          MOV     #7,LENGTH       ;CHARACTER LENGTH OF 7 BITS.
035676  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE
035704  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
035712  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
035720  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
035726  013777  002344  144336          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
035734  112737  000347  002342          MOVB    #347,IPCR       ;SET UP CHARACTER LENGTH


035742                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
035746  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
035752  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
035756                                  CALL    $DATA           ;
035762  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

035764                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
035770                          20$:
035770                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
035774                          50$:

035774                          ENDTST
035774                                                                          L10136:
035774  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 36 - BOP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 36 - DPV-11
                                ;* BOP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ZERO, LOOP SET,
                                ;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
035776                          BGNTST
035776                                                                          T36::
035776                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
036002  103465                          BCS     50$             ;IF NOT, SKIP THE TEST.
036004                                  CALL    $RESET          ;RESET THE DPV
036010                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
036010  104410                                                                  TRAP    C$ESCAPE
036012  000144                                                                  .WORD   L10137-.
036014  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT WE ARE IN BOP MODE.
036022  012737  000400  002344          MOV     #CCITT0,IPCSAR  ;SET CRC-CCITT PRESET TO ZERO
036030  052737  020000  002344          BIS     #LOOP,IPCSAR    ;SET LOOP MODE TO RECOGNIZE THE GO AHEAD.
036036  012737  000001  002414          MOV     #1,START        ;SEND 1 FLAG
036044  012737  000002  002340          MOV     #2,HEADER       ;SEND 2 HEADER CHARACTERS
036052  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
036060  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE
036066  012737  005000  002422          MOV     #TGA!TEOM,TEND  ;TRANSMIT GO AHEAD AT END OF MESSAGE.
036074  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
036102  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
036110  013777  002344  144154          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS
036116  105037  002342                  CLRB    IPCR            ;SET UP CHARACTER LENGTH


036122                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
036126  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
036132  012737  000001  002334          MOV     #1,EXERR        ;FLAG THAT AN ERROR IS EXPECTED IN $DATA
036140                                  CALL    $DATA           ;
036144  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

036146                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
036152                          20$:
036152                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
036156                          50$:

036156                          ENDTST
036156                                                                          L10137:
036156  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 37 - BCP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 37 - DPV-11
                                ;* BCP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, VRC-ODD PARITY, IDLE BIT SET
                                ;*                        5 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
036160                          BGNTST
036160                                                                                  T37::
036160                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
036164  103475                          BCS     50$             ;IF NOT, SKIP THE TEST.
036166                                  CALL    $RESET          ;RESET THE DPV
036172                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
036172  104410                                                                          TRAP    C$ESCAPE
036174  000164                                                                          .WORD   L10140-.
036176  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
036202  012737  000024  002344          MOV     #24,IPCSAR      ;LOAD SYNCH IN PCSAR (FOR RECEIVER ONLY)
036210  052737  002000  002344          BIS     #VRCO,IPCSAR    ;SET ODD VRC
036216  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
036224  052737  004000  002344          BIS     #IDLE,IPCSAR    ;TRANSMIT SYNCH FROM TDSR
036232  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
036240  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
036246  012737  000005  002352          MOV     #5,LENGTH       ;CHARACTER LENGTH OF 5 BITS.
036254  012737  000424  002434          MOV     #TSOM!24,TSTART ;START OF MESSAGE AND SYNCH CHARACTER.
036262  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
036270  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
036276  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
036304  112737  000245  002342          MOVB    #245,IPCR       ;SET UP CHARACTER LENGTH
036312  113777  002342  143764          MOVB    IPCR,@PCR       ;SET UP CHARACTER LENGTH
036320  013777  002344  143744          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


036326                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
036332  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
036336  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
036342                                  CALL    $DATA           ;
036346  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

036350                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
036354                          20$:
036354                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
036360                          50$:

036360                          ENDTST
036360                                                                          L10140:
036360  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 38 - BCP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 38 - DPV-11
                                ;* BCP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, VRC-EVEN PARITY,
                                ;*                        6 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
036362                          BGNTST
036362                                                                          T38::
036362                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
036366  103472                          BCS     50$             ;IF NOT, SKIP THE TEST.
036370                                  CALL    $RESET          ;RESET THE DPV
036374                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
036374  104410                                                                  TRAP    C$ESCAPE
036376  000156                                                                  .WORD   L10141-.
036400  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
036404  012737  002400  002344          MOV     #VRCE,IPCSAR    ;SET EVEN VRC
036412  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
036420  112737  000105  002344          MOVB    #105,IPCSAR     ;SYNCH.
036426  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
036434  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
036442  012737  000006  002352          MOV     #6,LENGTH       ;CHARACTER LENGTH OF 6 BITS.
036450  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE
036456  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
036464  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
036472  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
036500  112737  000306  002342          MOVB    #306,IPCR       ;SET UP CHARACTER LENGTH
036506  113777  002342  143570          MOVB    IPCR,@PCR       ;SET UP CHARACTER LENGTH
036514  013777  002344  143550          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


036522                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
036526  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
036532  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
036536                                  CALL    $DATA           ;
036542  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

036544                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
036550                          20$:
036550                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
036554                          50$:

036554                          ENDTST
036554                                                                  L10141:
036554  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 39 - BCP DATA TEST

                                ;*************************************************************
                                ;*              TEST 39 - DPV-11
                                ;* BCP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES, STRIP SYNCHS,
                                ;*                        7 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*************************************************************
036556                          BGNTST
036556                                                                          T39::
036556                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
036562  103475                          BCS     50$             ;IF NOT, SKIP THE TEST.
036564                                  CALL    $RESET          ;RESET THE DPV
036570                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
036570  104410                                                                  TRAP    C$ESCAPE
036572  000164                                                                  .WORD   L10142-.
036574  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
036600  012737  001400  002344          MOV     #CRC16,IPCSAR   ;SET CRC 16
036606  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
036614  052737  020000  002344          BIS     #SSYNCH,IPCSAR  ;STRIP SYNCH.
036622  112737  000217  002344          MOVB    #217,IPCSAR     ;SYNCH
036630  012737  000005  002414          MOV     #5,START        ;SEND 5 SYNCHS
036636  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
036644  012737  000007  002352          MOV     #7,LENGTH       ;CHARACTER LENGTH OF 7 BITS.
036652  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE
036660  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
036666  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
036674  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
036702  112737  000347  002342          MOVB    #347,IPCR       ;CHARACTER LENGTH
036710  113777  002342  143366          MOVB    IPCR,@PCR       ;SET UP CHARACTER LENGTH
036716  013777  002344  143346          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


036724                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
036730  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
036734  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
036740                                  CALL    $DATA           ;
036744  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

036746                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
036752                          20$:
036752                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
036756                          50$:

036756                          ENDTST
036756                                                                          L10142:
036756  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 40 - BCP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 40 - DPV-11
                                ;* BCP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES,
                                ;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
036760                          BGNTST
036760                                                                          T40::
036760                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
036764  103463                          BCS     50$             ;IF NOT, SKIP THE TEST.
036766                                  CALL    $RESET          ;RESET THE DPV
036772                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
036772  104410                                                                  TRAP    C$ESCAPE
036774  000140                                                                  .WORD   L10143-.
036776  005037  002362                  CLR     MODE            ;FLAG THAT WE ARE IN BCP MODE.
037002  012737  001400  002344          MOV     #CRC16,IPCSAR   ;SET CRC16
037010  052737  040000  002344          BIS     #PROTO,IPCSAR   ;SET BCP PROTOCOL
037016  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
037024  012737  000001  002340          MOV     #1,HEADER       ;SEND 1 HEADER CHARACTER
037032  012737  000010  002352          MOV     #8.,LENGTH      ;CHARACTER LENGTH OF 8 BITS.
037040  012737  000400  002434          MOV     #TSOM,TSTART    ;START OF MESSAGE
037046  012737  001000  002422          MOV     #TEOM,TEND      ;END OF MESSAGE
037054  012737  002502  002470          MOV     #$CCITT,XTYPE   ;USE CCITT DATA PATTERN
037062  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
                                                                ;
037070  105037  002342                  CLRB    IPCR            ;CHARACTER LENGTH
037074  013777  002344  143170          MOV     IPCSAR,@PCSAR   ;SET UP PARAMETERS AND ADDRESS


037102                                  CALL    $BUFRS          ;SET UP TRANSMIT AND RECEIVE BUFFERS.
037106  005037  002356                  CLR     MAINT           ;CLEAR FLAG TO INDICATE NO MAINTENACE LOOPBACK
037112  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
037116                                  CALL    $DATA           ;
037122  103402                          BCS     20$             ;IF ERROR SKIP DATA CHECK.

037124                                  CALL    $CHECK          ;CHECK THAT THE DATA WAS CORRECT.
037130                          20$:
037130                                  CALL    $MODEM          ;PRINT OUT MODEM CONTROL STATUS.
037134                          50$:

037134                          ENDTST
037134                                                                          L10143:
037134  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 41 - DDCMP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 41 - DPV-11
                                ;* DDCMP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE USING THE
                                ;* DDCMP MESSAGE FORMAT.  CHECK THAT THE DATA IS CORRECTLY RECEIVED
                                ;* AND THAT THE CRC CHARACTERS ARE RECEIVED IN THE PROPER DDCMP
                                ;* ORDER.
                                ;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES, STRIP SYNCHS
                                ;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
037136                          BGNTST
037136                                                                                  T41::
037136                                  CALL    $SPEED          ;CAN THE CPU SUPPORT THE LOOPBACK?
037142  103521                          BCS     50$             ;IF NOT, SKIP THE TEST.
037144                                  CALL    $RESET          ;RESET THE DPV
037150                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
037150  104410                                                                          TRAP    C$ESCAPE
037152  000234                                                                          .WORD   L10144-.
037154  012737  000006  002414          MOV     #6,START        ;SEND 6 SYNCHS
037162  005037  002340                  CLR     HEADER          ;CLEAR DDCMP HEADER FLAG
                                                                ;
037166  012777  061626  143076          MOV     #SSYNCH!PROTO!CRC16!SYN,@PCSAR  ;SET BCP PROTOCOL AND CRC16.
                                                                                ;STRIP SYNCH AND SYNCH CHAR.
037174  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
037200  012703  000014                  MOV     #14,R3          ;BUFFER COUNT
037204                          1$:
037204  005021                          CLR     (R1)+           ;CLEAR THE BUFFER
037206  005303                          DEC     R3              ;DECREMENT COUNT
037210  001375                          BNE     1$              ;CONTINUE UNTIL DONE.


037212  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER.
037216  012702  002650                  MOV     #DDCMP,R2       ;TRANSMIT BUFFER ADDRESS
037222  012703  000006                  MOV     #DDCMP1,R3      ;TRANSMIT COUNT
037226  005037  002376                  CLR     RFLAG           ;CLEAR RECEIVE FLAG.
037232  005037  002360                  CLR     MCFLAG          ;CLEAR MODEM CONTROL FLAG.

037236                                  SETVEC  XMTVEC,#XDDCMP,#PRI04   ;TRANSMIT VECTOR
037236  012746  000200                                                          MOV     #PRI04,-(SP)
037242  012746  017420                                                          MOV     #XDDCMP,-(SP)
037246  013746  002266                                                          MOV     XMTVEC,-(SP)
037252  012746  000003                                                          MOV     #3,-(SP)
037256  104437                                                                  TRAP    C$SVEC
037260  062706  000010                                                          ADD     #10,SP
037264                                  SETVEC  RCVEC,#RDATA,#PRI04     ;RECEIVE VECTOR.
037264  012746  000200                                                          MOV     #PRI04,-(SP)
037270  012746  016544                                                          MOV     #RDATA,-(SP)
037274  013746  002264                                                          MOV     RCVEC,-(SP)
037300  012746  000003                                                          MOV     #3,-(SP)
037304  104437                                                                  TRAP    C$SVEC
037306  062706  000010                                                          ADD     #10,SP
037312                                  SETPRI  #PRI00          ;ENABLE INTERRUPTS
037312  012700  000000                                                          MOV     #PRI00,R0
037316  104441                                                                  TRAP    C$SPRI
```

```
037320  005037  002334                  CLR     EXERR               ;NO ERROR EXPECTED.
037324  012737  000027  002474          MOV     #DDCMP1+DDCMP2+4,ECOUNT ;DETERMINE END COUNT
037332                                  CALL    $DATA1              ;
037336                                  ESCAPE  TST                 ;IF ERROR, BR TO END
037336  104410                                                                          TRAP    C$ESCAPE
037340  000046                                                                          .WORD   L10144-.

037342  012701  003273                  MOV     #RCVBUF,R1          ;RECEIVE BUFFER.
037346  012702  002650                  MOV     #DDCMP,R2           ;TRANSMIT BUFFER ADDRESS
037352  012703  000006                  MOV     #DDCMP1,R3          ;TRANSMIT COUNT

037356                                  CALL    $CHK1               ;CHECK THE DATA RECEIVED
037362                                  ESCAPE  TST                 ;IF ERROR, BR TO END
037362  104410                                                                          TRAP    C$ESCAPE
037364  000022                                                                          .WORD   L10144-.
037366  062701  000002                  ADD     #2,R1               ;INCREMENT THE RECEIVE BUFFER BY 2
                                                                    ;IN ORDER TO COMPENSATE FOR CRC
037372  012703  000015                  MOV     #DDCMP2,R3          ;MESSAGE COUNT
037376                                  CALL    $CHK1               ;CHECK THE DATA RECEIVED
037402                                  ESCAPE  TST                 ;IF ERROR, BR TO END
037402  104410                                                                          TRAP    C$ESCAPE
037404  000002                                                                          .WORD   L10144-.
037406                          50$:


037406                          ENDTST
037406                                                                          L10144:
037406  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 42 - HIGH SPEED BCP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 42 - DPV-11
                                ;* BCP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BCP MODE, CRC-16 PRESET TO ONES,
                                ;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
037410                          BGNTST
037410                                                                                  T42::
037410                                  CALL    $RESET          ;RESET THE DPV
037414                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
037414  104410                                                                          TRAP    C$ESCAPE
037416  000264                                                                          .WORD   L10145-.
                                                                ;SET CRC16 AND BCP PROTOCOL.
037420  012777  041400  142644          MOV     #CRC16!PROTO,@PCSAR
037426  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
037434  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
037442  012737  000100  002326          MOV     #64.,COUNTER    ;# OF CHARACTERS RECEIVED
037450  005037  002362                  CLR     MODE            ;FLAG THAT THIS A BCP MODE TEST
037454  005037  002376                  CLR     RFLAG           ;CLEAR RECEIVER FLAG
037460  005037  002500                  CLR     RCOUNT          ;CLEAR RECEIVER COUNT
037464  005037  002476                  CLR     XMITD           ;CLEAR TRANSMITTER COUNT
037470  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
037474  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
037500  012703  000040                  MOV     #32.,R3         ;BUFFER COUNT
037504                          1$:
037504  005021                          CLR     (R1)+           ;CLEAR THE BUFFER
037506  005303                          DEC     R3              ;DECREMENT COUNT
037510  001375                          BNE     1$              ;CONTINUE UNTIL DONE.

037512  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
037516  012702  002502                  MOV     #$CCITT,R2      ;XMIT PATTERN
037522  012703  000100                  MOV     #64.,R3         ;XMIT COUNT

037526                                  SETVEC  XMTVEC,#XDATA2,#PRI04   ;TRANSMIT VECTOR
037526  012746  000200                                                          MOV     #PRI04,-(SP)
037532  012746  017330                                                          MOV     #XDATA2,-(SP)
037536  013746  002266                                                          MOV     XMTVEC,-(SP)
037542  012746  000003                                                          MOV     #3,-(SP)
037546  104437                                                                  TRAP    C$SVEC
037550  062706  000010                                                          ADD     #10,SP
037554                                  SETVEC  RCVEC,#RDATA2,#PRI04    ;RECEIVE VECTOR.
037554  012746  000200                                                          MOV     #PRI04,-(SP)
037560  012746  016776                                                          MOV     #RDATA2,-(SP)
037564  013746  002264                                                          MOV     RCVEC,-(SP)
037570  012746  000003                                                          MOV     #3,-(SP)
037574  104437                                                                  TRAP    C$SVEC
037576  062706  000010                                                          ADD     #10,SP
037602                                  SETPRI  #PRI00          ;ENABLE INTERRUPTS
037602  012700  000000                                                          MOV     #PRI00,R0
037606  104441                                                                  TRAP    C$SPRI

037610  042737  000040  002404          BIC     #DSITEN,RXINIT  ;CLEAR DATA SET INTERRUPT.
```

```
037616                                  CALL    $DATA1          ;DO THE DATA TRANSFER.
037622  052737  000040  002404          BIS     #DSITEN,RXINIT  ;RESET DATA SET INTERRUPT IN MASK.
037630  103014                          BCC     10$             ;IF NO ERROR, PROCEED.
037632  005737  002312                  TST     CPU             ;WAS THIS A LSI 11/23?
037636  001021                          BNE     20$             ;IF YES - SKIP THE PROMPT.
037640                                  PRINTX  #FMG28          ;PROMPT USER: IF THIS IS A LSI11 (M7264)
037640  012746  012754                                                          MOV     #FMG28,-(SP)
037644  012746  000001                                                          MOV     #1,-(SP)
037650  010600                                                                  MOV     SP,R0
037652  104415                                                                  TRAP    C$PNTX
037654  062706  000004                                                          ADD     #4,SP
                                                        ;WITH MEMORY REFRESH, CAN'T RUN.
037660  000410                          BR      20$
037662                          10$:
037662  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
037666  012702  002502                  MOV     #$CCITT,R2      ;XMIT PATTERN
037672  012703  000100                  MOV     #64.,R3         ;XMIT COUNT

037676                                  CALL    $CHK1           ;CHECK THAT THE DATA WAS CORRECT.
037702                          20$:

037702                          ENDTST
037702                                                                  L10145:
037702  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 43 - HIGH SPEED BOP DATA TEST

                                ;*******************************************************************
                                ;*              TEST 43 - DPV-11
                                ;* BOP DATA TEST
                                ;* TRANSMIT AND RECEIVE A COMPLETE DATA MESSAGE.  CHECK THAT THE
                                ;* DATA IS CORRECTLY RECEIVED.
                                ;*      SELECTED OPTIONS: BOP MODE, CRC-CCITT PRESET TO ONES,
                                ;*                        8 BIT CHARACTERS, USER SELECTED LOOPBACK.
                                ;*
                                ;*******************************************************************
037704                          BGNTST
037704                                                                                  T43::
037704                                  CALL    $RESET          ;RESET THE DPV
037710                                  ESCAPE  TST             ;IF ERROR, BR TO THE END.
037710  104410                                                                          TRAP    C$ESCAPE
037712  000266                                                                          .WORD   L10146-.
037714  012777  000000  142350          MOV     #CCITT1,@PCSAR  ;SET CRC-CCITT
037722  012737  000002  002414          MOV     #2,START        ;SEND 2 SYNCHS
037730  012737  000100  002472          MOV     #64.,XCOUNT     ;# OF CHARACTERS TO TRANSMIT
037736  012737  000100  002326          MOV     #64.,COUNTER    ;# OF CHARACTERS RECEIVED
037744  012737  100000  002362          MOV     #BOP,MODE       ;FLAG THAT THIS A BOP MODE TEST.
037752  005037  002376                  CLR     RFLAG           ;CLEAR RECEIVER FLAG
037756  005037  002500                  CLR     RCOUNT          ;CLEAR RECEIVER COUNT
037762  005037  002476                  CLR     XMITD           ;CLEAR TRANSMITTER COUNT
037766  005037  002334                  CLR     EXERR           ;FLAG THAT NO ERRORS ARE EXPECTED IN $DATA
037772  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
037776  012703  000040                  MOV     #32.,R3         ;BUFFER COUNT
040002                          1$:
040002  005021                          CLR     (R1)+           ;CLEAR THE BUFFER
040004  005303                          DEC     R3              ;DECREMENT COUNT
040006  001375                          BNE     1$              ;CONTINUE UNTIL DONE.

040010  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
040014  012702  002502                  MOV     #$CCITT,R2      ;XMIT PATTERN
040020  012703  000100                  MOV     #64.,R3         ;XMIT COUNT

040024                                  SETVEC  XMTVEC,#XDATA2,#PRI04   ;TRANSMIT VECTOR
040024  012746  000200                                                                  MOV     #PRI04,-(SP)
040030  012746  017330                                                                  MOV     #XDATA2,-(SP)
040034  013746  002266                                                                  MOV     XMTVEC,-(SP)
040040  012746  000003                                                                  MOV     #3,-(SP)
040044  104437                                                                          TRAP    C$SVEC
040046  062706  000010                                                                  ADD     #10,SP
040052                                  SETVEC  RCVEC,#RDATA2,#PRI04    ;RECEIVE VECTOR.
040052  012746  000200                                                                  MOV     #PRI04,-(SP)
040056  012746  016776                                                                  MOV     #RDATA2,-(SP)
040062  013746  002264                                                                  MOV     RCVEC,-(SP)
040066  012746  000003                                                                  MOV     #3,-(SP)
040072  104437                                                                          TRAP    C$SVEC
040074  062706  000010                                                                  ADD     #10,SP
040100                                  SETPRI  #PRI00          ;ENABLE INTERRUPTS
040100  012700  000000                                                                  MOV     #PRI00,R0
040104  104441                                                                          TRAP    C$SPRI

040106  042737  000040  002404          BIC     #DSITEN,RXINIT  ;CLEAR DATA SET INTERRUPT.
040114                                  CALL    $DATA1          ;DO THE DATA TRANSFER.
```

```
TEST 43 - HIGH SPEED BOP DATA TEST
040120  052737  000040  002404          BIS     #DSITEN,RXINIT  ;RESET DATA SET INTERRUPT IN MASK.
040126  103014                          BCC     10$             ;IF NO ERROR, PROCEED.
040130  005737  002312                  TST     CPU             ;WAS THIS A LSI 11/23?
040134  001021                          BNE     20$             ;IF YES - SKIP THE PROMPT.
040136                                  PRINTX  #FMG28          ;PROMPT USER: IF THIS IS A LSI11 (M7264)
040136  012746  012754                                                          MOV     #FMG28,-(SP)
040142  012746  000001                                                          MOV     #1,-(SP)
040146  010600                                                                  MOV     SP,R0
040150  104415                                                                  TRAP    C$PNTX
040152  062706  000004                                                          ADD     #4,SP
                                                                ;WITH MEMORY REFRESH, CAN'T RUN.
040156  000410                          BR      20$
040160                          10$:

040160  012701  003273                  MOV     #RCVBUF,R1      ;RECEIVE BUFFER
040164  012702  002502                  MOV     #$CCITT,R2      ;XMIT PATTERN
040170  012703  000100                  MOV     #64.,R3         ;XMIT COUNT

040174                                  CALL    $CHK1           ;CHECK THAT THE DATA WAS CORRECT.
040200                          20$:

040200                          ENDTST
040200                                                                  L10146:
040200  104401                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  HARDWARE PARAMETER CODING SECTION


                                        ;*********************************************************************
                                        ;  THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                        ;  THAT ARE USED BY THER SUPERVISOR TO BUILD P-TABLES.  THE
                                        ;  MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                        ;  INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                        ;  MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                        ;  WITH THE OPERATOR.
                                        ;*********************************************************************

 040202                                         BGNHRD
 040202  000020                                                                                 .WORD L10147-L$HARD/2
 040204                                                                                 L$HARD::

 040204                                         GPRMA   P1,0,0,160000,177776,YES
 040204  000031                                                                                 .WORD   T$CODE
 040206  040244                                                                                 .WORD   P1
 040210  160000                                                                                 .WORD   T$LOLIM
 040212  177776                                                                                 .WORD   T$HILIM
 040214                                         GPRMA   P2,2,0,0,776,YES
 040214  001031                                                                                 .WORD   T$CODE
 040216  040256                                                                                 .WORD   P2
 040220  000000                                                                                 .WORD   T$LOLIM
 040222  000776                                                                                 .WORD   T$HILIM
 040224                                         GPRMD   P3,4,0,7,0,4,YES
 040224  002032                                                                                 .WORD   T$CODE
 040226  040267                                                                                 .WORD   P3
 040230  000007                                                                                 .WORD   7
 040232  000000                                                                                 .WORD   T$LOLIM
 040234  000004                                                                                 .WORD   T$HILIM
 040236                                         GPRML   P4,6,-1,YES
 040236  003130                                                                                 .WORD   T$CODE
 040240  040427                                                                                 .WORD   P4
 040242  177777                                                                                 .WORD   -1

 040244                                         ENDHRD
                                                                                                .EVEN
 040244                                                                                 L10147:

 040244     101     104     104  P1:     .ASCIZ  /ADDRESS: /
 040247     122     105     123
 040252     123     072     040
 040255     000
 040256     126     105     103  P2:     .ASCIZ  /VECTOR: /
 040261     124     117     122
 040264     072     040     000
 040267     114     117     117  P3:     .ASCII  /LOOPBACK -/<CR><LF>
 040272     120     102     101
 040275     103     113     040
 040300     055     015     012
 040303     040     040     060          .ASCII  /  0 = INTERNAL, 1 = RS423, 2 = RS422/<CR><LF>
 040306     040     075     040
 040311     111     116     124
 040314     105     122     116
 040317     101     114     054
```

```
         040322    040    061    040
         040325    075    040    122
         040330    123    064    062
         040333    063    054    040
         040336    062    040    075
         040341    040    122    123
         040344    064    062    062
         040347    015    012
     26  040351    040    040    063          .ASCIZ  /  3 = LOCAL MODEM LOOP, 4 = REMOTE MODEM LOOP/
         040354    040    075    040
         040357    114    117    103
         040362    101    114    040
         040365    115    117    104
         040370    105    115    040
         040373    114    117    117
         040376    120    054    040
         040401    064    040    075
         040404    040    122    105
         040407    115    117    124
         040412    105    040    115
         040415    117    104    105
         040420    115    040    114
         040423    117    117    120
         040426    000
     27  040427    111    123    040  P4:     .ASCIZ  /IS THE PROCESSOR A LSI-11/<57>/23 (M8186)/
         040432    124    110    105
         040435    040    120    122
         040440    117    103    105
         040443    123    123    117
         040446    122    040    101
         040451    040    114    123
         040454    111    055    061
         040457    061    057    062
         040462    063    040    050
         040465    115    070    061
         040470    070    066    051
         040473    000
     28                                        .EVEN
     29
     30                                  ;*************************** PATCH AREA ************************************
     31  040474                          PATCH:
     32            040534                        .=.+40
     33  040534    000240                        NOP
     34  040536    000240                        NOP
     35  040540    000240                        NOP
     36                                  ;*******************************************************************************
     37
     38
     39  040542                          ENDMOD
     40
     41  040542                                  LASTAD
                                                                                          .EVEN
         040542    000000                                                                  .WORD   0
         040544    000000                                                                  .WORD   0
         040546                          L$LAST::
     42            000001                .END
```

SYMBOL TABLE

```
ABC      031661
ABORT    002322
ACOUNT=  000045
ADR    = 000020 G
ALL    = 000000
ALPHA    002602
APA    = 100000
ASSEMB=  000010
BITS     002324
BIT0   = 000001 G
BIT00  = 000001 G
BIT01  = 000002 G
BIT02  = 000004 G
BIT03  = 000010 G
BIT04  = 000020 G
BIT05  = 000040 G
BIT06  = 000100 G
BIT07  = 000200 G
BIT08  = 000400 G
BIT09  = 001000 G
BIT1   = 000002 G
BIT10  = 002000 G
BIT11  = 004000 G
BIT12  = 010000 G
BIT13  = 020000 G
BIT14  = 040000 G
BIT15  = 100000 G
BIT2   = 000004 G
BIT3   = 000010 G
BIT4   = 000020 G
BIT5   = 000040 G
BIT6   = 000100 G
BIT7   = 000200 G
BIT8   = 000400 G
BIT9   = 001000 G
BOE    = 000400 G
BOP    = 100000
CCITT0=  000400
CCITT1=  000000
CHLEN    031650
COUNTE   002326
CPU      002312
CR     = 000015
CRCHI  = 000266
CRCLO  = 000332
CRC16  = 001400
CSR0     002270
CSR1     002300
CSR2     002272
CSR3     002302
CSR4     002274
CSR5     002304
CSR6     002276
CSR7     002306
CTS    = 020000
C$AU   = 000052
C$AUTO=  000061
C$BRK  = 000022
C$BSEG=  000004
C$BSUB=  000002
C$CEFG=  000045
C$CLCK=  000062
C$CLEA=  000012
C$CLOS=  000035
C$CLP1=  000006
C$CVEC=  000036
C$DCLN=  000044
C$DODU=  000051
C$DRPT=  000024
C$DU   = 000053
C$EDIT=  000003
C$ERDF=  000055
C$ERHR=  000056
C$ERRO=  000060
C$ERSF=  000054
C$ERSO=  000057
C$ESCA=  000010
C$ESEG=  000005
C$ESUB=  000003
C$ETST=  000001
C$EXIT=  000032
C$GETB=  000026
C$GETW=  000027
C$GMAN=  000043
C$GPHR=  000042
C$GPLO=  000030
C$GPRI=  000040
C$INIT=  000011
C$INLP=  000020
C$MANI=  000050
C$MEM  = 000031
C$MSG  = 000023
C$OPEN=  000034
C$PNTB=  000014
C$PNTF=  000017
C$PNTS=  000016
C$PNTX=  000015
C$QIO  = 000377
C$RDBU=  000007
C$REFG=  000047
C$RESE=  000033
C$REVI=  000003
C$RFLA=  000021
C$RPT  = 000025
C$SEFG=  000046
C$SPRI=  000041
C$SVEC=  000037
C$TPRI=  000013
DATA     002330
DDCMP    002650
DDCMP1=  000006
DDCMP2=  000015
DDMSG    002656
DFPTBL   002254 G
DIAGMC=  000000
DM     = 001000
DSCNG  = 100000
DSITEN=  000040
DTR    = 000002
ECOUNT   002474
EF.CON=  000036 G
EF.NEW=  000035 G
EF.PWR=  000034 G
EF.RES=  000037 G
EF.STA=  000040 G
EMG0     013246
EMG1     013336
EMG10    013633
EMG11    013705
EMG12    013736
EMG13    013762
EMG14    014043
EMG15    014117
EMG16    014152
EMG17    014221
EMG18    014261
EMG19    014310
EMG2     013347
EMG20    014341
EMG21    014370
EMG22    014432
EMG23    014457
EMG24    014535
EMG25    014601
EMG26    014627
EMG3     013414
EMG30    014642
EMG31    014660
EMG32    014677
EMG33    014722
EMG34    014750
EMG35    015011
EMG36    015050
EMG37    015102
EMG38    015114
EMG39    015143
EMG4     013430
EMG40    015175
EMG5     013455
EMG6     013510
EMG7     013545
EMG8     013563
EMG9     013577
EMT0     020040
END      016122
ERR    = 100000
ERRG1    006532 G
ERRG10   007352 G
ERRG11   007452 G
ERRG12   010074 G
ERRG13   010152 G
ERRG14   010640 G
ERRG15   010724 G
ERRG2    006560 G
ERRG3    006674 G
ERRG4    006752 G
ERRG7    007052 G
ERRG8    007152 G
ERRG9    007252 G
ERROR    002332
EVL    = 000004 G
EXADD  = 000020
EXCON  = 000010
EXERR    002334
E$END  = 002100
E$LOAD=  000035
FINIT1   016124
FINIT2   016217
FIVE   = 050000
FLAG     002336
FMDROP   017574
FMG0     010750
FMG1     011046
FMG10    011454
FMG11    011520
FMG12    011564
FMG13    011630
FMG14    011674
FMG15    011751
FMG16    012013
FMG17    012024
FMG18    012101
FMG19    012150
FMG2     011103
FMG20    012215
FMG21    012302
FMG22    012351
FMG23    012416
FMG24    012465
FMG25    012532
FMG26    012575
FMG27    012671
FMG28    012754
FMG29    013075
FMG3     011140
FMG30    013170
FMG4     011212
FMG5     011257
FMG6     011270
FMG7     011273
FMG8     011337
FMG9     011402
FMODEM   005710
FMODE0   005775
FMODE1   006024
FMODE2   006113
FMODE3   006137
FMODE4   006146
FMODE5   006155
FMODE6   006205
FMS1     004102
FMT0     020076
FMT1     020150
FOUR   = 040000
FRSPAS   002316
FRSTIM   002314
F$AU   = 000015
F$AUTO=  000020
F$BGN  = 000040
F$CLEA=  000007
F$DU   = 000016
F$END  = 000041
F$HARD=  000004
F$HW   = 000013
F$INIT=  000006
F$JMP  = 000050
F$MOD  = 000000
F$MSG  = 000011
F$PROT=  000021
F$PWR  = 000017
F$RPT  = 000012
F$SEG  = 000003
F$SOFT=  000005
F$SRV  = 000010
F$SUB  = 000002
F$SW   = 000014
F$TEST=  000001
GETPRM   015440
G$CNTO=  000200
G$DELM=  000372
G$DISP=  000003
G$EXCP=  000400
G$HILI=  000002
G$LOLI=  000001
G$NO   = 000000
G$OFFS=  000400
G$OFSI=  000376
G$PRMA=  000001
G$PRMD=  000002
G$PRML=  000000
G$RADA=  000140
G$RADB=  000000
G$RADD=  000040
G$RADL=  000120
G$RADO=  000020
G$XFER=  000004
G$YES  = 000010
HEADER   002340
HELP   = 000000
HOE    = 100000 G
IBE    = 010000 G
IC     = 040000
IDLE   = 004000
IDU    = 000040 G
IER    = 020000 G
```

SYMBOL TABLE

```
IPCR     002342          L$HIME   002120 G        L10042  020704          L10133  035264          RABORT= 002000
IPCSAR   002344          L$HPCP   002016 G        L10043  021014          L10134  035436          RCOUNT  002500
IRDSR    002350          L$HPTP   002022 G        L10044  021124          L10135  035612          RCVBUF  003273
IRXCSR   002346          L$HW     002254 G        L10045  021204          L10136  035774          RCVEC   002264
ISR    = 000100 G        L$ICP    002104 G        L10046  021550          L10137  036156          RDATA   016544 G
IXE    = 004000 G        L$INIT   015246 G        L10047  021376          L10140  036360          RDATA2  016776 G
I$AU   = 000041          L$LADP   002026 G        L10050  021546          L10141  036554          RDATRY= 000200
I$AUTO= 000041           L$LAST   040546 G        L10051  022002          L10142  036756          RDSR   = 002272
I$CLN  = 000041          L$LOAD   002100 G        L10052  021650          L10143  037134          REG     002374
I$DU   = 000041          L$LUN    002074 G        L10053  022000          L10144  037406          REOM   = 001000
I$HRD  = 000041          L$MREV   002050 G        L10054  022160          L10145  037702          RESET  = 000001
I$INIT= 000041           L$NAME   002000 G        L10055  022412          L10146  040200          RETURN= 000207
I$MOD  = 000041          L$PRIO   002042 G        L10056  022710          L10147  040244          RFLAG   002376
I$MSG  = 000041          L$PROT   015240 G        L10057  023716          MAINT   002356          RINT    016414 G
I$PROT= 000040           L$PRT    002112 G        L10060  023146          MASK    004514          RL     = 000001
I$PTAB= 000041           L$REPP   002062 G        L10061  023444          MCFLAG  002360          ROVER  = 004000
I$PWR  = 000041          L$REV    002010 G        L10062  023714          MM     = 000010         RR     = 010000
I$RPT  = 000041          L$SPC    002056 G        L10063  025032          MMASK   006300          RSAVE   002400
I$SEG  = 000041          L$SPCP   002020 G        L10064  024214          MODE    002362          RSIZE  = 000400
I$SETU= 000041           L$SPTP   002024 G        L10065  024524          MODEM   002444          RSOM   = 000400
I$SRV  = 000041          L$STA    002030 G        L10066  025030          NESTPC  002364          RSTARY= 002000
I$SUB  = 000041          L$TEST   002114 G        L10067  025276          NEWST   015422          RTS    = 000004
I$TST  = 000041          L$TIML   002014 G        L10070  025566          NOERR  = 003400         RXACT  = 004000
J$JMP  = 000167          L$UNIT   002012 G        L10071  026476          NONE1  = 001000         RXCSR  = 002270
LENGTH   002352          L10000   002264          L10072  025712          NONE2  = 003000         RXENA  = 000020
LF     = 000012          L10001   006556          L10073  025770          NXM     017534 G        RXINI   002402
LL     = 000010          L10002   006672          L10074  026046          NXMFLG  002366          RXINIT  002404
LOCATE   017766 G        L10003   006750          L10075  026166          ONE    = 010000         RXITEN= 000100
LOE    = 040000 G        L10004   007050          L10076  026306          OVER    002370          RXMINI  002406
LOGDEV   002354          L10005   007150          L10077  026446          O$APTS= 000000          SAVE    002410
LOOP   = 020000          L10006   007250          L10100  027602          O$AU   = 000000         SAVTIM  002412
LOT    = 000010 G        L10007   007350          L10101  027000          O$BGNR= 000000          SECADR= 010000
L$ACP    002110 G        L10010   007450          L10102  027270          O$BGNS= 000000          SEVEN  = 070000
L$APT    002036 G        L10011   010072          L10103  027600          O$DU   = 000001         SF     = 000001
L$AUT    002070 G        L10012   010150          L10104  030512          O$ERRT= 000000          SFR    = 000400
L$AUTO   016312 G        L10013   010636          L10105  030104          O$GNSW= 000000          SIX    = 060000
L$CCP    002106 G        L10014   010722          L10106  030510          O$POIN= 000001          SQ     = 000040
L$CLEA   016376 G        L10015   010746          L10107  031036          O$SETU= 000000          SSYNCH= 020000
L$CO     002032 G        L10017   016122          L10110  030674          PATCH   040474          STARES  002320
L$DEPO   002011 G        L10020   016374          L10111  031034          PCR    = 002304         STARST  015416
L$DESC   003702 G        L10021   016412          L10112  031210          PCSAR  = 002272         START   002414
L$DESP   002076 G        L10022   016542          L10113  031420          PNT    = 001000 G       SUBRPC  002416
L$DEVP   002060 G        L10023   016774          L10114  031646          PRI    = 002000 G       SVCGBL= 000000
L$DISP   002124 G        L10024   017046          L10115  032036          PRI00  = 000000 G       SVCINS= 000001
L$DLY    002116 G        L10025   017154          L10116  032222          PRI01  = 000040 G       SVCSUB= 000001
L$DTP    002040 G        L10026   017326          L10117  032406          PRI02  = 000100 G       SVCTAG= 000001
L$DTYP   002034 G        L10027   017416          L10120  032572          PRI03  = 000140 G       SVCTST= 000001
L$DU     017544 G        L10030   017532          L10121  032762          PRI04  = 000200 G       SW00   = 000001
L$DUT    002072 G        L10031   017542          L10122  033150          PRI05  = 000240 G       SW01   = 000002
L$DVTY   003674 G        L10032   017572          L10123  033566          PRI06  = 000300 G       SW02   = 000004
L$EF     002052 G        L10033   017764          L10124  033346          PRI07  = 000340 G       SW03   = 000010
L$ENVI   002044 G        L10034   020036          L10125  033564          PROTO  = 040000         SW04   = 000020
L$ETP    002102 G        L10035   020456          L10126  033756          PSTACK  002372          SW05   = 000040
L$EXP1   002046 G        L10036   020364          L10127  034146          P1      040244          SW06   = 000100
L$EXP4   002064 G        L10037   020454          L10130  034544          P2      040256          SW07   = 000200
L$EXP5   002066 G        L10040   021206          L10131  034720          P3      040267          SW08   = 000400
L$HARD   040204 G        L10041   020574          L10132  035074          P4      040427          SW09   = 001000
```

SYMBOL TABLE

```
SW10   = 002000    T$EXCP= 000000    T1      017624 G    T26     033152 G    T9      022712 G
SW11   = 004000    T$FLAG= 000040    T10     023720 G    T26.1   033152      T9.1    022712
SW12   = 010000    T$GMAN= 000000    T10.1   023720      T26.2   033350      T9.2    023150
SW13   = 020000    T$HILI= 000004    T10.2   024216      T27     033570 G    T9.3    023446
SW14   = 040000    T$LAST= 000001    T10.3   024526      T28     033760 G    UAM   = 000200 G
SW15   = 100000    T$LOLI= 000000    T11     025034 G    T29     034150 G    VRCE  = 002400
SYN    = 000226    T$LSYM= 010000    T12     025300 G    T3      020460 G    VRCO  = 002000
S$LSYM= 010000     T$LTNO= 000053    T13     025570 G    T3.1    020470      XCOUNT  002472
TBE    = 000004    T$NEST= 177777    T13.1   025636      T3.2    020576      XDATA   017156 G
TDSR   = 002276    T$NS0 = 000000    T13.2   025714      T3.3    020706      XDATA2  017330 G
TEMP     002420    T$NS1 = 000004    T13.3   025772      T3.4    021016      XDDCMP  017420 G
TEND     002422    T$NS2 = 000002    T13.4   026050      T3.5    021126      XINT    017050 G
TECM   = 001000    T$NS3 = 000003    T13.5   026170      T30     034546 G    XMITD   002476
TERR   = 100000    T$PTNU= 000000    T13.6   026310      T31     034722 G    XMTBUF  002673
TFLAG    002424    T$SAVL= 177777    T14     026500 G    T32     035076 G    XMTVEC  002266
TGA    = 004000    T$SEGL= 177777    T14.1   026512      T33     035266 G    XTYPE   002470
THREE  = 030000    T$SEK0= 010002    T14.2   027002      T34     035440 G    X$ALWA= 000000
TIMEO    002426    T$SUBN= 000000    T14.3   027272      T35     035614 G    X$FALS= 000040
TIMER    002430    T$TAGL= 177777    T15     027604 G    T36     035776 G    X$OFFS= 000400
TM     = 000040    T$TAGN= 010150    T15.1   027604      T37     036160 G    X$TRUE= 000020
TOGGLE   002432    T$TEMP= 000000    T15.2   030106      T38     036362 G    $BUFRS  004316
TSOM   = 000400    T$TEST= 000053    T16     030514 G    T39     036556 G    $CCITT  002502
TSTART   002434    T$TSTM= 177777    T16.1   030514      T4      021210 G    $CHECK  005134
TURN     002310    T$TSTS= 000001    T16.2   030676      T4.1    021210      $CHK1   005264
TWO    = 020000    T$$AUT= 010020    T17     031040 G    T4.2    021400      $DATA   004526
TXABO  = 002000    T$$CLE= 010021    T18     031212 G    T40     036760 G    $DATA1  004700
TXACT  = 000002    T$$DU = 010032    T19     031422 G    T41     037136 G    $DLAY   006464
TXCSR  = 002274    T$$HAR= 010147    T2      020234 G    T42     037410 G    $GO     004714
TXENA  = 000020    T$$HW = 010000    T2.1    020234      T43     037704 G    $LSTIN= 000001
TXIE   = 000100    T$$INI= 010017    T2.2    020366      T5      021552 G    $LSTTA= 000001
TXINI    002436    T$$MSG= 010015    T20     031672 G    T5.1    021552      $MODEM  005332
TXINIT   002440    T$$PRO= 010016    T21     032040 G    T5.2    021652      $RESET  004136
TXMINI   002442    T$$SEG= 010002    T22     032224 G    T6      022004 G    $SPEED  006402
T$ARGC= 000001     T$$SRV= 010034    T23     032410 G    T7      022162 G    $TURN   006324
T$CODE= 003130     T$$SUB= 010125    T24     032574 G    T8      022414 G    $WAIT   003724
T$ERRN= 000132     T$$TES= 010146    T25     032764 G

. ABS.  040546     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  22664 WORDS  ( 89 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  69 PAGES
CVDPVA.BIN,DM0:CVDPVA.SEQ/C=#SVC34R.MLB,CVDPVA.P11
```

$BUFRS	29-31#	72-45	72-97	73-35	73-59	74-33	75-31	76-24	77-33	78-34	79-34	80-33	81-34	83-35
	84-42	84-72	85-34	86-34	87-26	88-31	89-31	90-33	91-31	93-33	94-32	95-32	96-35	97-34
	98-35	99-32												
$CCITT	22-129#	72-38	72-90	73-28	73-52	74-24	75-24	76-22	77-26	78-25	79-25	80-25	81-27	83-28
	84-35	84-66	85-26	86-26	88-24	89-24	90-26	91-24	93-26	94-25	95-25	96-27	97-26	98-27
	99-25	101-33	101-51	102-32	102-51									
$CHECK	31-32#	72-51	72-103	72-142	74-39	75-37	77-39	78-40	79-40	80-39	87-97	88-37	89-37	90-39
	91-37	93-39	94-38	95-38	96-41	97-40	98-41	99-38						
$CHK1	31-61#	31-66	100-51	100-56	101-54	102-54								
$DATA	30-41#	72-48	72-67	72-100	72-119	72-139	73-38	73-62	74-36	75-34	76-38	77-36	78-37	79-37
	80-36	81-37	83-38	84-46	84-79	85-37	86-37	88-34	89-34	90-36	91-34	93-36	94-35	95-35
	96-38	97-37	98-38	99-35										
$DATA1	30-58	30-63#	100-44	101-41	102-40									
$DLAY	35-25#	54-60	60-37	62-45	63-49	64-188	68-23	68-30	68-35	68-40	68-50	69-47	69-67	69-87
	69-107	69-132	69-157											
$GO	30-61	30-66#												
$LSTIN	17-21#													
$LSTTA	17-22#													
$MODEM	32-28#	88-39	89-39	90-41	91-39	93-41	94-40	95-40	96-43	97-42	98-43	99-40		
$RESET	28-22#	54-27	56-22	58-18	58-52	58-69	59-15	59-32	60-12	62-20	63-16	63-59	64-32	64-84
	64-156	65-17	65-71	65-131	66-14	66-52	68-19	69-38	69-58	69-79	69-98	69-123	69-148	69-174
	70-22	70-60	70-70	70-108	70-118	70-157	72-28	72-56	72-79	72-108	72-129	73-19	73-46	74-15
	75-14	76-27	77-17	78-14	79-14	80-14	81-17	83-18	84-24	84-55	85-15	86-15	87-15	88-15
	89-15	90-15	91-15	93-17	94-15	95-15	96-15	97-15	98-15	99-15	100-17	101-13	102-13	
$SPEED	34-30#	87-13	88-13	89-13	90-13	91-13	93-15	94-13	95-13	96-13	97-13	98-13	99-13	100-15
$TURN	33-28#	68-16	69-24	70-17										
$WAIT	27-26#	58-26	58-38	58-60	59-41	59-45	62-27	62-32	62-37					
ABC	76-44	76-59#												
ABORT	22-52#	40-18*	46-33	64-160*	64-207*	65-138*	65-184*							
ACOUNT	22-146#	87-22												
ADR	21-8#													
ALL	21-90#													
ALPHA	22-145#	22-146	87-21											
APA	21-79#	29-39	72-83	94-19										
ASSEMB	17-15	17-15												
BIT0	21-8#	21-36	21-37	21-104	29-52	47-30	56-26	56-64	56-92	56-120				
BIT00	21-8	21-8#												
BIT01	21-8	21-8#												
BIT02	21-8	21-8#												
BIT03	21-8	21-8#												
BIT04	21-8	21-8#												
BIT05	21-8	21-8#												
BIT06	21-8	21-8#												
BIT07	21-8	21-8#												
BIT08	21-8	21-8#												
BIT09	21-8	21-8#												
BIT1	21-8#	21-39	21-105	47-37										
BIT10	21-8#	21-49	21-68	21-69	21-70	21-72	21-87	21-124	31-41					
BIT11	21-8#	21-50	21-74	21-88	21-125									
BIT12	21-8#	21-51	21-75	21-91	21-93	21-95	21-97							
BIT13	21-8#	21-52	21-76	21-77	21-92	21-93	21-96	21-97						
BIT14	21-8#	21-53	21-78	21-94	21-95	21-96	21-97							
BIT15	21-8#	21-54	21-79	21-99	21-127	21-137								
BIT2	21-8#	21-40	21-106											
BIT3	21-8#	21-41	21-107	21-116										
BIT4	21-8#	21-42	21-108	21-117										

CROSS REFERENCE TABLE (CREF V01-05)

BIT5	21-8#	21-43	21-109	21-110										
BIT6	21-8#	21-44	21-112											
BIT7	21-8#	21-46												
BIT8	21-8#	21-47	21-66	21-67	21-69	21-70	21-85	21-122						
BIT9	21-8#	21-48	21-67	21-70	21-71	21-72	21-86	21-123						
BITS	22-53#	27-29*	27-39	27-45	27-47									
BOE	21-8#													
BOP	21-137#	72-30	72-81	73-21	74-17	75-16	76-15	77-19	81-19	83-20	87-17	88-17	89-17	90-17
	91-17	93-19	94-17	95-17	102-19									
C$AU	17-15#													
C$AUTO	17-15#	41-27												
C$BRK	17-15#	27-41	30-81											
C$BSEG	17-15#	72-27	72-55	72-78	72-107	72-128								
C$BSUB	17-15#	54-26	54-56	56-25	56-55	56-92	56-111	56-138	58-17	58-51	59-14	59-31	64-31	64-83
	64-155	65-16	65-70	65-130	69-37	69-[illegible]	69-78	69-97	69-122	69-147	70-21	70-69	70-117	72-26
	72-77	73-18	73-45	84-23	84-54									
C$CEFG	17-15#													
C$CLCK	17-15#													
C$CLEA	17-15#	42-14												
C$CLOS	17-15#													
C$CLP1	17-15#													
C$CVEC	17-15#	30-112	30-113	40-28	41-24	53-47	60-44	63-62	63-63	65-65	65-66	65-122	65-123	65-183
	66-55	66-56	69-177	69-178	70-63	70-64	70-111	70-112	70-160	70-161				
C$DCLN	17-15#	41-23	53-44											
C$DODU	17-15#	41-22	53-43											
C$DRPT	17-15#													
C$DU	17-15#	51-13												
C$EDIT	17-15#	18-11												
C$ERDF	17-15#	27-46	28-37	30-89	30-93	30-100	31-48	31-55	31-72	32-35	53-56	54-50	54-71	56-48
	56-76	56-104	56-132	56-144	58-32	58-43	58-66	58-74	59-26	59-53	60-33	60-40	62-41	62-48
	62-51	63-44	63-54	63-57	64-54	64-67	64-72	64-77	64-107	64-117	64-124	64-130	64-138	64-148
	64-179	64-192	64-199	64-205	65-42	65-51	65-57	65-61	65-98	65-107	65-114	65-118	65-158	65-167
	65-173	65-179	66-43	66-49	68-45	68-65	69-50	69-70	69-90	69-110	69-116	69-135	69-141	69-160
	69-167	70-50	70-58	70-98	70-106	70-146	70-155	72-71	72-123	73-41	73-65	75-45	76-46	81-41
	83-42	84-50	84-88	85-40	86-40	87-43	87-58	87-79						
C$ERHR	17-15#													
C$ERRO	17-15#													
C$ERSF	17-15#													
C$ERSO	17-15#													
C$ESCA	17-15#	54-28	56-23	58-19	58-27	58-39	58-46	58-53	58-61	58-70	58-77	59-16	59-33	59-42
	59-46	60-13	62-21	62-28	62-33	62-38	63-17	64-33	64-85	64-157	65-18	65-72	65-132	66-15
	68-20	69-39	69-59	69-80	69-99	69-124	69-149	70-23	70-65	70-71	70-113	70-119	70-162	72-29
	72-49	72-52	72-57	72-80	72-101	72-104	72-109	72-124	72-130	72-140	72-143	73-20	73-47	74-16
	75-15	75-38	76-28	76-39	77-18	77-37	78-15	79-15	80-15	81-18	81-38	83-19	83-39	84-25
	84-47	84-56	84-80	85-16	86-16	87-[illegible]	88-16	89-16	90-16	91-16	93-18	94-16	95-16	96-16
	97-16	98-16	99-16	100-18	100-45	100-52	100-57	101-14	102-1[illegible]					
C$ESEG	17-15#	72-53	72-73	72-105	72-126	72-144								
C$ESUB	17-15#	54-52	54-73	56-52	56-80	56-109	56-136	56-148	58-48	58-79	59-28	59-55	64-81	64-151
	64-208	65-68	65-126	65-187	69-54	69-74	69-94	69-119	69-144	69-170	70-67	70-115	70-164	72-74
	72-145	73-43	73-67	84-52	84-90									
C$ETST	17-15#	53-49	54-75	56-150	58-82	59-58	60-46	62-54	63-65	64-212	65-190	66-60	68-67	69-181
	70-166	72-148	73-69	74-43	75-49	76-56	77-43	78-44	79-44	80-43	81-44	83-46	84-92	85-44
	86-44	87-102	88-42	89-42	90-44	91-42	93-43	94-43	95-43	96-46	97-45	98-46	99-43	100-61
	101-57	102-57												
C$EXIT	17-15#	69-26	70-19											
C$GETB	17-15#													
C$GETW	17-15#													

CROSS REFERENCE TABLE (CREF V01-05)

C$GMAN	17-15#													
C$GPHR	17-15#	40-51												
C$GPLO	17-15#													
C$GPRI	17-15#													
C$INIT	17-15#	40-126												
C$INLP	17-15#													
C$MANI	17-15#													
C$MEM	17-15#													
C$MSG	17-15#	37-10	37-20	37-25	37-32	37-39	37-45	37-51	37-57	37-76	37-81	37-123	37-131	37-135
C$OPEN	17-15#													
C$PNTB	17-15#	27-49	28-48	32-36	32-40	32-44	32-45	32-46	32-55	32-58	32-70	32-73	37-9	37-16
	37-18	37-19	37-23	37-24	37-29	37-30	37-31	37-36	37-37	37-38	37-42	37-43	37-44	37-48
	37-49	37-50	37-54	37-55	37-56	37-63	37-65	37-66	37-67	37-68	37-69	37-70	37-71	37-72
	37-73	37-74	37-75	37-79	37-80	37-87	37-93	37-99	37-100	37-101	37-108	37-109	37-110	37-111
	37-112	37-116	37-117	37-118	37-121	37-128	37-130	37-134	40-57	40-86	69-111	69-136	69-161	69-162
	70-52	70-100	70-148	70-150										
C$PNTF	17-15#	51-11												
C$PNTS	17-15#													
C$PNTX	17-15#	33-33	34-37	53-42	53-59	56-145	101-46	102-45						
C$QIO	17-15#													
C$RDBU	17-15#													
C$REFG	17-15#	40-30	40-32	40-34	40-36									
C$RESE	17-15#	17-15#	51-10	54-59										
C$REVI	17-15#	18-11												
C$RFLA	17-15#													
C$RPT	17-15#													
C$SEFG	17-15#													
C$SPRI	17-15#	30-56	40-10	60-18	60-42	63-25	63-60	64-38	64-91	64-163	65-26	65-63	65-82	65-120
	65-142	65-181	66-21	66-53	69-30	69-175	70-31	70-61	70-79	70-109	70-127	70-158	100-40	101-38
	102-37													
C$SVEC	17-15#	30-54	30-55	41-10	53-22	60-17	63-23	63-24	64-37	64-90	64-162	65-24	65-25	65-80
	65-81	65-140	65-141	66-19	66-20	69-29	70-29	70-30	70-77	70-78	70-125	70-126	100-38	100-39
	101-36	101-37	102-35	102-36										
C$TPRI	17-15#													
CCITT0	21-66#	72-82	83-21	88-18	90-18	94-18	95-18							
CCITT1	21-65#	72-31	73-22	74-18	75-17	77-20	81-20	87-19	89-18	91-18	93-20	102-15		
CHLEN	76-33	76-58#												
COUNTE	22-54#	45-31*	101-19*	102-18*										
CPU	22-34#	34-31	40-93*	40-117	101-44	102-43								
CR	21-138#	103-24	103-25											
CRC16	21-67#	84-27	84-58	98-18	99-18	100-22	101-16							
CRCHI	21-141#	84-85												
CRCLO	21-140#	84-83												
CSR0	22-14#	22-23	37-18	37-30	37-30	37-66	37-66	37-117	37-117	40-59*	40-61	41-12	53-33	53-59
CSR1	22-18#	28-46	40-61*	40-62*										
CSR2	22-15#	22-24	22-26	37-18	40-63*	40-64*	40-68	53-35						
CSR3	22-19#	40-68*	40-69*											
CSR4	22-16#	22-27	37-19	37-37	37-37	37-68	37-68	37-111	37-111	40-70*	40-71*	40-74	53-37	
CSR5	22-20#	22-29	37-43	40-74*	40-76*									
CSR6	22-17#	22-28	37-19	37-49	37-49	37-72	37-72	40-77*	40-78*	40-80	53-39	56-141		
CSR7	22-21#	37-55	37-55	37-74	37-74	40-80*	40-81*	47-36*	56-113*	56-114	56-117*	56-118	56-123*	56-124
	56-126*	56-134*	56-140*											
CTS	21-52#	32-87	37-86	68-24										
DATA	22-55#	46-28*	46-31	46-42*	66-36									
DDCMP	22-152#	22-157	100-33	100-48										
DDCMP1	22-157#	100-34	100-43	100-49										
DDCMP2	22-161#	49-42	100-43	100-55										

CROSS REFERENCE TABLE (CREF V01-05)

DDMSG	22-159#	22-161												
DFPTBL	20-8#													
DIAGMC	17-15	17-15												
DM	21-48#	32-87	37-98	68-41										
DSCNG	21-54#	32-87												
DSITEN	21-43#	40-112	43-37	44-29	44-34	69-64	69-104	69-129	69-154	70-40	70-88	70-136	101-40	101-42
	102-39	102-41												
DTR	21-39#	32-87	37-90	37-92	40-104	40-109	68-28	68-49	68-55	69-44	69-64	69-85	69-129	70-75
ESEND	17-15#													
ESLOAD	17-15#	18-11												
ECOUNT	22-114#	29-64*	44-66	84-45*	84-77*	100-43*								
EF.CON	21-8#	40-36												
EF.NEW	21-8#	40-34												
EF.PWR	21-8#													
EF.RES	21-8#	40-32												
EF.STA	21-8#	40-30												
EMG0	37-170#	54-71												
EMG1	27-46	37-171#	64-117	64-138	64-192	87-58								
EMG10	37-180#	60-40												
EMG11	37-181#	64-77												
EMG12	37-182#	62-41	64-54	64-107	64-179	65-42	65-98	65-158						
EMG13	37-183#	62-48	63-54											
EMG14	37-184#	62-51												
EMG15	37-185#	63-44	66-49											
EMG16	37-186#	63-57												
EMG17	37-187#	64-67	65-57											
EMG18	37-188#	64-72	64-130	64-148	64-205	65-61	65-118	65-179						
EMG19	37-189#	64-124	65-114											
EMG2	30-89	37-172#												
EMG20	37-190#	64-199	65-173											
EMG21	37-191#	65-51	65-107	65-167										
EMG22	37-192#	68-45	68-65											
EMG23	37-193#	69-50	69-70	69-90										
EMG24	37-194#	69-110	69-135	69-160	70-50	70-98	70-146							
EMG25	31-55	37-195#												
EMG26	31-72	37-196#												
EMG3	28-37	37-173#												
EMG30	30-93	37-197#	87-43											
EMG31	30-100	37-198#	87-79											
EMG32	37-199#	73-41												
EMG33	37-200#	73-65	75-45											
EMG34	37-201#													
EMG35	37-202#	72-71	72-123											
EMG36	37-203#	76-46												
EMG37	31-48	37-204#	84-88											
EMG38	37-205#	81-41	83-42	84-50										
EMG39	37-206#	85-40	86-40											
EMG4	37-174#	54-50	56-48	56-76	56-104	56-132	56-144							
EMG40	32-35	37-207#	69-116	69-141	69-167	70-58	70-106	70-155						
EMG5	37-175#	58-32	58-66											
EMG6	37-176#	58-43	58-74											
EMG7	37-177#	59-26												
EMG8	37-178#	59-53												
EMG9	37-179#	60-33	66-43											
EMT0	53-56	53-62#												
END	40-38	40-125#												
ERR	21-99#	44-59	87-73											

CROSS REFERENCE TABLE (CREF V01-05)

ERRG1	31-48	32-35	37-8#											
ERRG10	37-53#	56-132												
ERRG11	28-37	37-60#	54-71											
ERRG12	27-46	37-78#												
ERRG13	37-83#	68-45												
ERRG14	31-55	37-125#												
ERRG15	37-133#	68-65												
ERRG2	30-89	30-93	30-100	37-13#	59-53	60-33	60-40	62-41	62-48	62-51	63-44	63-54	63-57	64-54
	64-67	64-72	64-77	64-107	64-117	64-124	64-130	64-138	64-148	64-179	64-192	64-199	64-205	65-42
	65-51	65-57	65-61	65-98	65-107	65-114	65-118	65-158	65-167	65-173	65-179	66-43	66-49	69-50
	69-70	69-90	69-110	69-135	69-160	70-50	70-98	70-146						
ERRG3	31-72	37-22#												
ERRG4	37-28#	56-48												
ERRG7	37-35#	54-50	58-32	58-43	58-66	58-74	59-26							
ERRG8	37-41#	56-76												
ERRG9	37-47#	56-104	56-144											
ERROR	22-56#	30-46*	30-102*	32-31	40-13*									
EVL	21-8#													
EXADD	21-117#	29-50												
EXCON	21-116#	29-57												
EXERR	22-57#	30-87	30-98	72-47*	72-65*	72-99*	72-117*	72-138*	73-37*	73-61*	74-35*	75-33*	76-37*	77-35*
	78-36*	79-36*	80-35*	81-36*	83-37*	84-44*	84-75*	85-36*	86-36*	88-33*	89-33*	90-35*	91-33*	93-35*
	94-34*	95-34*	96-37*	97-36*	98-37*	99-34*	100-42*	101-24*	102-23*					
F$AU	17-15#													
F$AUTO	17-15#	41-8	41-27											
F$BGN	17-15#	17-18	37-8	37-13	37-22	37-28	37-35	37-41	37-47	37-53	37-60	37-78	37-83	37-125
	37-133	39-8	40-8	41-8	42-9	43-30	44-24	45-20	46-22	47-26	48-18	49-22	50-18	51-8
	53-20	53-49	53-52	54-25	54-26	54-26	54-28	54-52	54-56	54-56	54-73	54-75	56-21	56-23
	56-25	56-25	56-52	56-55	56-55	56-80	56-82	56-82	56-109	56-111	56-111	56-136	56-138	56-138
	56-148	56-150	58-15	58-17	58-17	58-19	58-27	58-39	58-46	58-48	58-51	58-51	58-53	58-61
	58-70	58-77	58-79	58-82	59-12	59-14	59-14	59-16	59-28	59-31	59-31	59-33	59-42	59-46
	59-55	59-58	60-10	60-13	60-46	62-18	62-21	62-28	62-33	62-38	62-54	63-13	63-17	63-65
	64-29	64-31	64-31	64-33	64-81	64-83	64-83	64-85	64-151	64-155	64-155	64-157	64-208	64-212
	65-13	65-16	65-16	65-18	65-68	65-70	65-70	65-72	65-126	65-130	65-130	65-132	65-187	65-190
	66-12	66-15	66-60	68-15	68-20	68-67	69-23	69-26	69-37	69-37	69-39	69-54	69-57	69-57
	69-59	69-74	69-78	69-78	69-80	69-94	69-97	69-97	69-99	69-119	69-122	69-122	69-124	69-144
	69-147	69-147	69-149	69-170	69-181	70-16	70-19	70-21	70-21	70-23	70-65	70-67	70-69	70-69
	70-71	70-113	70-115	70-117	70-117	70-119	70-162	70-164	70-166	72-24	72-26	72-26	72-27	72-29
	72-49	72-52	72-55	72-57	72-74	72-77	72-77	72-78	72-80	72-101	72-104	72-107	72-109	72-124
	72-128	72-130	72-140	72-143	72-145	72-148	73-17	73-18	73-18	73-20	73-43	73-45	73-45	73-47
	73-67	73-69	74-13	74-16	74-43	75-12	75-15	75-38	75-49	76-13	76-28	76-39	76-56	77-15
	77-18	77-37	77-43	78-12	78-15	78-44	79-12	79-15	79-44	80-12	80-15	80-43	81-15	81-18
	81-38	81-44	83-15	83-19	83-39	83-46	84-21	84-23	84-23	84-25	84-47	84-52	84-54	84-54
	84-56	84-80	84-90	84-92	85-12	85-16	85-44	86-12	86-16	86-44	87-12	87-16	87-102	88-12
	88-16	88-42	89-12	89-16	89-42	90-12	90-16	90-44	91-12	91-16	91-42	93-14	93-18	93-43
	94-12	94-16	94-43	95-12	95-16	95-43	96-12	96-16	96-46	97-12	97-16	97-45	98-12	98-16
	98-46	99-12	99-16	99-43	100-14	100-18	100-45	100-52	100-57	100-61	101-12	101-14	101-57	102-12
	102-14	102-57	103-13	103-39										
F$CLEA	17-15#	42-9	42-14											
F$DU	17-15#	51-8	51-13											
F$END	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	17-15#	17-18	37-10	37-20	37-25	37-32	37-39	37-45	37-51	37-57	37-76	37-81
	37-123	37-131	37-135	40-126	41-27	42-14	43-59	44-74	45-38	46-44	47-66	48-39	49-49	50-22
	51-13	53-20	53-20	53-20	53-49	53-49	53-60	54-25	54-25	54-25	54-26	54-26	54-28	54-52
	54-52	54-56	54-56	54-73	54-73	54-75	54-75	56-21	56-21	56-21	56-23	56-25	56-25	56-52
	56-52	56-55	56-55	56-80	56-80	56-82	56-82	56-109	56-109	56-111	56-111	56-136	56-136	56-138
	56-138	56-148	56-148	56-150	56-150	58-15	58-15	58-15	58-17	58-17	58-19	58-27	58-39	58-46

CROSS REFERENCE TABLE (CREF V01-05)

	58-48	58-48	58-51	58-51	58-53	58-61	58-70	58-77	58-79	58-79	58-82	58-82	59-12	59-12
	59-12	59-14	59-14	59-16	59-28	59-28	59-31	59-31	59-33	59-42	59-46	59-55	59-55	59-58
	59-58	60-10	60-10	60-10	60-13	60-46	60-46	62-18	62-18	62-18	62-21	62-28	62-33	62-38
	62-54	62-54	63-13	63-13	63-13	63-17	63-65	63-65	64-29	64-29	64-29	64-31	64-31	64-33
	64-81	64-81	64-83	64-83	64-85	64-151	64-151	64-155	64-155	64-157	64-208	64-208	64-212	64-212
	65-13	65-13	65-13	65-16	65-16	65-18	65-68	65-68	65-70	65-70	65-72	65-126	65-126	65-130
	65-130	65-132	65-187	65-187	65-190	65-190	66-12	66-12	66-12	66-15	66-60	66-60	68-15	68-15
	68-15	68-20	68-67	68-67	69-23	69-23	69-23	69-26	69-37	69-37	69-39	69-54	69-54	69-57
	69-57	69-59	69-74	69-74	69-78	69-78	69-80	69-94	69-94	69-97	69-97	69-99	69-119	69-119
	69-122	69-122	69-124	69-144	69-144	69-147	69-147	69-149	69-170	69-170	69-181	69-181	70-16	70-16
	70-16	70-19	70-21	70-21	70-23	70-65	70-67	70-67	70-69	70-69	70-71	70-113	70-115	70-115
	70-117	70-117	70-119	70-162	70-164	70-164	70-166	70-166	72-24	72-24	72-24	72-26	72-26	72-29
	72-49	72-52	72-53	72-57	72-73	72-74	72-74	72-77	72-77	72-80	72-101	72-104	72-105	72-109
	72-124	72-126	72-130	72-140	72-143	72-144	72-145	72-145	72-148	72-148	73-17	73-17	73-17	73-18
	73-18	73-20	73-43	73-43	73-45	73-45	73-47	73-67	73-67	73-69	73-69	74-13	74-13	74-13
	74-16	74-43	74-43	75-12	75-12	75-12	75-15	75-38	75-49	75-49	76-13	76-13	76-13	76-28
	76-39	76-56	76-56	77-15	77-15	77-15	77-18	77-37	77-43	77-43	78-12	78-12	78-12	78-15
	78-44	78-44	79-12	79-12	79-12	79-15	79-44	79-44	80-12	80-12	80-12	80-15	80-43	80-43
	81-15	81-15	81-15	81-18	81-38	81-44	81-44	83-15	83-15	83-15	83-19	83-39	83-46	83-46
	84-21	84-21	84-21	84-23	84-23	84-25	84-47	84-52	84-52	84-54	84-54	84-56	84-80	84-90
	84-90	84-92	84-92	85-12	85-12	85-12	85-16	85-44	85-44	86-12	86-12	86-12	86-16	86-44
	86-44	87-12	87-12	87-12	87-16	87-102	87-102	88-12	88-12	88-12	88-16	88-42	88-42	89-12
	89-12	89-12	89-16	89-42	89-42	90-12	90-12	90-12	90-16	90-44	90-44	91-12	91-12	91-12
	91-16	91-42	91-42	93-14	93-14	93-14	93-18	93-43	93-43	94-12	94-12	94-12	94-16	94-43
	94-43	95-12	95-12	95-12	95-16	95-43	95-43	96-12	96-12	96-12	96-16	96-46	96-46	97-12
	97-12	97-12	97-16	97-45	97-45	98-12	98-12	98-12	98-16	98-46	98-46	99-12	99-12	99-12
	99-16	99-43	99-43	100-14	100-14	100-14	100-18	100-45	100-52	100-57	100-61	100-61	101-12	101-12
	101-12	101-14	101-57	101-57	102-12	102-12	102-12	102-14	102-57	102-57	103-20	103-39		
F$HARD	17-15#	103-13	103-20											
F$HW	17-15#	20-8	20-15											
F$INIT	17-15#	40-8	40-126											
F$JMP	17-15#	69-26	70-19											
F$MOD	17-15#	17-18	103-39											
F$MSG	17-15#	37-8	37-10	37-13	37-20	37-22	37-25	37-28	37-32	37-35	37-39	37-41	37-45	37-47
	37-51	37-53	37-57	37-60	37-76	37-78	37-81	37-83	37-123	37-125	37-131	37-133	37-135	
F$PROT	17-15#	39-8	39-14											
F$PWR	17-15#													
F$RPT	17-15#													
F$SEG	17-15#	72-27	72-53	72-55	72-73	72-78	72-105	72-107	72-126	72-128	72-144			
F$SOFT	17-15#													
F$SRV	17-15#	43-30	43-59	44-24	44-74	45-20	45-38	46-22	46-44	47-26	47-66	48-18	48-39	49-22
	49-49	50-18	50-22	53-52	53-60									
F$SUB	17-15#	54-26	54-52	54-56	54-73	56-25	56-52	56-55	56-80	56-82	56-109	56-111	56-136	56-138
	56-148	58-17	58-48	58-51	58-79	59-14	59-28	59-31	59-55	64-31	64-81	64-83	64-151	64-155
	64-208	65-16	65-68	65-70	65-126	65-130	65-187	69-37	69-54	69-57	69-74	69-78	69-94	69-97
	69-119	69-122	69-144	69-147	69-170	70-21	70-67	70-69	70-115	70-117	70-164	72-26	72-74	72-77
	72-145	73-18	73-43	73-45	73-67	84-23	84-52	84-54	84-90					
F$SW	17-15#													
F$TEST	17-15#	53-20	53-49	54-25	54-75	56-21	56-150	58-15	58-82	59-12	59-58	60-10	60-46	62-18
	62-54	63-13	63-65	64-29	64-212	65-13	65-190	66-12	66-60	68-15	68-67	69-23	69-181	70-16
	70-166	72-24	72-148	73-17	73-69	74-13	74-43	75-12	75-49	76-13	76-56	77-15	77-43	78-12
	78-44	79-12	79-44	80-12	80-43	81-15	81-44	83-15	83-46	84-21	84-92	85-12	85-44	86-12
	86-44	87-12	87-102	88-12	88-42	89-12	89-42	90-12	90-44	91-12	91-42	93-14	93-43	94-12
	94-43	95-12	95-43	96-12	96-46	97-12	97-45	98-12	98-46	99-12	99-43	100-14	100-61	101-12
	101-57	102-12	102-57											
FINIT1	40-57	40-127#												
FINIT2	40-86	40-128#												

CROSS REFERENCE TABLE (CREF V01-05)

FIVE	21-95#											
FLAG	22-58#	40-14*	60-38									
FMDROP	51-11	51-16#										
FMG0	33-33	37-137#										
FMG1	37-18	37-138#										
FMG10	37-37	37-68	37-111	37-147#								
FMG11	37-43	37-70	37-148#									
FMG12	37-49	37-72	37-149#									
FMG13	37-55	37-74	37-150#									
FMG14	37-80	37-151#										
FMG15	37-117	37-152#										
FMG16	37-118	37-153#										
FMG17	37-87	37-154#										
FMG18	37-93	37-155#										
FMG19	37-99	37-156#										
FMG2	37-19	37-139#										
FMG20	37-108	37-157#										
FMG21	37-100	37-109	37-158#									
FMG22	37-121	37-159#										
FMG23	37-63	37-160#										
FMG24	37-130	37-161#										
FMG25	37-134	37-162#										
FMG26	37-163#	69-111	69-136	69-161	70-52	70-100	70-148					
FMG27	34-37	37-164#										
FMG28	37-165#	101-46	102-45									
FMG29	37-101	37-167#	69-162	70-150								
FMG3	37-9	37-16	37-23	37-79	37-128	37-140#						
FMG30	37-168#	56-145										
FMG4	37-29	37-36	37-42	37-48	37-54	37-65	37-110	37-116	37-141#			
FMG5	37-31	37-38	37-44	37-50	37-56	37-67	37-69	37-71	37-73	37-75	37-112	37-142#
FMG6	32-73	37-143#										
FMG7	37-30	37-66	37-144#									
FMG8	37-24	37-145#										
FMG9	28-48	37-146#										
FMODE0	32-44	32-78#										
FMODE1	32-45	32-79#										
FMODE2	32-46	32-80#										
FMODE3	32-55	32-81#										
FMODE4	32-58	32-82#										
FMODE5	32-70	32-83#										
FMODE6	32-40	32-84#										
FMODEM	32-36	32-77#										
FMS1	27-49	27-56#										
FMT0	53-59	53-63#										
FMT1	53-42	53-64#										
FOUR	21-94#											
FRSPAS	22-43#	40-25*	40-45*									
FRSTIM	22-42#	40-22	40-24*									
G$CNTO	17-15#											
G$DELM	17-15#	35-29	59-18									
G$DISP	17-15#											
G$EXCP	17-15#											
G$HILI	17-15#											
G$LOLI	17-15#											
G$NO	17-15#											
G$OFFS	17-15#	103-15	103-16	103-17	103-18							
G$OFSI	17-15#	103-15	103-16	103-17	103-18							

CROSS REFERENCE TABLE (CREF V01-05)

G$PRMA	17-15#	103-15	103-16											
G$PRMD	17-15#	103-17												
G$PRML	17-15#	103-18												
G$RADA	17-15#													
G$RADB	17-15#													
G$RADD	17-15#													
G$RADL	17-15#	103-18												
G$RADO	17-15#	103-15	103-16	103-17										
G$XFER	17-15#													
G$YES	17-15#	103-15	103-16	103-17	103-18									
GETPRM	40-37	40-47#	40-52											
HEADER	22-59#	47-48	47-52*	47-55*	49-39	49-41*	72-34*	72-59*	72-86*	72-111*	72-132*	73-24*	73-51*	74-20*
	75-20*	76-30*	77-22*	78-21*	79-21*	80-21*	81-23*	83-24*	84-31*	84-62*	85-22*	86-22*	88-20*	89-20*
	90-22*	91-20*	93-22*	94-21*	95-21*	96-23*	97-22*	98-23*	99-21*	100-20*				
HELP	17-3#	17-36	18-13	19-10	24-26									
HOE	21-8#													
I$AU	17-15#													
I$AUTO	17-15#	41-8#	41-27#											
I$CLN	17-15#	42-9#	42-14#											
I$DU	17-15#	51-8#	51-13#											
I$HRD	103-13#	103-20#												
I$INIT	17-15#	40-8#	40-126#											
I$MOD	17-15#	17-18	17-18#	103-39	103-39#									
I$MSG	17-15#	37-8#	37-10#	37-13#	37-20#	37-22#	37-25#	37-28#	37-32#	37-35#	37-39#	37-41#	37-45#	37-47#
	37-51#	37-53#	37-57#	37-60#	37-76#	37-78#	37-81#	37-83#	37-123#	37-125#	37-131#	37-133#	37-135#	
I$PROT	17-15#	39-8#												
I$PTAB	17-15#													
I$PWR	17-15#													
I$RPT	17-15#													
I$SEG	17-15#	53-20	54-25	54-26	54-56	56-21	56-25	56-55	56-82	56-111	56-138	58-15	58-17	58-51
	59-12	59-14	59-31	60-10	62-18	63-13	64-29	64-31	64-83	64-155	65-13	65-16	65-70	65-130
	66-12	68-15	69-23	69-37	69-57	69-78	69-97	69-122	69-147	70-16	70-21	70-69	70-117	72-24
	72-26	72-27#	72-53#	72-55#	72-73#	72-77	72-78#	72-105#	72-107#	72-126#	72-128#	72-144#	73-17	73-18
	73-45	74-13	75-12	76-13	77-15	78-12	79-12	80-12	81-15	83-15	84-21	84-23	84-54	85-12
	86-12	87-12	88-12	89-12	90-12	91-12	93-14	94-12	95-12	96-12	97-12	98-12	99-12	100-14
	101-12	102-12												
I$SETU	17-15#													
I$SRV	17-15#	43-30#	43-59#	44-24#	44-74#	45-20#	45-38#	46-22#	46-44#	47-26#	47-66#	48-18#	48-39#	49-22#
	49-49#	50-18#	50-22#	53-52#	53-60#									
I$SUB	17-15#	53-20	54-25	54-26	54-26#	54-52	54-52#	54-52#	54-56	54-56#	54-73	54-73#	54-73#	56-21
	56-25	56-25#	56-52	56-52#	56-52#	56-55	56-55#	56-80	56-80#	56-80#	56-82	56-82#	56-109	56-109#
	56-109#	56-111	56-111#	56-136	56-136#	56-136#	56-138	56-138#	56-148	56-148#	56-148#	58-15	58-17	58-17#
	58-48	58-48#	58-48#	58-51	58-51#	58-79	58-79#	58-79#	59-12	59-14	59-14#	59-28	59-28#	59-28#
	59-31	59-31#	59-55	59-55#	59-55#	60-10	62-18	63-13	64-29	64-31	64-31#	64-81	64-81#	64-81#
	64-83	64-83#	64-151	64-151#	64-151#	64-155	64-155#	64-208	64-208#	64-208#	65-13	65-16	65-16#	65-68
	65-68#	65-68#	65-70	65-70#	65-126	65-126#	65-126#	65-130	65-130#	65-187	65-187#	65-187#	66-12	68-15
	69-23	69-37	69-37#	69-54	69-54#	69-54#	69-57	69-57#	69-74	69-74#	69-74#	69-78	69-78#	69-94
	69-94#	69-94#	69-97	69-97#	69-119	69-119#	69-119#	69-122	69-122#	69-144	69-144#	69-144#	69-147	69-147#
	69-170	69-170#	69-170#	70-16	70-21	70-21#	70-67	70-67#	70-67#	70-69	70-69#	70-115	70-115#	70-115#
	70-117	70-117#	70-164	70-164#	70-164#	72-24	72-26	72-26#	72-74	72-74#	72-74#	72-77	72-77#	72-145
	72-145#	72-145#	73-17	73-18	73-18#	73-43	73-43#	73-43#	73-45	73-45#	73-67	73-67#	73-67#	74-13
	75-12	76-13	77-15	78-12	79-12	80-12	81-15	83-15	84-21	84-23	84-23#	84-52	84-52#	84-52#
	84-54	84-54#	84-90	84-90#	84-90#	85-12	86-12	87-12	88-12	89-12	90-12	91-12	93-14	94-12
	95-12	96-12	97-12	98-12	99-12	100-14	101-12	102-12						
I$TST	17-15#	53-20	53-20#	53-49	53-49#	53-49#	54-25	54-25#	54-26	54-28	54-56	54-75	54-75#	54-75#
	56-21	56-21#	56-23	56-25	56-55	56-82	56-111	56-138	56-150	56-150#	56-150#	58-15	58-15#	58-17
	58-19	58-27	58-39	58-46	58-51	58-53	58-61	58-70	58-77	58-82	58-82#	58-82#	59-12	59-12#

CROSS REFERENCE TABLE (CREF V01-05)

	59-14	59-16	59-31	59-33	59-42	59-46	59-58	59-58#	59-58#	60-10	60-10#	60-13	60-46	60-46#
	60-46#	62-18	62-18#	62-21	62-28	62-33	62-38	62-54	62-54#	62-54#	63-13	63-13#	63-17	63-65
	63-65#	63-65#	64-29	64-29#	64-31	64-33	64-83	64-85	64-155	64-157	64-212	64-212#	64-212#	65-13
	65-13#	65-16	65-18	65-70	65-72	65-130	65-132	65-190	65-190#	65-190#	66-12	66-12#	66-15	66-60
	66-60#	66-60#	68-15	68-15#	68-20	68-67	68-67#	68-67#	69-23	69-23#	69-26	69-37	69-39	69-57
	69-59	69-78	69-80	69-97	69-99	69-122	69-124	69-147	69-149	69-181	69-181#	69-181#	70-16	70-16#
	70-19	70-21	70-23	70-65	70-69	70-71	70-113	70-117	70-119	70-162	70-166	70-166#	70-166#	72-24
	72-24#	72-26	72-29	72-49	72-52	72-57	72-77	72-80	72-101	72-104	72-109	72-124	72-130	72-140
	72-143	72-148	72-148#	72-148#	73-17	73-17#	73-18	73-20	73-45	73-47	73-69	73-69#	73-69#	74-13
	74-13#	74-16	74-43	74-43#	74-43#	75-12	75-12#	75-15	75-38	75-49	75-49#	75-49#	76-13	76-13#
	76-28	76-39	76-56	76-56#	76-56#	77-15	77-15#	77-18	77-37	77-43	77-43#	77-43#	78-12	78-12#
	78-15	78-44	78-44#	78-44#	79-12	79-12#	79-15	79-44	79-44#	79-44#	80-12	80-12#	80-15	80-43
	80-43#	80-43#	81-15	81-15#	81-18	81-38	81-44	81-44#	81-44#	83-15	83-15#	83-19	83-39	83-46
	83-46#	83-46#	84-21	84-21#	84-23	84-25	84-47	84-54	84-56	84-80	84-92	84-92#	84-92#	85-12
	85-12#	85-16	85-44	85-44#	85-44#	86-12	86-12#	86-16	86-44	86-44#	86-44#	87-12	87-12#	87-16
	87-102	87-102#	87-102#	88-12	88-12#	88-16	88-42	88-42#	88-42#	89-12	89-12#	89-16	89-42	89-42#
	89-42#	90-12	90-12#	90-16	90-44	90-44#	90-44#	91-12	91-12#	91-16	91-42	91-42#	91-42#	93-14
	93-14#	93-18	93-43	93-43#	93-43#	94-12	94-12#	94-16	94-43	94-43#	94-43#	95-12	95-12#	95-16
	95-43	95-43#	95-43#	96-12	96-12#	96-16	96-46	96-46#	96-46#	97-12	97-12#	97-16	97-45	97-45#
	97-45#	98-12	98-12#	98-16	98-46	98-46#	98-46#	99-12	99-12#	99-16	99-43	99-43#	99-43#	100-14
	100-14#	100-18	100-45	100-52	100-57	100-61	100-61#	100-61#	101-12	101-12#	101-14	101-57	101-57#	101-57#
	102-12	102-12#	102-14	102-57	102-57#	102-57#								
IBE	21-8#													
IC	21-53#	32-87	37-92	68-31										
IDLE	21-74#	73-49	79-19	96-21										
IDU	21-8#													
IER	21-8#													
IPCR	22-60#	29-50	29-57	47-56	72-42*	72-62*	72-94*	72-114*	72-135*	73-32*	73-56*	74-28*	75-28*	76-33*
	77-30*	78-29*	78-31	79-29*	79-30	80-28*	80-29	81-31*	83-32*	84-38*	84-70*	85-29*	86-29*	88-28*
	89-28*	90-30*	91-28*	93-30*	94-29*	95-29*	96-30*	96-31	97-29*	97-30	98-30*	98-31	99-28*	
IPCSAR	22-61#	29-39	29-44	29-46	31-41	72-31*	72-32*	72-41	72-61	72-82*	72-83*	72-93	72-113	72-134
	73-22*	73-31	73-48*	73-49*	73-55	74-18*	74-27	75-17*	75-18*	75-27	76-16*	76-31	77-20*	77-29
	78-17*	78-18*	78-19*	78-30	79-17*	79-18*	79-19*	79-31	80-17*	80-18*	80-19*	80-30	81-20*	81-21*
	81-30	83-21*	83-22*	83-31	84-27*	84-28*	84-29*	84-39	84-58*	84-59*	84-60*	84-69	85-18*	85-19*
	85-20*	85-31	86-18*	86-19*	86-20*	86-31	87-18*	87-19*	88-18*	88-27	89-18*	89-27	90-18*	90-19*
	90-20*	90-29	91-18*	91-27	93-20*	93-29	94-18*	94-19*	94-28	95-18*	95-19*	95-28	96-18*	96-19*
	96-20*	96-21*	96-32	97-18*	97-19*	97-20*	97-31	98-18*	98-19*	98-20*	98-21*	98-32	99-18*	99-19*
	99-29													
IRDSR	22-63#	31-37	31-43	44-51*	44-54	44-59	73-39	73-63	75-40	75-42	76-43*	76-44	81-39	83-40
	84-48	85-38	86-38	87-65*	87-68	87-73	87-75							
IRXCSR	22-62#	43-32*	43-39	43-48	44-26*	44-29	44-40	44-49	44-52	44-57	87-64*	87-66	87-71	
ISR	21-8#													
IXE	21-8#													
J$JMP	17-15#													
L$ACP	18-11#													
L$APT	18-11#													
L$AUT	18-11#													
L$AUTO	18-11	41-8#												
L$CCP	18-11#													
L$CLEA	18-11	42-9#												
L$CO	18-11#													
L$DEPO	18-11#													
L$DESC	18-11	24-18#												
L$DESP	18-11#													
L$DEVP	18-11#													
L$DISP	18-11	19-8#												
L$DLY	18-11#	35-29	59-18											

CROSS REFERENCE TABLE (CREF V01-05)

L$DTP	18-11#		
L$DTYP	18-11#		
L$DU	18-11	51-8#	
L$DUT	18-11#		
L$DVTY	18-11	24-13#	
L$EF	18-11#		
L$ENVI	18-11#		
L$ETP	18-11#		
L$EXP1	18-11#		
L$EXP4	18-11#		
L$EXP5	18-11#		
L$HARD	18-11	103-13	103-13#
L$HIME	18-11#		
L$HPCP	18-11#		
L$HPTP	18-11#		
L$HW	18-11	20-8	20-8#
L$ICP	18-11#		
L$INIT	18-11	40-8#	
L$LADP	18-11#		
L$LAST	18-11	103-41#	
L$LOAD	18-11#		
L$LUN	18-11#		
L$MREV	18-11#		
L$NAME	18-11#		
L$PRIO	18-11#		
L$PROT	18-11	39-8#	
L$PRT	18-11#		
L$REPP	18-11#		
L$REV	18-11#		
L$SPC	18-11#		
L$SPCP	18-11#		
L$SPTP	18-11#		
L$STA	18-11#		
L$TEST	18-11#	33-33	34-37
L$TIML	18-11#		
L$UNIT	18-11#	40-49	
L10000	20-8	20-15#	
L10001	37-10#		
L10002	37-20#		
L10003	37-25#		
L10004	37-32#		
L10005	37-39#		
L10006	37-45#		
L10007	37-51#		
L10010	37-57#		
L10011	37-76#		
L10012	37-81#		
L10013	37-123#		
L10014	37-131#		
L10015	37-135#		
L10017	40-126#		
L10020	41-27#		
L10021	42-14#		
L10022	43-59#		
L10023	44-74#		
L10024	45-38#		
L10025	46-44#		

CROSS REFERENCE TABLE (CREF V01-05)

L10026	47-66#												
L10027	48-39#												
L10030	49-49#												
L10031	50-22#												
L10032	51-13#												
L10033	53-49#												
L10034	53-60#												
L10035	54-28	54-75#											
L10036	54-52#												
L10037	54-73#												
L10040	56-23	56-150#											
L10041	56-52#												
L10042	56-80#												
L10043	56-109#												
L10044	56-136#												
L10045	56-148#												
L10046	58-19	58-27	58-39	58-46	58-53	58-61	58-70	58-77	58-82#				
L10047	58-48#												
L10050	58-79#												
L10051	59-16	59-33	59-42	59-46	59-58#								
L10052	59-28#												
L10053	59-55#												
L10054	60-13	60-46#											
L10055	62-21	62-28	62-33	62-38	62-54#								
L10056	63-17	63-65#											
L10057	64-33	64-85	64-157	64-212#									
L10060	64-81#												
L10061	64-151#												
L10062	64-208#												
L10063	65-18	65-72	65-132	65-190#									
L10064	65-68#												
L10065	65-126#												
L10066	65-187#												
L10067	66-15	66-60#											
L10070	68-20	68-67#											
L10071	69-26	69-39	69-59	69-80	69-99	69-124	69-149	69-181#					
L10072	69-54#												
L10073	69-74#												
L10074	69-94#												
L10075	69-119#												
L10076	69-144#												
L10077	69-170#												
L10100	70-19	70-23	70-65	70-71	70-113	70-119	70-162	70-166#					
L10101	70-67#												
L10102	70-115#												
L10103	70-164#												
L10104	72-29	72-49	72-52	72-57	72-80	72-101	72-104	72-109	72-124	72-130	72-140	72-143	72-148#
L10105	72-74#												
L10106	72-145#												
L10107	73-20	73-47	73-69#										
L10110	73-43#												
L10111	73-67#												
L10112	74-16	74-43#											
L10113	75-15	75-38	75-49#										
L10114	76-28	76-39	76-56#										
L10115	77-18	77-37	77-43#										
L10116	78-15	78-44#											

CROSS REFERENCE TABLE (CREF V01-05)

L10117	79-15	79-44#												
L10120	80-15	80-43#												
L10121	81-18	81-38	81-44#											
L10122	83-19	83-39	83-46#											
L10123	84-25	84-47	84-56	84-80	84-92#									
L10124	84-52#													
L10125	84-90#													
L10126	85-16	85-44#												
L10127	86-16	86-44#												
L10130	87-16	87-102#												
L10131	88-16	88-42#												
L10132	89-16	89-42#												
L10133	90-16	90-44#												
L10134	91-16	91-42#												
L10135	93-18	93-43#												
L10136	94-16	94-43#												
L10137	95-16	95-43#												
L10140	96-16	96-46#												
L10141	97-16	97-45#												
L10142	98-16	98-46#												
L10143	99-16	99-43#												
L10144	100-18	100-45	100-52	100-57	100-61#									
L10145	101-14	101-57#												
L10146	102-14	102-57#												
L10147	103-13	103-20#												
LENGTH	22-64#	29-32	72-35*	72-87*	73-25*	74-21*	75-21*	76-18*	76-25*	76-32	76-42	76-49*	76-50	77-23*
	78-22*	79-22*	80-22*	81-24*	83-25*	84-32*	84-63*	85-23*	86-23*	87-20*	88-21*	89-21*	90-23*	91-21*
	93-23*	94-22*	95-22*	96-24*	97-23*	98-24*	99-22*							
LF	21-139#	103-24	103-25											
LL	21-41#	32-87	37-96	37-98	40-104	68-38	68-49	68-61	69-44	69-64	69-85	69-154	70-123	
LOCATE	53-22	53-52#												
LOE	21-8#													
LOGDEV	22-65#	33-33	40-44*	40-48*	40-49	40-51	41-22	51-11	53-43					
LOOP	21-77#	75-18	81-21	83-22	95-19									
LOT	21-8#													
MAINT	22-66#	30-57	72-46*	72-98*	73-36*	73-60*	74-34*	75-32*	76-36*	77-34*	78-35*	79-35*	80-34*	81-35*
	83-36*	84-43*	84-74*	85-35*	86-35*	88-32*	89-32*	90-34*	91-32*	93-34*	94-33*	95-33*	96-36*	97-35*
	98-36*	99-33*												
MASK	29-67	29-80#												
MCFLAG	22-67#	30-45*	32-33	32-36	32-37	32-39*	32-64	32-67*	43-34*	43-35	44-31*	44-32	44-38	63-20*
	65-21*	65-76*	65-136*	66-18*	69-41*	69-48	69-61*	69-68	69-82*	69-88	69-101*	69-108	69-114	69-126*
	69-133	69-139	69-151*	69-158	69-165	70-26*	70-45	70-56	70-74*	70-93	70-104	70-122*	70-141	70-153
	100-36*													
MM	21-107#	40-98	40-116	54-42	58-22	58-56	59-36	62-24	63-35	64-44	64-97	64-169	65-32	65-88
	65-148	66-32	70-41	70-89	70-137									
MMASK	32-49	32-87#												
MODE	22-68#	29-36	31-35	44-64	72-30*	72-81*	73-21*	74-17*	75-16*	76-15*	77-19*	78-16*	79-16*	80-16*
	81-19*	83-20*	84-26*	84-57*	85-17*	86-17*	87-17*	88-17*	89-17*	90-17*	91-17*	93-19*	94-17*	95-17*
	96-17*	97-17*	98-17*	99-17*	101-20*	102-19*								
MODEM	22-106#	28-40*	28-41*	28-44*	32-43	44-40*	44-41*	44-44*						
NESTPC	22-69#													
NEWST	40-35	40-43#	40-50											
NOERR	21-70#	76-16												
NONE1	21-71#	73-48												
NONE2	21-72#													
NXM	41-10	50-18#												
NXMFLG	22-70#	40-17*	41-11*	41-20	42-10	50-20*	53-23*	53-40	53-45*	53-53	53-57*			

CROSS REFERENCE TABLE (CREF V01-05)

O$APTS	17-15#	18-11												
O$AU	17-15#	18-11												
O$BGNR	17-15#	18-11												
O$BGNS	17-15#	18-11												
O$DU	17-15#	17-34#	18-11											
O$ERRT	17-15#	18-11												
O$GNSW	17-15#	18-11												
O$POIN	17-15#	17-34	17-34#	18-11										
O$SETU	17-15#	18-11	103-41											
ONE	21-91#													
OVER	22-71#	40-20*	43-53	65-78*	65-124*									
P1	103-15	103-22#												
P2	103-16	103-23#												
P3	103-17	103-24#												
P4	103-18	103-27#												
PATCH	103-31#													
PCR	22-29#	28-30	37-43	37-70	37-70	47-56*	56-57*	56-58	56-61*	56-62	56-67	56-68	56-71*	56-78*
	74-30*	78-31*	79-30*	80-29*	96-31*	97-30*	98-31*							
PCSAR	22-24#	62-22*	63-32*	66-28*	70-38*	70-86*	70-134*	72-41*	72-61*	72-93*	72-113*	72-134*	73-31*	73-55*
	74-27*	75-27*	76-31*	77-29*	78-30*	79-31*	80-30*	81-30*	83-31*	84-39*	84-69*	85-31*	86-31*	88-27*
	89-27*	90-29*	91-27*	93-29*	94-28*	95-28*	96-32*	97-31*	98-32*	99-29*	100-22*	101-16*	102-15*	
PNT	21-8#													
PRI	21-8#													
PRI00	21-8#	30-56	60-18	63-25	64-38	64-91	64-163	65-26	65-82	65-142	66-21	69-30	70-31	70-79
	70-127	100-40	101-38	102-37										
PRI01	21-8#													
PRI02	21-8#													
PRI03	21-8#													
PRI04	21-8#	30-54	30-55	60-17	63-23	63-24	64-37	64-90	64-162	65-24	65-25	65-80	65-81	65-140
	65-141	66-19	66-20	69-29	70-29	70-30	70-77	70-78	70-125	70-126	100-38	100-39	101-36	101-37
	102-35	102-36												
PRI05	21-8#													
PRI06	21-8#													
PRI07	21-8#	40-10	41-10	53-22	60-42	63-60	65-63	65-120	65-181	66-53	69-175	70-61	70-109	70-158
PROTO	21-78#	78-19	79-18	80-19	84-29	84-60	85-20	86-20	96-20	97-19	98-19	99-19	100-22	101-16
PSTACK	22-72#	40-11*												
RABORT	21-87#	44-59	64-197	65-171	73-39	73-63	75-42	87-73						
RCOUNT	22-116#	30-52*	31-51	37-130	44-55*	44-66	45-30*	47-45*	49-30*	87-31*	87-69*	101-22*	102-21*	
RCVBUF	22-171#	22-172	29-71	30-49	31-59	84-81	87-28	100-24	100-32	100-47	101-25	101-32	101-50	102-24
	102-31	102-50												
RCVEC	22-12#	30-55	30-113	40-88*	63-24	63-62	65-25	65-65	65-81	65-122	65-141	65-183	66-19	66-55
	69-29	69-177	70-29	70-63	70-77	70-111	70-125	70-160	100-39	101-37	102-36			
RDATA	30-55	44-24#	100-39											
RDATA2	45-20#	101-37	102-36											
RDATRY	21-46#	43-39	44-49	44-52	62-29	62-34	62-37	62-46	63-52	64-59	64-186	87-62	87-66	
RDSR	22-26#	28-26	43-57	44-51	45-29	54-64	64-61	64-122	64-197	87-65				
REG	22-73#	27-31*	27-32	27-32*	27-38	37-80								
REOM	21-86#	64-62	65-55	75-40	87-75									
RESET	21-104#	28-23	30-111	42-12	60-36									
RETURN	21-136#													
RFLAG	22-74#	30-43*	30-75	30-96	40-15*	43-41*	43-50*	44-61*	44-69*	45-25*	45-33*	63-19*	63-39	63-48*
	63-50	65-19*	65-47	65-74*	65-103	65-134*	65-163	66-17*	66-47	69-40*	69-60*	69-81*	69-100*	69-125*
	69-150*	70-25*	70-73*	70-121*	100-35*	101-21*	102-20*							
RINT	43-30#	63-24	65-25	65-81	65-141	66-19	69-29	70-29	70-77	70-125				
RL	21-37#	40-109												
ROVER	21-88#	44-59	64-122	65-112	87-73									
RR	21-51#	32-87	37-86	68-26										

CROSS REFERENCE TABLE (CREF V01-05)

RSAVE	22-75#	43-57*	64-61*	64-62	65-55	65-112	65-171							
RSIZE	22-172#	29-72												
RSOM	21-85#													
RSTARY	21-49#	43-48	44-49	44-57	64-59	64-70	64-112	64-128	64-133	64-145	64-184	64-202	65-59	65-116
	65-176	87-62	87-71											
RTS	21-40#	32-87	37-84	37-86	40-101	68-21	68-49	68-52	69-44	69-64	69-85	69-104	70-27	
RXACT	21-50#	62-29	62-34	62-39	62-46	63-52	64-50	64-75	64-103	64-175	65-38	65-94	65-154	
RXCSR	22-23#	28-24	28-40	30-59*	30-64*	37-84	37-90	37-96	37-105	43-32	43-37*	43-46*	44-26	44-34*
	44-71*	45-22	45-35*	54-62	56-29*	56-30	56-33*	56-40*	56-41	56-44*	56-45	56-50*	62-23*	62-29
	62-34	62-37	62-39	62-44*	62-46	63-33*	63-47*	63-52	64-46*	64-50	64-59	64-70	64-75	64-99*
	64-103	64-112	64-128	64-133	64-143*	64-145	64-171*	64-175	64-184	64-186	64-202	65-34*	65-38	65-59
	65-90*	65-94	65-116	65-150*	65-154	65-176	66-30*	68-22*	68-24	68-26	68-29*	68-31	68-34*	68-39*
	68-41	68-49*	68-53	68-56	68-58*	68-59	68-61*	68-62	69-44*	69-64*	69-85*	69-104*	69-129*	69-154*
	70-40*	70-88*	70-136*	87-34*	87-62	87-64								
RXENA	21-42#	40-94	40-115	62-23	62-44	63-33	63-47	64-46	64-99	64-143	64-171	65-34	65-90	65-150
	66-30	70-40	70-88	70-136										
RXINI	22-76#	40-94*	40-101*	40-104*	40-109*	40-111	87-34							
RXINIT	22-77#	30-64	40-111*	40-112*	101-40*	101-42*	102-39*	102-41*						
RXITEN	21-44#	40-112	40-115	44-71	45-35	63-33	65-34	65-90	65-150	66-30	69-44	69-104	69-129	69-154
	70-40	70-88	70-136											
RXMINI	22-78#	30-59	40-115*											
S$LSYM	17-15#	20-15#	37-10#	37-20#	37-25#	37-32#	37-39#	37-45#	37-51#	37-57#	37-76#	37-81#	37-123#	37-131#
	37-135#	40-126#	41-27#	42-14#	43-59#	44-74#	45-38#	46-44#	47-66#	48-39#	49-49#	50-22#	51-13#	53-49#
	53-60#	54-52#	54-73#	54-75#	56-52#	56-80#	56-109#	56-136#	56-148#	56-150#	58-48#	58-79#	58-82#	59-28#
	59-55#	59-58#	60-46#	62-54#	63-65#	64-81#	64-151#	64-208#	64-212#	65-68#	65-126#	65-187#	65-190#	66-60#
	68-67#	69-54#	69-74#	69-94#	69-119#	69-144#	69-170#	69-181#	70-67#	70-115#	70-164#	70-166#	72-27	72-27
	72-27#	72-55	72-55	72-55#	72-74#	72-78	72-78	72-78#	72-107	72-107	72-107#	72-128	72-128	72-128#
	72-145#	72-148#	73-43#	73-67#	73-69#	74-43#	75-49#	76-56#	77-43#	78-44#	79-44#	80-43#	81-44#	83-46#
	84-52#	84-90#	84-92#	85-44#	86-44#	87-102#	88-42#	89-42#	90-44#	91-42#	93-43#	94-43#	95-43#	96-46#
	97-45#	98-46#	99-43#	100-61#	101-57#	102-57#	103-20#							
SAVE	22-79#													
SAVTIM	22-80#	40-124*	72-68	72-120										
SECADR	21-75#	29-44	72-32	72-83	90-19									
SEVEN	21-97#													
SF	21-36#	32-87	37-105	68-33	68-49	68-58								
SFR	21-47#													
SIX	21-96#													
SQ	21-109#	37-107	68-36											
SSYNCH	21-76#	80-18	98-20	100-22										
STARES	22-44#	33-31	34-35	40-41*	40-46*	54-57								
STARST	40-31	40-33	40-40#											
START	22-81#	46-24	46-27*	47-28	47-42*	48-19	48-24*	48-27*	49-24	49-27*	63-21*	64-35*	64-88*	64-159*
	65-22*	65-77*	65-137*	66-29*	70-39*	70-87*	70-135*	72-33*	72-58*	72-85*	72-110*	72-131*	73-23*	73-50*
	74-19*	75-19*	76-29*	77-21*	78-20*	79-20*	80-20*	81-22*	83-23*	84-30*	84-61*	85-21*	86-21*	88-19*
	89-19*	90-21*	91-19*	93-21*	94-20*	95-20*	96-22*	97-21*	98-22*	99-20*	100-19*	101-17*	102-16*	
SUBRPC	22-82#	27-27*	27-28*	27-52*	28-35*	28-36*	28-38*	30-67*	30-68*	30-103*	30-109*	31-46*	31-47*	31-53*
	31-54*	31-68*	31-69*	31-74*	32-29*	32-30*	37-9	37-14	37-16	37-23	37-61	37-63	37-79	37-126
	37-128	40-12*												
SVCGBL	17-15#	17-26#	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
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	20-8	24-13	24-18	37-8	37-13	37-22	37-28	37-35	37-41	37-47	37-53	37-60	19-8	20-8
	37-125	37-133	39-8	40-8	41-8	42-9	43-30	44-24	45-20	46-22	47-26	48-18	37-78	37-83
	51-8	53-52	103-13	103-41	103-41	103-41	103-41#						49-22	50-18
SVCINS	17-15#	17-23#	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
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37-81	37-81	37-87	37-87	37-87	37-87	37-87	37-[illegible]	37-87	37-87	37-87	37-87	37-87	37-87
37-87	37-87	37-87	37-93	37-93	37-93	37-93	37-93	37-93	37-93	37-93	37-93	37-93	37-93
37-93	37-93	37-93	37-93	37-99	37-99	37-99	37-99	37-99	37-99	37-99	37-99	37-99	37-99
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CROSS REFERENCE TABLE (CREF V01-05)

37-118	37-118	37-118	37-118	37-118	37-118	37-118	37-118	37-118	37-118	37-118	37-121	37-121	37-121
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37-121	37-123	37-123	37-123	37-128	37-128	37-128	37-128	37-128	37-128	37-128	37-128	37-128	37-128
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CROSS REFERENCE TABLE (CREF V01-05)

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65-98	65-98	65-98	65-98	65-98	65-107	65-107	65-107	65-107	65-107	65-107	65-107	65-107	65-107
65-107	65-107	65-107	65-114	65-114	65-114	65-114	65-114	65-114	65-114	65-114	65-114	65-114	65-114
65-114	65-118	65-118	65-118	65-118	65-118	65-118	65-118	65-118	65-118	65-118	65-118	65-118	65-120
65-120	65-120	65-120	65-120	65-120	65-122	65-122	65-122	65-122	65-122	65-122	65-123	65-123	65-123
65-123	65-123	65-123	65-126	65-126	65-126	65-130	65-130	65-130	65-132	65-132	65-132	65-132	65-132
65-132	65-140	65-140	65-140	65-140	65-140	65-140	65-140	65-140	65-140	65-140	65-140	65-140	65-140
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65-141	65-141	65-141	65-141	65-141	65-141	65-141	65-141	65-141	65-142	65-142	65-142	65-142	65-142
65-142	65-158	65-158	65-158	65-158	65-158	65-158	65-158	65-158	65-158	65-158	65-158	65-158	65-167
65-167	65-167	65-167	65-167	65-167	65-167	65-167	65-167	65-167	65-167	65-167	65-173	65-173	65-173
65-173	65-173	65-173	65-173	65-173	65-173	65-173	65-173	65-173	65-179	65-179	65-179	65-179	65-179
65-179	65-179	65-179	65-179	65-179	65-179	65-179	65-181	65-181	65-181	65-181	65-181	65-181	65-183

CROSS REFERENCE TABLE (CREF V01-05)

65-183	65-183	65-183	65-183	65-183	65-187	65-187	65-187	65-190	65-190	65-190	66-15	66-15	66-15
66-15	66-15	66-15	66-19	66-19	66-19	66-19	66-19	66-19	66-19	66-19	66-19	66-19	66-19
66-19	66-19	66-19	66-19	66-19	66-19	66-19	66-20	66-20	66-20	66-20	66-20	66-20	66-20
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66-21	66-21	66-21	66-43	66-43	66-43	66-43	66-43	66-43	66-43	66-43	66-43	66-43	66-43
66-43	66-49	66-49	66-49	66-49	66-49	66-49	66-49	66-49	66-49	66-49	66-49	66-49	66-53
66-53	66-53	66-53	66-53	66-53	66-55	66-55	66-55	66-55	66-55	66-55	66-56	66-56	66-56
66-56	66-56	66-56	66-60	66-60	66-60	68-20	68-20	68-20	68-20	68-20	68-20	68-45	68-45
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70-150	70-150	70-150	70-150	70-150	70-155	70-155	70-155	70-155	70-155	70-155	70-155	70-155	70-155
70-155	70-155	70-155	70-158	70-158	70-158	70-158	70-158	70-158	70-160	70-160	70-160	70-160	70-160
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CROSS REFERENCE TABLE (CREF V01-05)

70-164	70-164	70-166	70-166	70-166	72-26	72-26	72-26	72-27	72-27	72-27	72-29	72-29	72-29
72-29	72-29	72-29	72-49	72-49	72-49	72-49	72-49	72-49	72-52	72-52	72-52	72-52	72-52
72-52	72-53	72-53	72-53	72-55	72-55	72-55	72-57	72-57	72-57	72-57	72-57	72-57	72-71
72-71	72-71	72-71	72-71	72-71	72-71	72-71	72-71	72-71	72-71	72-71	72-73	72-73	72-73
72-74	72-74	72-74	72-77	72-77	72-77	72-78	72-78	72-78	72-80	72-80	72-80	72-80	72-80
72-80	72-101	72-101	72-101	72-101	72-101	72-101	72-104	72-104	72-104	72-104	72-104	72-104	72-105
72-105	72-105	72-107	72-107	72-107	72-109	72-109	72-109	72-109	72-109	72-109	72-123	72-123	72-123
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72-124	72-126	72-126	72-126	72-128	72-128	72-128	72-130	72-130	72-130	72-130	72-130	72-130	72-140
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72-145	72-145	72-145	72-148	72-148	72-148	73-18	73-18	73-18	73-20	73-20	73-20	73-20	73-20
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75-15	75-15	75-38	75-38	75-38	75-38	75-38	75-38	75-45	75-45	75-45	75-45	75-45	75-45
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99-43	99-43	99-43	100-18	100-18	100-18	100-18	100-18	100-18	100-38	100-38	100-38	100-38	100-38
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102-36	102-36	102-36	102-36	102-36	102-36	102-36	102-36	102-36	102-36	102-36	102-36	102-37	102-37
102-37	102-37	102-37	102-37	102-45	102-45	102-45	102-45	102-45	102-45	102-45	102-45	102-45	102-45

CROSS REFERENCE TABLE (CREF V01-05)

	102-45	102-45	102-45	102-45	102-45	102-57	102-57	102-57	103-13	103-13	103-13	103-15	103-15	103-15
	103-15	103-15	103-15	103-15	103-15	103-15	103-15	103-15	103-15	103-16	103-16	103-16	103-16	103-16
	103-16	103-16	103-16	103-16	103-16	103-16	103-16	103-17	103-17	103-17	103-17	103-17	103-17	103-17
	103-17	103-17	103-17	103-17	103-17	103-17	103-17	103-17	103-18	103-18	103-18	103-18	103-18	103-18
	103-18	103-18	103-18	103-20	103-20	103-20	103-41	103-41	103-41	103-41	103-41	103-41	103-41	103-41
	103-41													
SVCSUB	17-15#	17-25#	54-26	54-56	56-25	56-55	56-82	56-111	56-138	58-17	58-51	59-14	59-31	64-31
	64-83	64-155	65-16	65-70	65-130	69-37	69-57	69-78	69-97	69-122	69-147	70-21	70-69	70-117
	72-26	72-77	73-18	73-45	84-23	84-54								
SVCTAG	17-15#	17-27#	20-15	37-10	37-20	37-25	37-32	37-39	37-45	37-51	37-57	37-76	37-81	37-123
	37-131	37-135	40-126	41-27	42-14	43-59	44-74	45-38	46-44	47-66	48-39	49-49	50-22	51-13
	53-49	53-60	54-52	54-73	54-75	56-52	56-80	56-109	56-136	56-148	56-150	58-48	58-79	58-82
	59-28	59-55	59-58	60-46	62-54	63-65	64-81	64-151	64-208	64-212	65-68	65-126	65-187	65-190
	66-60	68-67	69-54	69-74	69-94	69-119	69-144	69-170	69-181	70-67	70-115	70-164	70-166	72-53
	72-73	72-74	72-105	72-126	72-144	72-145	72-148	73-43	73-67	73-69	74-43	75-49	76-56	77-43
	78-44	79-44	80-43	81-44	83-46	84-52	84-90	84-92	85-44	86-44	87-102	88-42	89-42	90-44
	91-42	93-43	94-43	95-43	96-46	97-45	98-46	99-43	100-61	101-57	102-57	103-20		
SVCTST	17-15#	17-24#	53-20	54-25	56-21	58-15	59-12	60-10	62-18	63-13	64-29	65-13	66-12	68-15
	69-23	70-16	72-24	73-17	74-13	75-12	76-13	77-15	78-12	79-12	80-12	81-15	83-15	84-21
	85-12	86-12	87-12	88-12	89-12	90-12	91-12	93-14	94-12	95-12	96-12	97-12	98-12	99-12
	100-14	101-12	102-12											
SW00	21-29#													
SW01	21-28#													
SW02	21-27#													
SW03	21-26#													
SW04	21-25#													
SW05	21-24#													
SW06	21-23#													
SW07	21-22#													
SW08	21-21#													
SW09	21-20#													
SW10	21-19#													
SW11	21-18#													
SW12	21-17#													
SW13	21-16#													
SW14	21-15#													
SW15	21-14#													
SYN	21-135#	100-22												
TSSAUT	41-8#	41-27												
TSSCLE	42-9#	42-14												
TSSDU	51-8#	51-13												
TSSHAR	103-13	103-13#	103-20											
TSSHW	20-8	20-8#	20-15											
TSSINI	40-8#	40-126												
TSSMSG	37-8#	37-10	37-13#	37-20	37-22#	37-25	37-28#	37-32	37-35#	37-39	37-41#	37-45	37-47#	37-51
	37-53#	37-57	37-60#	37-76	37-78#	37-81	37-83#	37-123	37-125#	37-131	37-133#	37-135		
TSSPRO	39-8#													
TSSSEG	72-27	72-27#	72-53	72-53#	72-55	72-55#	72-73	72-73#	72-78	72-78#	72-105	72-105#	72-107	72-107#
	72-126	72-126#	72-128	72-128#	72-144	72-144#								
TSSSRV	43-30#	43-59	44-24#	44-74	45-20#	45-38	46-22#	46-44	47-26#	47-66	48-18#	48-39	49-22#	49-49
	50-18#	50-22	53-52#	53-60										
TSSSUB	54-26#	54-52	54-56#	54-73	56-25#	56-52	56-55#	56-80	56-82#	56-109	56-111#	56-136	56-138#	56-148
	58-17#	58-48	58-51#	58-79	59-14#	59-28	59-31#	59-55	64-31#	64-81	64-83#	64-151	64-155#	64-208
	65-16#	65-68	65-70#	65-126	65-130#	65-187	69-37#	69-54	69-57#	69-74	69-78#	69-94	69-97#	69-119
	69-122#	69-144	69-147#	69-170	70-21#	70-67	70-69#	70-115	70-117#	70-164	72-26#	72-74	72-77#	72-145
	73-18#	73-43	73-45#	73-67	84-23#	84-52	84-54#	84-90						
TSSTES	53-20#	53-49	54-25#	54-28	54-75	56-21#	56-23	56-150	58-15#	58-19	58-27	58-39	58-46	58-53

CROSS REFERENCE TABLE (CREF V01-05)

	58-61	58-70	58-77	58-82	59-12#	59-16	59-33	59-42	59-46	59-58	60-10#	60-13	60-46	62-18#
	62-21	62-28	62-33	62-38	62-54	63-13#	63-17	63-65	64-29#	64-33	64-85	64-157	64-212	65-13#
	65-18	65-72	65-132	65-190	66-12#	66-15	66-60	68-15#	68-20	68-67	69-23#	69-26	69-39	69-59
	69-80	69-99	69-124	69-149	69-181	70-16#	70-19	70-23	70-65	70-71	70-113	70-119	70-162	70-166
	72-24#	72-29	72-49	72-52	72-57	72-80	72-101	72-104	72-109	72-124	72-130	72-140	72-143	72-148
	73-17#	73-20	73-47	73-69	74-13#	74-16	74-43	75-12#	75-15	75-38	75-49	76-13#	76-28	76-39
	76-56	77-15#	77-18	77-37	77-43	78-12#	78-15	78-44	79-12#	79-15	79-44	80-12#	80-15	80-43
	81-15#	81-18	81-38	81-44	83-15#	83-19	83-39	83-46	84-21#	84-25	84-47	84-56	84-80	84-92
	85-12#	85-16	85-44	86-12#	86-16	86-44	87-12#	87-16	87-102	88-12#	88-16	88-42	89-12#	89-16
	89-42	90-12#	90-16	90-44	91-12#	91-16	91-42	93-14#	93-18	93-43	94-12#	94-16	94-43	95-12#
	95-16	95-43	96-12#	96-16	96-46	97-12#	97-16	97-45	98-12#	98-16	98-46	99-12#	99-16	99-43
	100-14#	100-18	100-45	100-52	100-57	100-61	101-12#	101-14	101-57	102-12#	102-14	102-57		
T$ARGC	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	27-49	27-49	27-49#	28-48	28-48	28-48#	32-36	32-36	32-36	32-36#	32-36#
	32-40	32-40	32-40#	32-44	32-44	32-44#	32-45	32-45	32-45#	32-46	32-46	32-46#	32-55	32-55
	32-55#	32-58	32-58	32-58#	32-70	32-70	32-70	32-70#	32-70#	32-73	32-73	32-73#	33-33	33-33
	33-33	33-33	33-33#	33-33#	33-33#	34-37	34-37	34-37	34-37#	34-37#	37-9	37-9	37-9	37-9#
	37-9#	37-16	37-16	37-16	37-16#	37-16#	37-18	37-18	37-18	37-18	37-18#	37-18#	37-18#	37-19
	37-19	37-19	37-19	37-19#	37-19#	37-19#	37-23	37-23	37-23	37-23#	37-23#	37-24	37-24	37-24
	37-24	37-24#	37-24#	37-24#	37-29	37-29	37-29#	37-30	37-30	37-30	37-30	37-30#	37-30#	37-30#
	37-31	37-31	37-31	37-31#	37-31#	37-36	37-36	37-36#	37-37	37-37	37-37	37-37	37-37#	37-37#
	37-37#	37-38	37-38	37-38	37-38#	37-38#	37-42	37-42	37-42#	37-43	37-43	37-43	37-43	37-43#
	37-43#	37-43#	37-44	37-44	37-44	37-44#	37-44#	37-48	37-48	37-48#	37-49	37-49	37-49	37-49
	37-49#	37-49#	37-49#	37-50	37-50	37-50	37-50#	37-50#	37-54	37-54	37-54#	37-55	37-55	37-55
	37-55	37-55#	37-55#	37-55#	37-56	37-56	37-56	37-56#	37-56#	37-63	37-63	37-63	37-63#	37-63#
	37-65	37-65	37-65#	37-66	37-66	37-66	37-66	37-66#	37-66#	37-66#	37-67	37-67	37-67	37-67#
	37-67#	37-68	37-68	37-68	37-68	37-68#	37-68#	37-68#	37-69	37-69	37-69	37-69#	37-69#	37-70
	37-70	37-70	37-70	37-70#	37-70#	37-70#	37-71	37-71	37-71	37-71#	37-71#	37-72	37-72	37-72
	37-72	37-72#	37-72#	37-72#	37-73	37-73	37-73	37-73#	37-73#	37-74	37-74	37-74	37-74	37-74#
	37-74#	37-74#	37-75	37-75	37-75	37-75#	37-75#	37-79	37-79	37-79	37-79#	37-79#	37-80	37-80
	37-80	37-80	37-80	37-80#	37-80#	37-80#	37-80#	37-87	37-87	37-87#	37-93	37-93	37-93#	37-99
	37-99	37-99#	37-100	37-100	37-100#	37-101	37-101	37-101#	37-108	37-108	37-108#	37-109	37-109	37-109#
	37-110	37-110	37-110#	37-111	37-111	37-111	37-111	37-111#	37-111#	37-111#	37-112	37-112	37-112	37-112#
	37-112#	37-116	37-116	37-116#	37-117	37-117	37-117	37-117	37-117#	37-117#	37-117#	37-118	37-118	37-118
	37-118#	37-118#	37-121	37-121	37-121	37-121#	37-121#	37-128	37-128	37-128	37-128#	37-128#	37-130	37-130
	37-130	37-130	37-130#	37-130#	37-130#	37-134	37-134	37-134	37-134#	37-134#	40-57	40-57	40-57	40-57
	40-57#	40-57#	40-57#	40-86	40-86	40-86	40-86	40-86#	40-86#	40-86#	51-11	51-11	51-11	51-11#
	51-11#	53-42	53-42	53-42#	53-59	53-59	53-59	53-59	53-59#	53-59#	53-59#	56-145	56-145	56-145#
	69-111	69-111	69-111#	69-136	69-136	69-136#	69-161	69-161	69-161#	69-162	69-162	69-162#	70-52	70-52
	70-52#	70-100	70-100	70-100#	70-148	70-148	70-148#	70-150	70-150	70-150#	101-46	101-46	101-46#	102-45
	102-45	102-45#												
T$CODE	103-15	103-15	103-15	103-15#	103-15#	103-15#	103-16	103-16	103-16	103-16#	103-16#	103-16#	103-17	103-17
	103-17	103-17#	103-17#	103-17#	103-18	103-18	103-18	103-18#	103-18#	103-18#				
T$ERRN	17-15#	27-46	27-46#	28-37	28-37#	30-89	30-89#	30-93	30-93#	30-100	30-100#	31-48	31-48#	31-55
	31-55#	31-72	31-72#	32-35	32-35#	53-56	53-56#	54-50	54-50#	54-71	54-71#	56-48	56-48#	56-76
	56-76#	56-104	56-104#	56-132	56-132#	56-144	56-144#	58-32	58-32#	58-43	58-43#	58-66	58-66#	58-74
	58-74#	59-26	59-26#	59-53	59-53#	60-33	60-33#	60-40	60-40#	62-41	62-41#	62-48	62-48#	62-51
	62-51#	63-44	63-44#	63-54	63-54#	63-57	63-57#	64-54	64-54#	64-67	64-67#	64-72	64-72#	64-77
	64-77#	64-107	64-107#	64-117	64-117#	64-124	64-124#	64-130	64-130#	64-138	64-138#	64-148	64-148#	64-179
	64-179#	64-192	64-192#	64-199	64-199#	64-205	64-205#	65-42	65-42#	65-51	65-51#	65-57	65-57#	65-61
	65-61#	65-98	65-98#	65-107	65-107#	65-114	65-114#	65-118	65-118#	65-158	65-158#	65-167	65-167#	65-173
	65-173#	65-179	65-179#	66-43	66-43#	66-49	66-49#	68-45	68-45#	68-65	68-65#	69-50	69-50#	69-70
	69-70#	69-90	69-90#	69-110	69-110#	69-116	69-116#	69-135	69-135#	69-141	69-141#	69-160	69-160#	69-167
	69-167#	70-50	70-50#	70-58	70-58#	70-98	70-98#	70-106	70-106#	70-146	70-146#	70-155	70-155#	72-71
	72-71#	72-123	72-123#	73-41	73-41#	73-65	73-65#	75-45	75-45#	76-46	76-46#	81-41	81-41#	83-42
	83-42#	84-50	84-50#	84-88	84-88#	85-40	85-40#	86-40	86-40#	87-43	87-43#	87-58	87-58#	87-79
	87-79#													

CROSS REFERENCE TABLE (CREF V01-05)

T$EXCP	103-15	103-15#	103-16	103-16#	103-17	103-17#								
T$FLAG	54-28	54-28#	54-28#	56-23	56-23#	56-23#	58-19	58-19#	58-19#	58-27	58-27#	58-27#	58-39	58-39#
	58-39#	58-46	58-46#	58-46#	58-53	58-53#	58-53#	58-61	58-61#	58-61#	58-70	58-70#	58-70#	58-77
	58-77#	58-77#	59-16	59-16#	59-16#	59-33	59-33#	59-33#	59-42	59-42#	59-42#	59-46	59-46#	59-46#
	60-13	60-13#	60-13#	62-21	62-21#	62-21#	62-28	62-28#	62-28#	62-33	62-33#	62-33#	62-38	62-38#
	62-38#	63-17	63-17#	63-17#	64-33	64-33#	64-33#	64-85	64-85#	64-85#	64-157	64-157#	64-157#	65-18
	65-18#	65-18#	65-72	65-72#	65-72#	65-132	65-132#	65-132#	66-15	66-15#	66-15#	68-20	68-20#	68-20#
	69-26	69-26	69-26#	69-26#	69-39	69-39#	69-39#	69-59	69-59#	69-59#	69-80	69-80#	69-80#	69-99
	69-99#	69-99#	69-124	69-124#	69-124#	69-149	69-149#	69-149#	70-19	70-19	70-19#	70-19#	70-23	70-23#
	70-23#	70-65	70-65#	70-65#	70-71	70-71#	70-71#	70-113	70-113#	70-113#	70-119	70-119#	70-119#	70-162
	70-162#	70-162#	72-29	72-29#	72-29#	72-49	72-49#	72-49#	72-52	72-52#	72-52#	72-57	72-57#	72-57#
	72-80	72-80#	72-80#	72-101	72-101#	72-101#	72-104	72-104#	72-104#	72-109	72-109#	72-109#	72-124	72-124#
	72-124#	72-130	72-130#	72-130#	72-140	72-140#	72-140#	72-143	72-143#	72-143#	73-20	73-20#	73-20#	73-47
	73-47#	73-47#	74-16	74-16#	74-16#	75-15	75-15#	75-15#	75-38	75-38#	75-38#	76-28	76-28#	76-28#
	76-39	76-39#	76-39#	77-18	77-18#	77-18#	77-37	77-37#	77-37#	78-15	78-15#	78-15#	79-15	79-15#
	79-15#	80-15	80-15#	80-15#	81-18	81-18#	81-18#	81-38	81-38#	81-38#	83-19	83-19#	83-19#	83-39
	83-39#	83-39#	84-25	84-25#	84-25#	84-47	84-47#	84-47#	84-56	84-56#	84-56#	84-80	84-80#	84-80#
	85-16	85-16#	85-16#	86-16	86-16#	86-16#	87-16	87-16#	87-16#	88-16	88-16#	88-16#	89-16	89-16#
	89-16#	90-16	90-16#	90-16#	91-16	91-16#	91-16#	93-18	93-18#	93-18#	94-16	94-16#	94-16#	95-16
	95-16#	95-16#	96-16	96-16#	96-16#	97-16	97-16#	97-16#	98-16	98-16#	98-16#	99-16	99-16#	99-16#
	100-18	100-18#	100-18#	100-45	100-45#	100-45#	100-52	100-52#	100-52#	100-57	100-57#	100-57#	101-14	101-14#
	101-14#	102-14	102-14#	102-14#										
T$GMAN	17-15#													
T$HILI	103-15	103-15#	103-16	103-16#	103-17	103-17#								
T$LAST	17-15#	103-41#												
T$LOLI	103-15	103-15#	103-16	103-16#	103-17	103-17#								
T$LSYM	17-15	17-15#	20-15	37-10	37-20	37-25	37-32	37-39	37-45	37-51	37-57	37-76	37-81	37-123
	37-131	37-135	40-126	41-27	42-14	43-59	44-74	45-38	46-44	47-66	48-39	49-49	50-22	51-13
	53-49	53-60	54-52	54-73	54-75	56-52	56-80	56-109	56-136	56-148	56-150	58-48	58-79	58-82
	59-28	59-55	59-58	60-46	62-54	63-65	64-81	64-151	64-208	64-212	65-68	65-126	65-187	65-190
	66-60	68-67	69-54	69-74	69-94	69-119	69-144	69-170	69-181	70-67	70-115	70-164	70-166	72-74
	72-145	72-148	73-43	73-67	73-69	74-43	75-49	76-56	77-43	78-44	79-44	80-43	81-44	83-46
	84-52	84-90	84-92	85-44	86-44	87-102	88-42	89-42	90-44	91-42	93-43	94-43	95-43	96-46
	97-45	98-46	99-43	100-61	101-57	102-57	103-20							
T$LTNO	103-41#													
T$NEST	17-15#	17-18	17-18	17-18#	20-8	20-8	20-8#	20-15	20-15	20-15	20-15#	37-8	37-8	37-8#
	37-10	37-10	37-10	37-10#	37-13	37-13	37-13#	37-20	37-20	37-20	37-20#	37-22	37-22	37-22#
	37-25	37-25	37-25	37-25#	37-28	37-28	37-28#	37-32	37-32	37-32	37-32#	37-35	37-35	37-35#
	37-39	37-39	37-39	37-39#	37-41	37-41	37-41#	37-45	37-45	37-45	37-45#	37-47	37-47	37-47#
	37-51	37-51	37-51	37-51#	37-53	37-53	37-53#	37-57	37-57	37-57	37-57#	37-60	37-60	37-60#
	37-76	37-76	37-76	37-76#	37-78	37-78	37-78#	37-81	37-81	37-81	37-81#	37-83	37-83	37-83#
	37-123	37-123	37-123	37-123#	37-125	37-125	37-125#	37-131	37-131	37-131	37-131#	37-133	37-133	37-133#
	37-135	37-135	37-135	37-135#	39-8	39-8	39-8#	39-14	39-14	39-14	39-14#	40-8	40-8	40-8#
	40-126	40-126	40-126	40-126#	41-8	41-8	41-8#	41-27	41-27	41-27	41-27#	42-9	42-9	42-9#
	42-14	42-14	42-14	42-14#	43-30	43-30	43-30#	43-59	43-59	43-59	43-59#	44-24	44-24	44-24#
	44-74	44-74	44-74	44-74#	45-20	45-20	45-20#	45-38	45-38	45-38	45-38#	46-22	46-22	46-22#
	46-44	46-44	46-44	46-44#	47-26	47-26	47-26#	47-66	47-66	47-66	47-66#	48-18	48-18	48-18#
	48-39	48-39	48-39	48-39#	49-22	49-22	49-22#	49-49	49-49	49-49	49-49#	50-18	50-18	50-18#
	50-22	50-22	50-22	50-22#	51-8	51-8	51-8#	51-13	51-13	51-13	51-13#	53-20	53-20	53-20#
	53-49	53-49	53-49	53-49#	53-52	53-52	53-52#	53-60	53-60	53-60	53-60#	54-25	54-25	54-25#
	54-26	54-26	54-26#	54-52	54-52	54-52	54-52#	54-56	54-56	54-56#	54-73	54-73	54-73	54-73#
	54-75	54-75	54-75	54-75#	56-21	56-21	56-21#	56-25	56-25	56-25#	56-52	56-52	56-52	56-52#
	56-55	56-55	56-55#	56-80	56-80	56-80	56-80#	56-82	56-82	56-82#	56-109	56-109	56-109	56-109#
	56-111	56-111	56-111#	56-136	56-136	56-136	56-136#	56-138	56-138	56-138#	56-148	56-148	56-148	56-148#
	56-150	56-150	56-150	56-150#	58-15	58-15	58-15#	58-17	58-17	58-17#	58-48	58-48	58-48	58-48#
	58-51	58-51	58-51#	58-79	58-79	58-79	58-79#	58-82	58-82	58-82	58-82#	59-12	59-12	59-12#
	59-14	59-14	59-14#	59-28	59-28	59-28	59-28#	59-31	59-31	59-31#	59-55	59-55	59-55	59-55#

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	64-31	64-31	64-31#	64-81	64-81	64-81	64-81#	64-83	64-83	64-83#	64-151	64-151	64-151	64-151#
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	65-130	65-130	65-130#	65-187	65-187	65-187	65-187#	65-190	65-190	65-190	65-190#	66-12	66-12	66-12#
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	70-166	70-166	70-166	70-166#	72-24	72-24	72-24#	72-26	72-26	72-26#	72-27	72-27	72-27#	72-53
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	91-42	91-42	91-42	91-42#	93-14	93-14	93-14#	93-43	93-43	93-43	93-43#	94-12	94-12	94-12#
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	103-39#													
TSNS0	17-18#	103-39												
TSNS1	20-8#	20-15	37-8#	37-10	37-13#	37-20	37-22#	37-25	37-28#	37-32	37-35#	37-39	37-41#	37-45
	37-47#	37-51	37-53#	37-57	37-60#	37-76	37-78#	37-81	37-83#	37-123	37-125#	37-131	37-133#	37-135
	39-8#	39-14	40-8#	40-126	41-8#	41-27	42-9#	42-14	43-30#	43-59	44-24#	44-74	45-20#	45-38
	46-22#	46-44	47-26#	47-66	48-18#	48-39	49-22#	49-49	50-18#	50-22	51-8#	51-13	53-20#	53-49
	53-52#	53-60	54-25#	54-75	56-21#	56-150	58-15#	58-82	59-12#	59-58	60-10#	60-46	62-18#	62-54
	63-13#	63-65	64-29#	64-212	65-13#	65-190	66-12#	66-60	68-15#	68-67	69-23#	69-181	70-16#	70-166
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	95-12#	95-43	96-12#	96-46	97-12#	97-45	98-12#	98-46	99-12#	99-43	100-14#	100-61	101-12#	101-57
	102-12#	102-57	103-13#	103-20										
TSNS2	54-26#	54-52	54-56#	54-73	56-25#	56-52	56-55#	56-80	56-82#	56-109	56-111#	56-136	56-138#	56-148
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	65-16#	65-68	65-70#	65-126	65-130#	65-187	69-37#	69-54	69-57#	69-74	69-78#	69-94	69-97#	69-119
	69-122#	69-144	69-147#	69-170	70-21#	70-67	70-69#	70-115	70-117#	70-164	72-26#	72-74	72-77#	72-145
	73-18#	73-43	73-45#	73-67	84-23#	84-52	84-54#	84-90						
TSNS3	72-27#	72-53	72-55#	72-73	72-78#	72-105	72-107#	72-126	72-128#	72-144				
TSPTNU	17-15#													
TSSAVL	17-15#													
TSSEGL	17-15#	72-27	72-27	72-27#	72-53	72-53	72-53	72-53	72-53#	72-55	72-55	72-55#	72-73	72-73
	72-73	72-73	72-73#	72-78	72-78	72-78#	72-105	72-105	72-105	72-105	72-105#	72-107	72-107	72-107#
	72-126	72-126	72-126	72-126	72-126#	72-128	72-128	72-128#	72-144	72-144	72-144	72-144	72-144#	

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CVDPVA0 DPV11 FUNC DIAG MACRO V03.01 17-JUN-80 16:09:09 PAGE S-25                                          SEQ  231
CROSS REFERENCE TABLE (CREF V01-05 )
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CROSS REFERENCE TABLE (CREF V01-05)

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	75-38	75-38#	75-49	75-49#	76-28	76-28#	76-39	76-39#	76-56	76-56#	77-18	77-18#	77-37	77-37#
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	85-44	85-44#	86-16	86-16#	86-44	86-44#	87-16	87-16#	87-102	87-102#	88-16	88-16#	88-42	88-42#
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	93-43	93-43#	94-16	94-16#	94-43	94-43#	95-16	95-16#	95-43	95-43#	96-16	96-16#	96-46	96-46#
	97-16	97-16#	97-45	97-45#	98-16	98-16#	98-46	98-46#	99-16	99-16#	99-43	99-43#	100-18	100-18#
	100-45	100-45#	100-52	100-52#	100-57	100-57#	100-61	100-61#	101-14	101-14#	101-57	101-57#	102-14	102-14#
	102-57	102-57#	103-15	103-15	103-15	103-15#	103-15#	103-15#	103-16	103-16	103-16	103-16#	103-16#	103-16#
	103-17	103-17	103-17	103-17#	103-17#	103-17#	103-18	103-18	103-18	103-18#	103-18#	103-18#	103-20	103-20#
	103-39	103-39#												
T$TEST	17-15#	53-20	53-20	53-20#	54-25	54-25	54-25#	54-26	54-56	56-21	56-21	56-21#	56-25	56-55
	56-82	56-111	56-138	58-15	58-15	58-15#	58-17	58-51	59-12	59-12	59-12#	59-14	59-31	60-10
	60-10	60-10#	62-18	62-18	62-18#	63-13	63-13	63-13#	64-29	64-29	64-29#	64-31	64-83	64-155
	65-13	65-13	65-13#	65-16	65-70	65-130	66-12	66-12	66-12#	68-15	68-15	68-15#	69-23	69-23
	69-23#	69-37	69-57	69-78	69-97	69-122	69-147	70-16	70-16	70-16#	70-21	70-69	70-117	72-24
	72-24	72-24#	72-26	72-77	73-17	73-17	73-17#	73-18	73-45	74-13	74-13	74-13#	75-12	75-12
	75-12#	76-13	76-13	76-13#	77-15	77-15	77-15#	78-12	78-12	78-12#	79-12	79-12	79-12#	80-12
	80-12	80-12#	81-15	81-15	81-15#	83-15	83-15	83-15#	84-21	84-21	84-21#	84-23	84-54	85-12
	85-12	85-12#	86-12	86-12	86-12#	87-12	87-12	87-12#	88-12	88-12	88-12#	89-12	89-12	89-12#
	90-12	90-12	90-12#	91-12	91-12	91-12#	93-14	93-14	93-14#	94-12	94-12	94-12#	95-12	95-12
	95-12#	96-12	96-12	96-12#	97-12	97-12	97-12#	98-12	98-12	98-12#	99-12	99-12	99-12#	100-14
	100-14	100-14#	101-12	101-12	101-12#	102-12	102-12	102-12#	103-41					
T$TSTM	17-15#	27-41	27-46	27-49	28-37	28-48	30-54	30-55	30-56	30-81	30-89	30-93	30-100	30-112
	30-113	31-48	31-55	31-72	32-35	32-36	32-40	32-44	32-45	32-46	32-55	32-58	32-70	32-73
	33-33	34-37	37-9	37-10	37-16	37-18	37-19	37-20	37-23	37-24	37-25	37-29	37-30	37-31
	37-32	37-36	37-37	37-38	37-39	37-42	37-43	37-44	37-45	37-48	37-49	37-50	37-51	37-54
	37-55	37-56	37-57	37-63	37-65	37-66	37-67	37-68	37-69	37-70	37-71	37-72	37-73	37-74
	37-75	37-76	37-79	37-80	37-81	37-87	37-93	37-99	37-100	37-101	37-108	37-109	37-110	37-111
	37-112	37-116	37-117	37-118	37-121	37-123	37-128	37-130	37-131	37-134	37-135	40-10	40-28	40-30
	40-32	40-34	40-36	40-51	40-57	40-86	40-126	41-10	41-22	41-23	41-24	41-27	42-14	51-10
	51-11	51-13	53-22	53-42	53-43	53-44	53-47	53-49	53-56	53-59	54-26	54-28	54-50	54-52
	54-56	54-59	54-71	54-73	54-75	56-23	56-25	56-48	56-52	56-55	56-76	56-80	56-82	56-104
	56-109	56-111	56-132	56-136	56-138	56-144	56-145	56-148	56-150	58-17	58-19	58-27	58-32	58-39
	58-43	58-46	58-48	58-51	58-53	58-61	58-66	58-70	58-74	58-77	58-79	58-82	59-14	59-16
	59-26	59-28	59-31	59-33	59-42	59-46	59-53	59-55	59-58	60-13	60-17	60-18	60-33	60-40
	60-42	60-44	60-46	62-21	62-28	62-33	62-38	62-41	62-48	62-51	62-54	63-17	63-23	63-24
	63-25	63-44	63-54	63-57	63-60	63-62	63-63	63-65	64-31	64-33	64-37	64-38	64-54	64-67
	64-72	64-77	64-81	64-83	64-85	64-90	64-91	64-107	64-117	64-124	64-130	64-138	64-148	64-151
	64-155	64-157	64-162	64-163	64-179	64-192	64-199	64-205	64-208	64-212	65-16	65-18	65-24	65-25
	65-26	65-42	65-51	65-57	65-61	65-63	65-65	65-66	65-68	65-70	65-72	65-80	65-81	65-82
	65-98	65-107	65-114	65-118	65-120	65-122	65-123	65-126	65-130	65-132	65-140	65-141	65-142	65-158
	65-167	65-173	65-179	65-181	65-183	65-187	65-190	66-15	66-19	66-20	66-21	66-43	66-49	66-53
	66-55	66-56	66-60	68-20	68-45	68-65	68-67	69-26	69-29	69-30	69-37	69-39	69-50	69-54
	69-57	69-59	69-70	69-74	69-78	69-80	69-90	69-94	69-97	69-99	69-110	69-111	69-116	69-119
	69-122	69-124	69-135	69-136	69-141	69-144	69-147	69-149	69-160	69-161	69-162	69-167	69-170	69-175
	69-177	69-178	69-181	70-19	70-21	70-23	70-29	70-30	70-31	70-50	70-52	70-58	70-61	70-63
	70-64	70-65	70-67	70-69	70-71	70-77	70-78	70-79	70-98	70-100	70-106	70-109	70-111	70-112
	70-113	70-115	70-117	70-119	70-125	70-126	70-127	70-146	70-148	70-150	70-155	70-158	70-160	70-161

CROSS REFERENCE TABLE (CREF V01-05)

	70-162	70-164	70-166	72-26	72-27	72-29	72-49	72-52	72-53	72-55	72-57	72-71	72-73	72-74
	72-77	72-78	72-80	72-101	72-104	72-105	72-107	72-109	72-123	72-124	72-126	72-128	72-130	72-140
	72-143	72-144	72-145	72-148	73-18	73-20	73-41	73-43	73-45	73-47	73-65	73-67	73-69	74-16
	74-43	75-15	75-38	75-45	75-49	76-28	76-39	76-46	76-56	77-18	77-37	77-43	78-15	78-44
	79-15	79-44	80-15	80-43	81-18	81-38	81-41	81-44	83-19	83-39	83-42	83-46	84-23	84-25
	84-47	84-50	84-52	84-54	84-56	84-80	84-88	84-90	84-92	85-16	85-40	85-44	86-16	86-40
	86-44	87-16	87-43	87-58	87-79	87-102	88-16	88-42	89-16	89-42	90-16	90-44	91-16	91-42
	93-18	93-43	94-16	94-43	95-16	95-43	96-16	96-46	97-16	97-45	98-16	98-46	99-16	99-43
	100-18	100-38	100-39	100-40	100-45	100-52	100-57	100-61	101-14	101-36	101-37	101-38	101-46	101-57
	102-14	102-35	102-36	102-37	102-45	102-57								
T$TSTS	17-15#	53-20#	54-25#	56-21#	58-15#	59-12#	60-10#	62-18#	63-13#	64-29#	65-13#	66-12#	68-15#	69-23#
	70-16#	72-24#	73-17#	74-13#	75-12#	76-13#	77-15#	78-12#	79-12#	80-12#	81-15#	83-15#	84-21#	85-12#
	86-12#	87-12#	88-12#	89-12#	90-12#	91-12#	93-14#	94-12#	95-12#	96-12#	97-12#	98-12#	99-12#	100-14#
	101-12#	102-12#												
T1	19-8	53-20#												
T10	19-8	65-13#												
T10.1	65-16#													
T10.2	65-70#													
T10.3	65-130#													
T11	19-8	66-12#												
T12	19-8	68-15#												
T13	19-8	69-23#												
T13.1	69-37#													
T13.2	69-57#													
T13.3	69-78#													
T13.4	69-97#													
T13.5	69-122#													
T13.6	69-147#													
T14	19-8	70-16#												
T14.1	70-21#													
T14.2	70-69#													
T14.3	70-117#													
T15	19-8	72-24#												
T15.1	72-26#													
T15.2	72-77#													
T16	19-8	73-17#												
T16.1	73-18#													
T16.2	73-45#													
T17	19-8	74-13#												
T18	19-8	75-12#												
T19	19-8	76-13#												
T2	19-8	54-25#												
T2.1	54-26#													
T2.2	54-56#													
T20	19-8	77-15#												
T21	19-8	78-12#												
T22	19-8	79-12#												
T23	19-8	80-12#												
T24	19-8	81-15#												
T25	19-8	83-15#												
T26	19-8	84-21#												
T26.1	84-23#													
T26.2	84-54#													
T27	19-8	85-12#												
T28	19-8	86-12#												
T29	19-8	87-12#												
T3	19-8	56-21#												

CROSS REFERENCE TABLE (CREF V01-05)

T3.1	56-25#													
T3.2	56-55#													
T3.3	56-82#													
T3.4	56-111#													
T3.5	56-138#													
T30	19-8	88-12#												
T31	19-8	89-12#												
T32	19-8	90-12#												
T33	19-8	91-12#												
T34	19-8	93-14#												
T35	19-8	94-12#												
T36	19-8	95-12#												
T37	19-8	96-12#												
T38	19-8	97-12#												
T39	19-8	98-12#												
T4	19-8	58-15#												
T4.1	58-17#													
T4.2	58-51#													
T40	19-8	99-12#												
T41	19-8	100-14#												
T42	19-8	101-12#												
T43	19-8	102-12#												
T5	19-8	59-12#												
T5.1	59-14#													
T5.2	59-31#													
T6	19-8	60-10#												
T7	19-8	62-18#												
T8	19-8	63-13#												
T9	19-8	64-29#												
T9.1	64-31#													
T9.2	64-83#													
T9.3	64-155#													
TBE	21-106#	27-47	37-69	58-26	58-38	58-42	58-60	58-73	59-22	59-25	59-41	59-45	62-27	62-32
	87-48													
TDSR	22-28#	28-32	30-73	46-26*	46-35*	46-38*	46-41*	47-40*	47-51*	47-58*	47-62*	48-22*	48-28*	48-30*
	48-34*	49-26*	49-33*	49-34*	49-38*	54-30*	54-68	56-85*	56-86	56-89*	56-90	56-95*	56-96	56-98*
	56-106*	56-139*	58-25*	58-36*	58-59*	59-17*	59-24	59-40*	59-44*	59-49	62-26*	62-31*	62-36*	87-37*
	87-41	87-84	87-87*	87-89*	87-93*									
TEMP	22-83#													
TEND	22-84#	47-62	72-37*	72-89*	73-27*	74-23*	75-23*	76-21*	77-25*	78-24*	79-24*	80-24*	81-26*	83-27*
	84-34*	84-65*	85-25*	86-25*	88-23*	89-23*	90-25*	91-23*	93-25*	94-24*	95-24*	96-26*	97-25*	98-26*
	99-24*													
TEOM	21-123#	46-38	48-34	49-33	49-38	72-37	72-89	74-23	75-23	76-21	77-25	78-24	79-24	80-24
	84-34	84-65	85-25	86-25	87-93	88-23	89-23	90-25	91-23	93-25	94-24	95-24	96-26	97-25
	98-26	99-24												
TERR	21-127#													
TFLAG	22-85#	30-44*	40-16*	46-23*	60-14*	60-29	60-35*	63-18*	64-34*	64-87*	64-158*	65-20*	65-75*	65-135*
	66-16*	66-41	70-24*	70-72*	70-120*									
TGA	21-125#	75-23	95-24											
THREE	21-93#													
TIMEO	22-86#	30-47*	30-85*	72-69	72-121									
TIMER	22-87#	30-69	40-119*	40-122*	40-124	72-64*	72-68*	72-116*	72-120*	87-32				
TM	21-110#	28-42	28-44	32-87	44-42	44-44								
TOGGLE	22-88#	40-19*	43-42	43-44	43-45*	70-27*	70-75*	70-123*						
TSOM	21-122#	46-26	47-51	48-22	48-28	49-26	49-33	58-25	58-59	59-40	62-26	62-31	72-36	72-88
	73-26	74-22	75-22	76-20	78-23	79-23	80-23	81-25	83-26	84-33	84-64	85-24	86-24	87-37
	87-84	87-87	88-22	89-22	90-24	91-22	94-23	95-23	96-25	97-24	98-25	99-23		

CROSS REFERENCE TABLE (CREF V01-05)

TSTART	22-89#	47-30	47-36	47-37*	47-40	72-36*	72-88*	73-26*	74-22*	75-22*	76-20*	77-24*	78-23*	79-23*
	80-23*	81-25*	83-26*	84-33*	84-64*	85-24*	86-24*	88-22*	89-22*	90-24*	91-22*	93-24*	94-23*	95-23*
	96-25*	97-24*	98-25*	99-23*										
TURN	22-33#	30-79	33-29	34-33	40-92*	40-96	40-102	40-107	58-20	58-54	59-34			
TWO	21-92#													
TXABO	21-124#	46-35	73-27	81-26	83-27									
TXACT	21-105#	58-28	58-40	58-62	58-71									
TXCSR	22-27#	28-23*	28-28	28-42	30-60*	30-65*	30-92*	30-111*	42-12*	44-42	47-63*	48-35*	49-45*	54-31
	54-34*	54-35	54-38*	54-39	54-42*	54-43	54-46*	54-47	54-66	58-22*	58-24*	58-26	58-28	58-30
	58-37*	58-38	58-40	58-56*	58-58*	58-60	58-62	58-64	58-71	59-22	59-36*	59-39*	59-41	59-45
	60-25*	60-36*	62-24*	62-27	62-32	63-35*	64-44*	64-97*	64-169*	65-32*	65-88*	65-148*	66-32*	68-36
	70-41*	70-89*	70-137*	87-35*	87-48									
TXENA	21-108#	30-92	40-95	40-116	54-42	58-24	58-31	58-37	58-58	58-65	59-39	60-25	62-24	63-35
	64-44	64-97	64-169	65-32	65-88	65-148	66-32	70-41	70-89	70-137				
TXIE	21-112#	40-114	40-116	47-63	48-35	49-45	60-25	63-35	64-44	64-97	64-169	65-32	65-88	65-148
	66-32	70-41	70-89	70-137										
TXINI	22-90#	40-95*	40-98*	40-113	87-35									
TXINIT	22-91#	30-65	40-113*	40-114*										
TXMINI	22-92#	30-60	40-116*											
UAM	21-8#													
VRCE	21-69#	78-17	86-18	97-18										
VRCO	21-68#	79-17	80-17	85-18	96-19									
X$ALWA	17-15#													
X$FALS	17-15#													
X$OFFS	17-15#													
X$TRUE	17-15#													
XCOUNT	22-113#	29-35	29-54*	29-60*	29-62*	29-64	30-51	31-51	31-60	72-39*	72-91*	73-29*	73-53*	74-25*
	75-25*	76-23*	77-27*	78-26*	79-26*	80-26*	81-28*	83-29*	84-36*	84-67*	84-82	85-27*	86-27*	87-22*
	87-30	88-25*	89-25*	90-27*	91-25*	93-27*	94-26*	95-26*	96-28*	97-27*	98-28*	99-26*	101-18*	102-17*
XDATA	30-54	47-26#												
XDATA2	48-18#	101-36	102-35											
XDDCMP	49-22#	100-38												
XINT	46-22#	60-17	63-23	64-37	64-90	64-162	65-24	65-80	65-140	66-20	70-30	70-78	70-126	
XMITD	22-115#	37-130	47-44*	47-59*	48-31*	49-29*	49-35*	87-86*	87-90*	101-23*	102-22*			
XMTBUF	22-166#	29-34	30-50	31-58	72-66*	72-118*	72-137*	87-29						
XMTVEC	22-13#	30-54	30-112	40-89*	40-90*	60-17	60-44	63-23	63-63	64-37	64-90	64-162	65-24	65-66
	65-80	65-123	65-140	66-20	66-56	69-178	70-30	70-64	70-78	70-112	70-126	70-161	100-38	101-36
	102-35													
XTYPE	22-112#	29-33	72-38*	72-90*	73-28*	73-52*	74-24*	75-24*	76-22*	77-26*	78-25*	79-25*	80-25*	81-27*
	83-28*	84-35*	84-66*	85-26*	86-26*	87-21*	88-24*	89-24*	90-26*	91-24*	93-26*	94-25*	95-25*	96-27*
	97-26*	98-27*	99-25*											

CROSS REFERENCE TABLE (CREF V01-05)

$DELAY	25-91#	54-60	60-37	62-45	63-49	64-188	68-23	68-30	68-35	68-40	68-50	69-47	69-67	69-87
	69-107	69-132	69-157											
BCOMPL	1-15#	17-15#	40-31	40-33	40-35									
BERROR	1-19#	17-15#												
BGNAU	1-23#	17-15#												
BGNAUT	1-31#	17-15#	41-8											
BGNCLN	1-39#	17-15#	42-9											
BGNDU	1-47#	17-15#	51-8											
BGNHRD	1-55#	17-15#	103-13											
BGNHW	1-66#	17-15#	20-8											
BGNINI	1-77#	17-15#	40-8											
BGNMOD	1-85#	17-15#	17-18											
BGNMSG	1-98#	17-15#	37-8	37-13	37-22	37-28	37-35	37-41	37-47	37-53	37-60	37-78	37-83	37-125
	37-133													
BGNPRO	1-106#	17-15#	39-8											
BGNPTA	1-114#	17-15#												
BGNRPT	1-144#	17-15#												
BGNSEG	1-152#	17-15#	72-27	72-55	72-78	72-107	72-128							
BGNSET	1-161#	17-15#												
BGNSFT	1-182#	17-15#												
BGNSRV	1-193#	17-15#	43-30	44-24	45-20	46-22	47-26	48-18	49-22	50-18	53-52			
BGNSUB	1-201#	17-15#	54-26	54-56	56-25	56-55	56-82	56-111	56-138	58-17	58-51	59-14	59-31	64-31
	64-83	64-155	65-16	65-70	65-130	69-37	69-57	69-78	69-97	69-122	69-147	70-21	70-69	70-117
	72-26	72-77	73-18	73-45	84-23	84-54								
BGNSW	1-225#	17-15#												
BGNTST	1-236#	17-15#	53-20	54-25	56-21	58-15	59-12	60-10	62-18	63-13	64-29	65-13	66-12	68-15
	69-23	70-16	72-24	73-17	74-13	75-12	76-13	77-15	78-12	79-12	80-12	81-15	83-15	84-21
	85-12	86-12	87-12	88-12	89-12	90-12	91-12	93-14	94-12	95-12	96-12	97-12	98-12	99-12
	100-14	101-12	102-12											
BNCOMP	1-266#	17-15#	40-37	40-52										
BNERRO	1-270#	17-15#												
BREAK	1-274#	17-15#	27-41	30-81										
BRESET	1-278#	17-15#	51-10	54-59										
CALL	25-17#	54-27	56-22	58-18	58-52	58-69	59-15	59-32	60-12	62-20	63-16	63-59	64-32	64-84
	64-156	65-17	65-71	65-131	66-14	66-52	68-16	68-19	69-24	69-38	69-58	69-79	69-98	69-123
	69-148	69-174	70-17	70-22	70-60	70-70	70-108	70-118	70-157	72-28	72-45	72-48	72-51	72-56
	72-67	72-79	72-97	72-100	72-103	72-108	72-119	72-129	72-139	72-142	73-19	73-35	73-38	73-46
	73-59	73-62	74-15	74-33	74-36	74-39	75-14	75-31	75-34	75-37	76-24	76-27	76-38	77-17
	77-33	77-36	77-39	78-14	78-34	78-37	78-40	79-14	79-34	79-37	79-40	80-14	80-33	80-36
	80-39	81-17	81-34	81-37	83-18	83-35	83-38	84-24	84-42	84-46	84-55	84-72	84-79	85-15
	85-34	85-37	86-15	86-34	86-37	87-13	87-15	87-26	87-97	88-13	88-15	88-31	88-34	88-37
	88-39	89-13	89-15	89-31	89-34	89-37	89-39	90-13	90-15	90-33	90-36	90-39	90-41	91-13
	91-15	91-31	91-34	91-37	91-39	93-15	93-17	93-33	93-36	93-39	93-41	94-13	94-15	94-32
	94-35	94-38	94-40	95-13	95-15	95-32	95-35	95-38	95-40	96-13	96-15	96-35	96-38	96-41
	96-43	97-13	97-15	97-34	97-37	97-40	97-42	98-13	98-15	98-35	98-38	98-41	98-43	99-13
	99-15	99-32	99-35	99-38	99-40	100-15	100-17	100-44	100-51	100-56	101-13	101-41	101-54	102-13
	102-40	102-54												
CKLOOP	1-282#	17-15#												
CLOCK	1-286#	17-15#												
CLOSE	1-292#	17-15#												
CLRVEC	1-296#	17-15#	30-112	30-113	40-28	41-24	53-47	60-44	63-62	63-63	65-65	65-66	65-122	65-123
	65-183	66-55	66-56	69-177	69-178	70-63	70-64	70-111	70-112	70-160	70-161			
COMMEN	1-301#	17-15#												
DELAY	1-322#	17-15#	35-29	59-18										
DESCRI	1-317#	17-15#	24-18											
DEVTYP	1-341#	17-15#	24-13											

CROSS REFERENCE TABLE (CREF V01-05)

DISPAT	1-346#	17-15#	19-8											
DISPLA	1-360#	17-15#												
DOCLN	1-376#	17-15#	41-23	53-44										
DODU	1-380#	17-15#	41-22	53-43										
DORPT	1-385#	17-15#												
ENDAU	1-389#	17-15#												
ENDAUT	1-401#	17-15#	41-27											
ENDCLN	1-413#	17-15#	42-14											
ENDCOM	1-425#	17-15#												
ENDDU	1-441#	17-15#	51-13											
ENDHRD	1-453#	17-15#	103-20											
ENDHW	1-465#	17-15#	20-15											
ENDINI	1-475#	17-15#	40-126											
ENDMOD	1-487#	17-15#	103-39											
ENDMSG	1-500#	17-15#	37-10	37-20	37-25	37-32	37-39	37-45	37-51	37-57	37-76	37-81	37-123	37-131
	37-135													
ENDPRO	1-512#	17-15#	39-14											
ENDPTA	1-520#	17-15#												
ENDRPT	1-529#	17-15#												
ENDSEG	1-541#	17-15#	72-53	72-73	72-105	72-126	72-144							
ENDSET	1-555#	17-15#												
ENDSFT	1-568#	17-15#												
ENDSRV	1-580#	17-15#	43-59	44-74	45-38	46-44	47-66	48-39	49-49	50-22	53-60			
ENDSUB	1-596#	17-15#	54-52	54-73	56-52	56-80	56-109	56-136	56-148	58-48	58-79	59-28	59-55	64-81
	64-151	64-208	65-68	65-126	65-187	69-54	69-74	69-94	69-119	69-144	69-170	70-67	70-115	70-164
	72-74	72-145	73-43	73-67	84-52	84-90								
ENDSW	1-614#	17-15#												
ENDTST	1-624#	17-15#	53-49	54-75	56-150	58-82	59-58	60-46	62-54	63-65	64-212	65-190	66-60	68-67
	69-181	70-166	72-148	73-69	74-43	75-49	76-56	77-43	78-44	79-44	80-43	81-44	83-46	84-92
	85-44	86-44	87-102	88-42	89-42	90-44	91-42	93-43	94-43	95-43	96-46	97-45	98-46	99-43
	100-61	101-57	102-57											
EQUALS	1-642#	17-15#	21-8											
ERRDF	1-714#	17-15#	27-46	28-37	30-89	30-93	30-100	31-48	31-55	31-72	32-35	53-56	54-50	54-71
	56-48	56-76	56-104	56-132	56-144	58-32	58-43	58-66	58-74	59-26	59-53	60-33	60-40	62-41
	62-48	62-51	63-44	63-54	63-57	64-54	64-67	64-72	64-77	64-107	64-117	64-124	64-130	64-138
	64-148	64-179	64-192	64-199	64-205	65-42	65-51	65-57	65-61	65-98	65-107	65-114	65-118	65-158
	65-167	65-173	65-179	66-43	66-49	68-45	68-65	69-50	69-70	69-90	69-110	69-116	69-135	69-141
	69-160	69-167	70-50	70-58	70-98	70-106	70-146	70-155	72-71	72-123	73-41	73-65	75-45	76-46
	81-41	83-42	84-50	84-88	85-40	86-40	87-43	87-58	87-79					
ERRHRD	1-718#	17-15#												
ERROR	1-722#	17-15#												
ERRSF	1-726#	17-15#												
ERRSOF	1-730#	17-15#												
ERRTBL	1-734#	17-15#												
ESCAPE	1-744#	17-15#	54-28	56-23	58-19	58-27	58-39	58-46	58-53	58-61	58-70	58-77	59-16	59-33
	59-42	59-46	60-13	62-21	62-28	62-33	62-38	63-17	64-33	64-85	64-157	65-18	65-72	65-132
	66-15	68-20	69-39	69-59	69-80	69-99	69-124	69-149	70-23	70-65	70-71	70-113	70-119	70-162
	72-29	72-49	72-52	72-57	72-80	72-101	72-104	72-109	72-124	72-130	72-140	72-143	73-20	73-47
	74-16	75-15	75-38	76-28	76-39	77-18	77-37	78-15	79-15	80-15	81-18	81-38	83-19	83-39
	84-25	84-47	84-56	84-80	85-16	86-16	87-16	88-16	89-16	90-16	91-16	93-18	94-16	95-16
	96-16	97-16	98-16	99-16	100-18	100-45	100-52	100-57	101-14	102-14				
EXIT	1-771#	17-15#	69-26	70-19										
FEQUAL	1-810#	17-15#												
GETBYT	1-824#	17-15#												
GETPRI	1-834#	17-15#												
GETWOR	1-829#	17-15#												
GMANIA	1-839#	17-15#												

CROSS REFERENCE TABLE (CREF V01-05)

GMANID	1-848#	17-15#												
GMANIL	1-859#	17-15#												
GPHARD	1-868#	17-15#	40-51											
GPRMA	1-874#	17-15#	103-15	103-16										
GPRMD	1-903#	17-15#	103-17											
GPRML	1-934#	17-15#	103-18											
HEADER	1-954#	17-15#	18-11											
INLOOP	1-962#	17-15#												
IOSETU	1-966#	17-15#												
IOSTAR	1-974#	17-15#												
KT11	1-982#	17-15#												
LASTAD	1-;47#	17-15#	103-41											
MSBYTE	1-D00#	17-15#	18-11	18-11	18-11	18-11#								
MSCHEC	1-E18#	17-15#	69-26	69-26#	70-19	70-19#								
MSCNTO	1-E82#	17-15#	103-15	103-15#	103-16	103-16#	103-17	103-17#	103-18	103-18#				
MSCOUN	1-D66#	17-15#	27-49	27-49#	28-48	28-48#	32-36	32-36#	32-40	32-40#	32-44	32-44#	32-45	32-45#
	32-46	32-46#	32-55	32-55#	32-58	32-58#	32-70	32-70#	32-73	32-73#	33-33	33-33	33-33#	34-37
	34-37#	37-9	37-9#	37-16	37-16#	37-18	37-18	37-18#	37-19	37-19	37-19#	37-23	37-23#	37-24
	37-24	37-24#	37-29	37-29#	37-30	37-30	37-30#	37-31	37-31#	37-36	37-36#	37-37	37-37	37-37#
	37-38	37-38#	37-42	37-42#	37-43	37-43	37-43#	37-44	37-44#	37-48	37-48#	37-49	37-49	37-49#
	37-50	37-50#	37-54	37-54#	37-55	37-55	37-55#	37-56	37-56#	37-63	37-63#	37-65	37-65#	37-66
	37-66	37-66#	37-67	37-67#	37-68	37-68	37-68#	37-69	37-69#	37-70	37-70	37-70#	37-71	37-71#
	37-72	37-72	37-72#	37-73	37-73#	37-74	37-74	37-74#	37-75	37-75#	37-79	37-79#	37-80	37-80
	37-80	37-80#	37-87	37-87#	37-93	37-93#	37-99	37-99#	37-100	37-100#	37-101	37-101#	37-108	37-108#
	37-109	37-109#	37-110	37-110#	37-111	37-111	37-111#	37-112	37-112#	37-116	37-116#	37-117	37-117	37-117#
	37-118	37-118#	37-121	37-121#	37-128	37-128#	37-130	37-130	37-130#	37-134	37-134#	40-57	40-57	40-57#
	40-86	40-86	40-86#	51-11	51-11#	53-42	53-42#	53-59	53-59	53-59#	56-145	56-145#	69-111	69-111#
	69-136	69-136#	69-161	69-161#	69-162	69-162#	70-52	70-52#	70-100	70-100#	70-148	70-148#	70-150	70-150#
	101-46	101-46#	102-45	102-45#										
MSDATA	1-B67#	17-15#	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11#	18-11#	24-13
	24-13#	24-18	24-18#											
MSDECR	1-D29#	17-15#	20-15	20-15#	37-10	37-10#	37-20	37-20#	37-25	37-25#	37-32	37-32#	37-39	37-39#
	37-45	37-45#	37-51	37-51#	37-57	37-57#	37-76	37-76#	37-81	37-81#	37-123	37-123#	37-131	37-131#
	37-135	37-135#	39-14	39-14#	40-126	40-126#	41-27	41-27#	42-14	42-14#	43-59	43-59#	44-74	44-74#
	45-38	45-38#	46-44	46-44#	47-66	47-66#	48-39	48-39#	49-49	49-49#	50-22	50-22#	51-13	51-13#
	53-49	53-49#	53-60	53-60#	54-52	54-52#	54-73	54-73#	54-75	54-75#	56-52	56-52#	56-80	56-80#
	56-109	56-109#	56-136	56-136#	56-148	56-148#	56-150	56-150#	58-48	58-48#	58-79	58-79#	58-82	58-82#
	59-28	59-28#	59-55	59-55#	59-58	59-58#	60-46	60-46#	62-54	62-54#	63-65	63-65#	64-81	64-81#
	64-151	64-151#	64-208	64-208#	64-212	64-212#	65-68	65-68#	65-126	65-126#	65-187	65-187#	65-190	65-190#
	66-60	66-60#	68-67	68-67#	69-54	69-54#	69-74	69-74#	69-94	69-94#	69-119	69-119#	69-144	69-144#
	69-170	69-170#	69-181	69-181#	70-67	70-67#	70-115	70-115#	70-164	70-164#	70-166	70-166#	72-53	72-53
	72-53#	72-53#	72-73	72-73	72-73#	72-73#	72-74	72-74#	72-105	72-105	72-105#	72-105#	72-126	72-126
	72-126#	72-126#	72-144	72-144	72-144#	72-144#	72-145	72-145#	72-148	72-148#	73-43	73-43#	73-67	73-67#
	73-69	73-69#	74-43	74-43#	75-49	75-49#	76-56	76-56#	77-43	77-43#	78-44	78-44#	79-44	79-44#
	80-43	80-43#	81-44	81-44#	83-46	83-46#	84-52	84-52#	84-90	84-90#	84-92	84-92#	85-44	85-44#
	86-44	86-44#	87-102	87-102#	88-42	88-42#	89-42	89-42#	90-44	90-44#	91-42	91-42#	93-43	93-43#
	94-43	94-43#	95-43	95-43#	96-46	96-46#	97-45	97-45#	98-46	98-46#	99-43	99-43#	100-61	100-61#
	101-57	101-57#	102-57	102-57#	103-20	103-20#	103-39	103-39#						
MSDEFA	1-E70#	17-15#	103-15	103-15#	103-16	103-16#	103-17	103-17#	103-18	103-18#				
MSENDE	1-D74#	17-15#	20-15#	37-10#	37-20#	37-25#	37-32#	37-39#	37-45#	37-51#	37-57#	37-76#	37-81#	37-123#
	37-131#	37-135#	40-126#	41-27#	42-14#	43-59#	44-74#	45-38#	46-44#	47-66#	48-39#	49-49#	50-22#	51-13#
	53-49#	53-60#	54-52#	54-73#	54-75#	56-52#	56-80#	56-109#	56-136#	56-148#	56-150#	58-48#	58-79#	58-82#
	59-28#	59-55#	59-58#	60-46#	62-54#	63-65#	64-81#	64-151#	64-208#	64-212#	65-68#	65-126#	65-187#	65-190#
	66-60#	68-67#	69-54#	69-74#	69-94#	69-119#	69-144#	69-170#	69-181#	70-67#	70-115#	70-164#	70-166#	72-53#
	72-73#	72-74#	72-105#	72-126#	72-144#	72-145#	72-148#	73-43#	73-67#	73-69#	74-43#	75-49#	76-56#	77-43#

	78-44#	79-44#	80-43#	81-44#	83-46#	84-52#	84-90#	84-92#	85-44#	86-44#	87-102#	88-42#	89-42#	90-44#
	91-42#	93-43#	94-43#	95-43#	96-46#	97-45#	98-46#	99-43#	100-61#	101-57#	102-57#	103-20#	103-39#	
MSERRI	1-@49#	17-15#	27-46	27-46#	28-37	28-37#	30-89	30-89#	30-93	30-93#	30-100	30-100#	31-48	31-48#
	31-55	31-55#	31-72	31-72#	32-35	32-35#	53-56	53-56#	54-50	54-50#	54-71	54-71#	56-48	56-48#
	56-76	56-76#	56-104	56-104#	56-132	56-132#	56-144	56-144#	58-32	58-32#	58-43	58-43#	58-66	58-66#
	58-74	58-74#	59-26	59-26#	59-53	59-53#	60-33	60-33#	60-40	60-40#	62-41	62-41#	62-48	62-48#
	62-51	62-51#	63-44	63-44#	63-54	63-54#	63-57	63-57#	64-54	64-54#	64-67	64-67#	64-72	64-72#
	64-77	64-77#	64-107	64-107#	64-117	64-117#	64-124	64-124#	64-130	64-130#	64-138	64-138#	64-148	64-148#
	64-179	64-179#	64-192	64-192#	64-199	64-199#	64-205	64-205#	65-42	65-42#	65-51	65-51#	65-57	65-57#
	65-61	65-61#	65-98	65-98#	65-107	65-107#	65-114	65-114#	65-118	65-118#	65-158	65-158#	65-167	65-167#
	65-173	65-173#	65-179	65-179#	66-43	66-43#	66-49	66-49#	68-45	68-45#	68-65	68-65#	69-50	69-50#
	69-70	69-70#	69-90	69-90#	69-110	69-110#	69-116	69-116#	69-135	69-135#	69-141	69-141#	69-160	69-160#
	69-167	69-167#	70-50	70-50#	70-58	70-58#	70-98	70-98#	70-106	70-106#	70-146	70-146#	70-155	70-155#
	72-71	72-71#	72-123	72-123#	73-41	73-41#	73-65	73-65#	75-45	75-45#	76-46	76-46#	81-41	81-41#
	83-42	83-42#	84-50	84-50#	84-88	84-88#	85-40	85-40#	86-40	86-40#	87-43	87-43#	87-58	87-58#
	87-79	87-79#												
MSESCA	1-D06#	17-15#	54-28	54-28#	56-23	56-23#	58-19	58-19#	58-27	58-27#	58-39	58-39#	58-46	58-46#
	58-53	58-53#	58-61	58-61#	58-70	58-70#	58-77	58-77#	59-16	59-16#	59-33	59-33#	59-42	59-42#
	59-46	59-46#	60-13	60-13#	62-21	62-21#	62-28	62-28#	62-33	62-33#	62-38	62-38#	63-17	63-17#
	64-33	64-33#	64-85	64-85#	64-157	64-157#	65-18	65-18#	65-72	65-72#	65-132	65-132#	66-15	66-15#
	68-20	68-20#	69-39	69-39#	69-59	69-59#	69-80	69-80#	69-99	69-99#	69-124	69-124#	69-149	69-149#
	70-23	70-23#	70-65	70-65#	70-71	70-71#	70-113	70-113#	70-119	70-119#	70-162	70-162#	72-29	72-29#
	72-49	72-49#	72-52	72-52#	72-57	72-57#	72-80	72-80#	72-101	72-101#	72-104	72-104#	72-109	72-109#
	72-124	72-124#	72-130	72-130#	72-140	72-140#	72-143	72-143#	73-20	73-20#	73-47	73-47#	74-16	74-16#
	75-15	75-15#	75-38	75-38#	76-28	76-28#	76-39	76-39#	77-18	77-18#	77-37	77-37#	78-15	78-15#
	79-15	79-15#	80-15	80-15#	81-18	81-18#	81-38	81-38#	83-19	83-19#	83-39	83-39#	84-25	84-25#
	84-47	84-47#	84-56	84-56#	84-80	84-80#	85-16	85-16#	86-16	86-16#	87-16	87-16#	88-16	88-16#
	89-16	89-16#	90-16	90-16#	91-16	91-16#	93-18	93-18#	94-16	94-16#	95-16	95-16#	96-16	96-16#
	97-16	97-16#	98-16	98-16#	99-16	99-16#	100-18	100-18#	100-45	100-45#	100-52	100-52#	100-57	100-57#
	101-14	101-14#	102-14	102-14#										
MSESCS	1-D10#	17-15#	54-28#	56-23#	58-19#	58-27#	58-39#	58-46#	58-53#	58-61#	58-70#	58-77#	59-16#	59-33#
	59-42#	59-46#	60-13#	62-21#	62-28#	62-33#	62-38#	63-17#	64-33#	64-85#	64-157#	65-18#	65-72#	65-132#
	66-15#	68-20#	69-39#	69-59#	69-80#	69-99#	69-124#	69-149#	70-23#	70-65#	70-71#	70-113#	70-119#	70-162#
	72-29#	72-49#	72-52#	72-57#	72-80#	72-101#	72-104#	72-109#	72-124#	72-130#	72-140#	72-143#	73-20#	73-47#
	74-16#	75-15#	75-38#	76-28#	76-39#	77-18#	77-37#	78-15#	79-15#	80-15#	81-18#	81-38#	83-19#	83-39#
	84-25#	84-47#	84-56#	84-80#	85-16#	86-16#	87-16#	88-16#	89-16#	90-16#	91-16#	93-18#	94-16#	95-16#
	96-16#	97-16#	98-16#	99-16#	100-18#	100-45#	100-52#	100-57#	101-14#	102-14#				
MSEXCP	1-E01#	17-15#	103-15	103-15	103-15#	103-16	103-16	103-16#	103-17	103-17	103-17#			
MSEXIT	1-D14#	17-15#	69-26	69-26#	70-19	70-19#								
MSEXSE	1-D22#	17-15#	69-26#	70-19#										
MSEXTJ	1-D18#	17-15#	69-26#	70-19#										
MSGEN	1-D38#	17-15#	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	19-8	19-8#	20-8	20-8	20-8#	20-8#
	20-15	20-15#	24-13	24-13#	24-18	24-18#	37-8	37-8#	37-10	37-10#	37-13	37-13#	37-20	37-20#
	37-22	37-22#	37-25	37-25#	37-28	37-28#	37-32	37-32#	37-35	37-35#	37-39	37-39#	37-41	37-41#
	37-45	37-45#	37-47	37-47#	37-51	37-51#	37-53	37-53#	37-57	37-57#	37-60	37-60#	37-76	37-76#
	37-78	37-78#	37-81	37-81#	37-83	37-83#	37-123	37-123#	37-125	37-125#	37-131	37-131#	37-133	37-133#
	37-135	37-135#	39-8	39-8#	40-8	40-8#	40-126	40-126#	41-8	41-8#	41-27	41-27#	42-9	42-9#
	42-14	42-14#	43-30	43-30#	43-59	43-59#	44-24	44-24#	44-74	44-74#	45-20	45-20#	45-38	45-38#
	46-22	46-22#	46-44	46-44#	47-26	47-26#	47-66	47-66#	48-18	48-18#	48-39	48-39#	49-22	49-22#
	49-49	49-49#	50-18	50-18#	50-22	50-22#	51-8	51-8#	51-13	51-13#	53-20	53-20#	53-49	53-49#
	53-52	53-52#	53-60	53-60#	54-25	54-25#	54-26	54-26#	54-52	54-52#	54-56	54-56#	54-73	54-73#
	54-75	54-75#	56-21	56-21#	56-25	56-25#	56-52	56-52#	56-55	56-55#	56-80	56-80#	56-82	56-82#

CROSS REFERENCE TABLE (CREF V01-05)

	56-109	56-109#	56-111	56-111#	56-136	56-136#	56-138	56-138#	56-148	56-148#	56-150	56-150#	58-15	58-15#
	58-17	58-17#	58-48	58-48#	58-51	58-51#	58-79	58-79#	58-82	58-82#	59-12	59-12#	59-14	59-14#
	59-28	59-28#	59-31	59-31#	59-55	59-55#	59-58	59-58#	60-10	60-10#	60-46	60-46#	62-18	62-18#
	62-54	62-54#	63-13	63-13#	63-65	63-65#	64-29	64-29#	64-31	64-31#	64-81	64-81#	64-83	64-83#
	64-151	64-151#	64-155	64-155#	64-208	64-208#	64-212	64-212#	65-13	65-13#	65-16	65-16#	65-68	65-68#
	65-70	65-70#	65-126	65-126#	65-130	65-130#	65-187	65-187#	65-190	65-190#	66-12	66-12#	66-60	66-60#
	68-15	68-15#	68-67	68-67#	69-23	69-23#	69-37	69-37#	69-54	69-54#	69-57	69-57#	69-74	69-74#
	69-78	69-78#	69-94	69-94#	69-97	69-97#	69-119	69-119#	69-122	69-122#	69-144	69-144#	69-147	69-147#
	69-170	69-170#	69-181	69-181#	70-16	70-16#	70-21	70-21#	70-67	70-67#	70-69	70-69#	70-115	70-115#
	70-117	70-117#	70-164	70-164#	70-166	70-166#	72-24	72-24#	72-26	72-26#	72-53	72-53#	72-73	72-73#
	72-74	72-74#	72-77	72-77#	72-105	72-105#	72-126	72-126#	72-144	72-144#	72-145	72-145#	72-148	72-148#
	73-17	73-17#	73-18	73-18#	73-43	73-43#	73-45	73-45#	73-67	73-67#	73-69	73-69#	74-13	74-13#
	74-43	74-43#	75-12	75-12#	75-49	75-49#	76-13	76-13#	76-56	76-56#	77-15	77-15#	77-43	77-43#
	78-12	78-12#	78-44	78-44#	79-12	79-12#	79-44	79-44#	80-12	80-12#	80-43	80-43#	81-15	81-15#
	81-44	81-44#	83-15	83-15#	83-46	83-46#	84-21	84-21#	84-23	84-23#	84-52	84-52#	84-54	84-54#
	84-90	84-90#	84-92	84-92#	85-12	85-12#	85-44	85-44#	86-12	86-12#	86-44	86-44#	87-12	87-12#
	87-102	87-102#	88-12	88-12#	88-42	88-42#	89-12	89-12#	89-42	89-42#	90-12	90-12#	90-44	90-44#
	91-12	91-12#	91-42	91-42#	93-14	93-14#	93-43	93-43#	94-12	94-12#	94-43	94-43#	95-12	95-12#
	95-43	95-43#	96-12	96-12#	96-46	96-46#	97-12	97-12#	97-45	97-45#	98-12	98-12#	98-46	98-46#
	99-12	99-12#	99-43	99-43#	100-14	100-14#	100-61	100-61#	101-12	101-12#	101-57	101-57#	102-12	102-12#
	102-57	102-57#	103-13	103-13#	103-20	103-20#	103-41	103-41#						
MSGENB	1-C38#	17-15#												
MSGETS	1-D35#	17-15#	20-15	20-15#	37-10	37-10#	37-20	37-20#	37-25	37-25#	37-32	37-32#	37-39	37-39#
	37-45	37-45#	37-51	37-51#	37-57	37-57#	37-76	37-76#	37-81	37-81#	37-123	37-123#	37-131	37-131#
	37-135	37-135#	39-14	39-14#	40-126	40-126#	41-27	41-27#	42-14	42-14#	43-59	43-59#	44-74	44-74#
	45-38	45-38#	46-44	46-44#	47-66	47-66#	48-39	48-39#	49-49	49-49#	50-22	50-22#	51-13	51-13#
	53-49	53-49#	53-60	53-60#	54-52	54-52#	54-73	54-73#	54-75	54-75#	56-52	56-52#	56-80	56-80#
	56-109	56-109#	56-136	56-136#	56-148	56-148#	56-150	56-150#	58-48	58-48#	58-79	58-79#	58-82	58-82#
	59-28	59-28#	59-55	59-55#	59-58	59-58#	60-46	60-46#	62-54	62-54#	63-65	63-65#	64-81	64-81#
	64-151	64-151#	64-208	64-208#	64-212	64-212#	65-68	65-68#	65-126	65-126#	65-187	65-187#	65-190	65-190#
	66-60	66-60#	68-67	68-67#	69-54	69-54#	69-74	69-74#	69-94	69-94#	69-119	69-119#	69-144	69-144#
	69-170	69-170#	69-181	69-181#	70-67	70-67#	70-115	70-115#	70-164	70-164#	70-166	70-166#	72-53	72-53
	72-53#	72-53#	72-73	72-73	72-73#	72-73#	72-74	72-74#	72-105	72-105	72-105#	72-105#	72-126	72-126
	72-126#	72-126#	72-144	72-144	72-144#	72-144#	72-145	72-145#	72-148	72-148#	73-43	73-43#	73-67	73-67#
	73-69	73-69#	74-43	74-43#	75-49	75-49#	76-56	76-56#	77-43	77-43#	78-44	78-44#	79-44	79-44#
	80-43	80-43#	81-44	81-44#	83-46	83-46#	84-52	84-52#	84-90	84-90#	84-92	84-92#	85-44	85-44#
	86-44	86-44#	87-102	87-102#	88-42	88-42#	89-42	89-42#	90-44	90-44#	91-42	91-42#	93-43	93-43#
	94-43	94-43#	95-43	95-43#	96-46	96-46#	97-45	97-45#	98-46	98-46#	99-43	99-43#	100-61	100-61#
	101-57	101-57#	102-57	102-57#	103-20	103-20#	103-39	103-39#						
MSGETT	1-B77#	17-15#	54-28#	56-23#	58-19#	58-27#	58-39#	58-46#	58-53#	58-61#	58-70#	58-77#	59-16#	59-33#
	59-42#	59-46#	60-13#	62-21#	62-28#	62-33#	62-38#	63-17#	64-33#	64-85#	64-157#	65-18#	65-72#	65-132#
	66-15#	68-20#	69-26#	69-39#	69-59#	69-80#	69-99#	69-124#	69-149#	70-19#	70-23#	70-65#	70-71#	70-113#
	70-119#	70-162#	72-29#	72-49#	72-52#	72-57#	72-80#	72-101#	72-104#	72-109#	72-124#	72-130#	72-140#	72-143#
	73-20#	73-47#	74-16#	75-15#	75-38#	76-28#	76-39#	77-18#	77-37#	78-15#	79-15#	80-15#	81-18#	81-38#
	83-19#	83-39#	84-25#	84-47#	84-56#	84-80#	85-16#	86-16#	87-16#	88-16#	89-16#	90-16#	91-16#	93-18#
	94-16#	95-16#	96-16#	97-16#	98-16#	99-16#	100-18#	100-45#	100-52#	100-57#	101-14#	102-14#		
MSGNGB	1-C02#	17-15#	17-18#	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	19-8	19-8#	20-8	20-8	20-8#
	24-13	24-13#	24-18	24-18#	37-8	37-8#	37-13	37-13#	37-22	37-22#	37-28	37-28#	37-35	37-35#
	37-41	37-41#	37-47	37-47#	37-53	37-53#	37-60	37-60#	37-78	37-78#	37-83	37-83#	37-125	37-125#
	37-133	37-133#	39-8	39-8#	40-8	40-8#	41-8	41-8#	42-9	42-9#	43-30	43-30#	44-24	44-24#
	45-20	45-20#	46-22	46-22#	47-26	47-26#	48-18	48-18#	49-22	49-22#	50-18	50-18#	51-8	51-8#
	53-52	53-52#	103-13	103-13#	103-41	103-41#								

MSGNIN	1-D49#	17-15#	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
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	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11
	18-11	18-11	18-11	18-11	18-11	18-11	18-11	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#
	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	18-11#	19-8	19-8	19-8	19-8	19-8	19-8
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	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8
	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8#	19-8#	19-8#	19-8#
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	24-13	24-13	24-13#	24-13#	24-18	24-18	24-18#	24-18#	27-41	27-41#	27-46	27-46	27-46	27-46
	27-46#	27-46#	27-46#	27-46#	27-46#	27-49	27-49	27-49	27-49	27-49	27-49#	27-49#	27-49#	27-49#
	28-37	28-37	28-37	28-37	28-37#	28-37#	28-37#	28-37#	28-37#	28-48	28-48	28-48	28-48	28-48
	28-48#	28-48#	28-48#	28-48#	30-54	30-54	30-54	30-54	30-54	30-54	30-54#	30-54#	30-54#	30-54#
	30-54#	30-54#	30-55	30-55	30-55	30-55	30-55	30-55	30-55#	30-55#	30-55#	30-55#	30-55#	30-55#
	30-56	30-56	30-56#	30-56#	30-81	30-81#	30-89	30-89	30-89	30-89	30-89#	30-89#	30-89#	30-89#
	30-89#	30-93	30-93	30-93	30-93	30-93#	30-93#	30-93#	30-93#	30-93#	30-100	30-100	30-100	30-100
	30-100#	30-100#	30-100#	30-100#	30-100#	30-112	30-112	30-112#	30-112#	30-113	30-113	30-113#	30-113#	31-48
	31-48	31-48	31-48	31-48#	31-48#	31-48#	31-48#	31-48#	31-55	31-55	31-55	31-55	31-55#	31-55#
	31-55#	31-55#	31-55#	31-72	31-72	31-72	31-72	31-72#	31-72#	31-72#	31-72#	31-72#	32-35	32-35
	32-35	32-35	32-35#	32-35#	32-35#	32-35#	32-35#	32-36	32-36	32-36	32-36	32-36	32-36	32-36#
	32-36#	32-36#	32-36#	32-36#	32-40	32-40	32-40	32-40	32-40	32-40#	32-40#	32-40#	32-40#	32-44
	32-44	32-44	32-44	32-44	32-44#	32-44#	32-44#	32-44#	32-45	32-45	32-45	32-45	32-45	32-45#
	32-45#	32-45#	32-45#	32-46	32-46	32-46	32-46	32-46	32-46#	32-46#	32-46#	32-46#	32-55	32-55
	32-55	32-55	32-55	32-55#	32-55#	32-55#	32-55#	32-58	32-58	32-58	32-58	32-58	32-58#	32-58#
	32-58#	32-58#	32-70	32-70	32-70	32-70	32-70	32-70	32-70#	32-70#	32-70#	32-70#	32-70#	32-73
	32-73	32-73	32-73	32-73	32-73#	32-73#	32-73#	32-73#	33-33	33-33	33-33	33-33	33-33	33-33
	33-33	33-33#	33-33#	33-33#	33-33#	33-33#	33-33#	34-37	34-37	34-37	34-37	34-37	34-37	34-37#
	34-37#	34-37#	34-37#	34-37#	35-29	35-29	35-29	35-29	35-29	35-29	35-29	35-29	35-29#	37-9
	37-9	37-9	37-9	37-9	37-9	37-9#	37-9#	37-9#	37-9#	37-9#	37-10	37-10#	37-16	37-16
	37-16	37-16	37-16	37-16	37-16#	37-16#	37-16#	37-16#	37-16#	37-18	37-18	37-18	37-18	37-18
	37-18	37-18	37-18#	37-18#	37-18#	37-18#	37-18#	37-18#	37-19	37-19	37-19	37-19	37-19	37-19
	37-19	37-19#	37-19#	37-19#	37-19#	37-19#	37-19#	37-20	37-20#	37-23	37-23	37-23	37-23	37-23
	37-23	37-23#	37-23#	37-23#	37-23#	37-23#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24
	37-24	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-25	37-25#	37-29	37-29	37-29	37-29	37-29
	37-29#	37-29#	37-29#	37-29#	37-30	37-30	37-30	37-30	37-30	37-30	37-30	37-30	37-30#	37-30#
	37-30#	37-30#	37-30#	37-30#	37-31	37-31	37-31	37-31	37-31	37-31	37-31	37-31#	37-31#	37-31#
	37-31#	37-31#	37-32	37-32#	37-36	37-36	37-36	37-36	37-36	37-36#	37-36#	37-36#	37-36#	37-37
	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37#	37-37#	37-37#	37-37#	37-37#	37-37#	37-38
	37-38	37-38	37-38	37-38	37-38	37-38	37-38#	37-38#	37-38#	37-38#	37-38#	37-39	37-39#	37-42
	37-42	37-42	37-42	37-42	37-42#	37-42#	37-42#	37-42#	37-43	37-43	37-43	37-43	37-43	37-43
	37-43	37-43	37-43#	37-43#	37-43#	37-43#	37-43#	37-43#	37-44	37-44	37-44	37-44	37-44	37-44
	37-44	37-44#	37-44#	37-44#	37-44#	37-44#	37-45	37-45#	37-48	37-48	37-48	37-48	37-48	37-48#
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69-167#	69-167#	69-167#	69-167#	69-170	69-170#	69-175	69-175	69-175#	69-175#	69-177	69-177	69-177#	69-177#

69-178	69-178	69-178#	69-178#	69-181	69-181#	70-19	70-19	70-19#	70-19#	70-21	70-21#	70-23	70-23
70-23#	70-23#	70-29	70-29	70-29	70-29	70-29	70-29	70-29#	70-29#	70-29#	70-29#	70-29#	70-29#
70-30	70-30	70-30	70-30	70-30	70-30	70-30#	70-30#	70-30#	70-30#	70-30#	70-30#	70-31	70-31
70-31#	70-31#	70-50	70-50	70-50	70-50	70-50#	70-50#	70-50#	70-50#	70-50#	70-52	70-52	70-52
70-52	70-52	70-52#	70-52#	70-52#	70-52#	70-58	70-58	70-58	70-58	70-58#	70-58#	70-58#	70-58#
70-58#	70-61	70-61	70-61#	70-61#	70-63	70-63	70-63#	70-63#	70-64	70-64	70-64#	70-64#	70-65
70-65	70-65#	70-65#	70-67	70-67#	70-69	70-69#	70-71	70-71	70-71#	70-71#	70-77	70-77	70-77
70-77	70-77	70-77	70-77#	70-77#	70-77#	70-77#	70-77#	70-77#	70-78	70-78	70-78	70-78	70-78
70-78	70-78#	70-78#	70-78#	70-78#	70-78#	70-78#	70-79	70-79	70-79#	70-79#	70-98	70-98	70-98
70-98	70-98#	70-98#	70-98#	70-98#	70-98#	70-100	70-100	70-100	70-100	70-100	70-100#	70-100#	70-100#
70-100#	70-106	70-106	70-106	70-106	70-106#	70-106#	70-106#	70-106#	70-106#	70-109	70-109	70-109#	70-109#
70-111	70-111	70-111#	70-111#	70-112	70-112	70-112#	70-112#	70-113	70-113	70-113#	70-113#	70-115	70-115#
70-117	70-117#	70-119	70-119	70-119#	70-119#	70-125	70-125	70-125	70-125	70-125	70-125	70-125#	70-125#
70-125#	70-125#	70-125#	70-125#	70-126	70-126	70-126	70-126	70-126	70-126	70-126#	70-126#	70-126#	70-126#
70-126#	70-126#	70-127	70-127	70-127#	70-127#	70-146	70-146	70-146	70-146	70-146#	70-146#	70-146#	70-146#
70-146#	70-148	70-148	70-148	70-148	70-148	70-148#	70-148#	70-148#	70-148#	70-150	70-150	70-150	70-150
70-150	70-150#	70-150#	70-150#	70-150#	70-155	70-155	70-155	70-155	70-155#	70-155#	70-155#	70-155#	70-155#
70-158	70-158	70-158#	70-158#	70-160	70-160	70-160#	70-160#	70-161	70-161	70-161#	70-161#	70-162	70-162
70-162#	70-162#	70-164	70-164#	70-166	70-166#	72-26	72-26#	72-27	72-27#	72-29	72-29	72-29#	72-29#
72-49	72-49	72-49#	72-49#	72-52	72-52	72-52#	72-52#	72-53	72-53#	72-55	72-55#	72-57	72-57
72-57#	72-57#	72-71	72-71	72-71	72-71	72-71#	72-71#	72-71#	72-71#	72-71#	72-73	72-73#	72-74
72-74#	72-77	72-77#	72-78	72-78#	72-80	72-80	72-80#	72-80#	72-101	72-101	72-101#	72-101#	72-104
72-104	72-104#	72-104#	72-105	72-105#	72-107	72-107#	72-109	72-109	72-109#	72-109#	72-123	72-123	72-123
72-123	72-123#	72-123#	72-123#	72-123#	72-123#	72-124	72-124	72-124#	72-124#	72-126	72-126#	72-128	72-128#
72-130	72-130	72-130#	72-130#	72-140	72-140	72-140#	72-140#	72-143	72-143	72-143#	72-143#	72-144	72-144#
72-145	72-145#	72-148	72-148#	73-18	73-18#	73-20	73-20	73-20#	73-20#	73-41	73-41	73-41	73-41
73-41#	73-41#	73-41#	73-41#	73-41#	73-43	73-43#	73-45	73-45#	73-47	73-47	73-47#	73-47#	73-65
73-65	73-65	73-65	73-65#	73-65#	73-65#	73-65#	73-65#	73-67	73-67#	73-69	73-69#	74-16	74-16
74-16#	74-16#	74-43	74-43#	75-15	75-15	75-15#	75-15#	75-38	75-38	75-38#	75-38#	75-45	75-45
75-45	75-45	75-45#	75-45#	75-45#	75-45#	75-45#	75-49	75-49#	76-28	76-28	76-28#	76-28#	76-39
76-39	76-39#	76-39#	76-46	76-46	76-46	76-46	76-46#	76-46#	76-46#	76-46#	76-46#	76-56	76-56#
77-18	77-18	77-18#	77-18#	77-37	77-37	77-37#	77-37#	77-43	77-43#	78-15	78-15	78-15#	78-15#
78-44	78-44#	79-15	79-15	79-15#	79-15#	79-44	79-44#	80-15	80-15	80-15#	80-15#	80-43	80-43#
81-18	81-18	81-18#	81-18#	81-38	81-38	81-38#	81-38#	81-41	81-41	81-41	81-41	81-41#	81-41#
81-41#	81-41#	81-41#	81-44	81-44#	83-19	83-19	83-19#	83-19#	83-39	83-39	83-39#	83-39#	83-42
83-42	83-42	83-42	83-42#	83-42#	83-42#	83-42#	83-42#	83-46	83-46#	84-23	84-23#	84-25	84-25
84-25#	84-25#	84-47	84-47	84-47#	84-47#	84-50	84-50	84-50	84-50	84-50#	84-50#	84-50#	84-50#
84-50#	84-52	84-52#	84-54	84-54#	84-56	84-56	84-56#	84-56#	84-80	84-80	84-80#	84-80#	84-88
84-88	84-88	84-88	84-88#	84-88#	84-88#	84-88#	84-88#	84-90	84-90#	84-92	84-92#	85-16	85-16
85-16#	85-16#	85-40	85-40	85-40	85-40	85-40#	85-40#	85-40#	85-40#	85-40#	85-44	85-44#	86-16
86-16	86-16#	86-16#	86-40	86-40	86-40	86-40	86-40#	86-40#	86-40#	86-40#	86-40#	86-44	86-44#
87-16	87-16	87-16#	87-16#	87-43	87-43	87-43	87-43	87-43#	87-43#	87-43#	87-43#	87-43#	87-58
87-58	87-58	87-58	87-58#	87-58#	87-58#	87-58#	87-58#	87-79	87-79	87-79	87-79	87-79#	87-79#
87-79#	87-79#	87-79#	87-102	87-102#	88-16	88-16	88-16#	88-16#	88-42	88-42#	89-16	89-16	89-16#
89-16#	89-42	89-42#	90-16	90-16	90-16#	90-16#	90-44	90-44#	91-16	91-16	91-16#	91-16#	91-42
91-42#	93-18	93-18	93-18#	93-18#	93-43	93-43#	94-16	94-16	94-16#	94-16#	94-43	94-43#	95-16
95-16	95-16#	95-16#	95-43	95-43#	96-16	96-16	96-16#	96-16#	96-46	96-46#	97-16	97-16	97-16#
97-16#	97-45	97-45#	98-16	98-16	98-16#	98-16#	98-46	98-46#	99-16	99-16	99-16#	99-16#	99-43
99-43#	100-18	100-18	100-18#	100-18#	100-38	100-38	100-38	100-38	100-38	100-38	100-38#	100-38#	100-38#
100-38#	100-38#	100-38#	100-39	100-39	100-39	100-39	100-39	100-39	100-39#	100-39#	100-39#	100-39#	100-39#
100-39#	100-40	100-40	100-40#	100-40#	100-45	100-45	100-45#	100-45#	100-52	100-52	100-52#	100-52#	100-57
100-57	100-57#	100-57#	100-61	100-61#	101-14	101-14	101-14#	101-14#	101-36	101-36	101-36	101-36	101-36
101-36	101-36#	101-36#	101-36#	101-36#	101-36#	101-36#	101-37	101-37	101-37	101-37	101-37	101-37	101-37#
101-37#	101-37#	101-37#	101-37#	101-37#	101-38	101-38	101-38#	101-38#	101-46	101-46	101-46	101-46	101-46
101-46#	101-46#	101-46#	101-46#	101-57	101-57#	102-14	102-14	102-14#	102-14#	102-35	102-35	102-35	102-35
102-35	102-35	102-35#	102-35#	102-35#	102-35#	102-35#	102-35#	102-36	102-36	102-36	102-36	102-36	102-36
102-36#	102-36#	102-36#	102-36#	102-36#	102-36#	102-37	102-37	102-37#	102-37#	102-45	102-45	102-45	102-45

CROSS REFERENCE TABLE (CREF V01-05)

	102-45	102-45#	102-45#	102-45#	102-45#	102-57	102-57#	103-13	103-13#	103-15	103-15	103-15	103-15	103-15#
	103-16	103-16	103-16	103-16	103-16#	103-17	103-17	103-17	103-17	103-17	103-17#	103-18	103-18	103-18
	103-18#	103-20	103-20#	103-41	103-41	103-41	103-41#	103-41#	103-41#					
MSGNLS	1-C13#	17-15#	72-53	72-53#	72-73	72-73#	72-105	72-105#	72-126	72-126#	72-144	72-144#		
MSGNSU	1-B98#	17-15#	54-26	54-26#	54-56	54-56#	56-25	56-25#	56-55	56-55#	56-82	56-82#	56-111	56-111#
	56-138	56-138#	58-17	58-17#	58-51	58-51#	59-14	59-14#	59-31	59-31#	64-31	64-31#	64-83	64-83#
	64-155	64-155#	65-16	65-16#	65-70	65-70#	65-130	65-130#	69-37	69-37#	69-57	69-57#	69-78	69-78#
	69-97	69-97#	69-122	69-122#	69-147	69-147#	70-21	70-21#	70-69	70-69#	70-117	70-117#	72-26	72-26#
	72-77	72-77#	73-18	73-18#	73-45	73-45#	84-23	84-23#	84-54	84-54#				
MSGNTA	1-B90#	17-15#	20-15	20-15#	37-10	37-10#	37-20	37-20#	37-25	37-25#	37-32	37-32#	37-39	37-39#
	37-45	37-45#	37-51	37-51#	37-57	37-57#	37-76	37-76#	37-81	37-81#	37-123	37-123#	37-131	37-131#
	37-135	37-135#	40-126	40-126#	41-27	41-27#	42-14	42-14#	43-59	43-59#	44-74	44-74#	45-38	45-38#
	46-44	46-44#	47-66	47-66#	48-39	48-39#	49-49	49-49#	50-22	50-22#	51-13	51-13#	53-49	53-49#
	53-60	53-60#	54-52	54-52#	54-73	54-73#	54-75	54-75#	56-52	56-52#	56-80	56-80#	56-109	56-109#
	56-136	56-136#	56-148	56-148#	56-150	56-150#	58-48	58-48#	58-79	58-79#	58-82	58-82#	59-28	59-28#
	59-55	59-55#	59-58	59-58#	60-46	60-46#	62-54	62-54#	63-65	63-65#	64-81	64-81#	64-151	64-151#
	64-208	64-208#	64-212	64-212#	65-68	65-68#	65-126	65-126#	65-187	65-187#	65-190	65-190#	66-60	66-60#
	68-67	68-67#	69-54	69-54#	69-74	69-74#	69-94	69-94#	69-119	69-119#	69-144	69-144#	69-170	69-170#
	69-181	69-181#	70-67	70-67#	70-115	70-115#	70-164	70-164#	70-166	70-166#	72-74	72-74#	72-145	72-145#
	72-148	72-148#	73-43	73-43#	73-67	73-67#	73-69	73-69#	74-43	74-43#	75-49	75-49#	76-56	76-56#
	77-43	77-43#	78-44	78-44#	79-44	79-44#	80-43	80-43#	81-44	81-44#	83-46	83-46#	84-52	84-52#
	84-90	84-90#	84-92	84-92#	85-44	85-44#	86-44	86-44#	87-102	87-102#	88-42	88-42#	89-42	89-42#
	90-44	90-44#	91-42	91-42#	93-43	93-43#	94-43	94-43#	95-43	95-43#	96-46	96-46#	97-45	97-45#
	98-46	98-46#	99-43	99-43#	100-61	100-61#	101-57	101-57#	102-57	102-57#	103-20	103-20#		
MSGNTE	1-B94#	17-15#	53-20	53-20#	54-25	54-25#	56-21	56-21#	58-15	58-15#	59-12	59-12#	60-10	60-10#
	62-18	62-18#	63-13	63-13#	64-29	64-29#	65-13	65-13#	66-12	66-12#	68-15	68-15#	69-23	69-23#
	70-16	70-16#	72-24	72-24#	73-17	73-17#	74-13	74-13#	75-12	75-12#	76-13	76-13#	77-15	77-15#
	78-12	78-12#	79-12	79-12#	80-12	80-12#	81-15	81-15#	83-15	83-15#	84-21	84-21#	85-12	85-12#
	86-12	86-12#	87-12	87-12#	88-12	88-12#	89-12	89-12#	90-12	90-12#	91-12	91-12#	93-14	93-14#
	94-12	94-12#	95-12	95-12#	96-12	96-12#	97-12	97-12#	98-12	98-12#	99-12	99-12#	100-14	100-14#
	101-12	101-12#	102-12	102-12#										
MSHAPT	1-A39#	17-15#	18-11	18-11#										
MSHNAP	1-B24#	17-15#	18-11	18-11#										
MSINCR	1-D26#	17-15#	17-18	17-18#	20-8	20-8	20-8#	20-8#	27-41#	27-46#	27-49#	28-37#	28-48#	30-54#
	30-55#	30-56#	30-81#	30-89#	30-93#	30-100#	30-112#	30-113#	31-48#	31-55#	31-72#	32-35#	32-36#	32-40#
	32-44#	32-45#	32-46#	32-55#	32-58#	32-70#	32-73#	33-33#	34-37#	37-8	37-8	37-8#	37-8#	37-9#
	37-10#	37-13	37-13	37-13#	37-13#	37-16#	37-18#	37-19#	37-20#	37-22	37-22	37-22#	37-22#	37-23#
	37-24#	37-25#	37-28	37-28	37-28#	37-28#	37-29#	37-30#	37-31#	37-32#	37-35	37-35	37-35#	37-35#
	37-36#	37-37#	37-38#	37-39#	37-41	37-41	37-41#	37-41#	37-42#	37-43#	37-44#	37-45#	37-47	37-47
	37-47#	37-47#	37-48#	37-49#	37-50#	37-51#	37-53	37-53	37-53#	37-53#	37-54#	37-55#	37-56#	37-57#
	37-60	37-60	37-60#	37-60#	37-63#	37-65#	37-66#	37-67#	37-68#	37-69#	37-70#	37-71#	37-72#	37-73#
	37-74#	37-75#	37-76#	37-78	37-78	37-78#	37-78#	37-79#	37-80#	37-81#	37-83	37-83	37-83#	37-83#
	37-87#	37-93#	37-99#	37-100#	37-101#	37-108#	37-109#	37-110#	37-111#	37-112#	37-116#	37-117#	37-118#	37-121#
	37-123#	37-125	37-125	37-125#	37-125#	37-128#	37-130#	37-131#	37-133	37-133	37-133#	37-133#	37-134#	37-135#
	39-8	39-8	39-8#	39-8#	40-8	40-8	40-8#	40-8#	40-10#	40-28#	40-30#	40-32#	40-34#	40-36#
	40-51#	40-57#	40-86#	40-126#	41-8	41-8	41-8#	41-8#	41-10#	41-22#	41-23#	41-24#	41-27#	42-9
	42-9	42-9#	42-9#	42-14#	43-30	43-30	43-30#	43-30#	44-24	44-24	44-24#	44-24#	45-20	45-20
	45-20#	45-20#	46-22	46-22	46-22#	46-22#	47-26	47-26	47-26#	47-26#	48-18	48-18	48-18#	48-18#
	49-22	49-22	49-22#	49-22#	50-18	50-18	50-18#	50-18#	51-8	51-8	51-8#	51-8#	51-10#	51-11#
	51-13#	53-20	53-20	53-20	53-20#	53-20#	53-20#	53-22#	53-42#	53-43#	53-44#	53-47#	53-49#	53-52
	53-52	53-52#	53-52#	53-56#	53-59#	54-25	54-25	54-25	54-25#	54-25#	54-25#	54-26	54-26	54-26
	54-26#	54-26#	54-26#	54-28#	54-50#	54-52#	54-56	54-56	54-56	54-56#	54-56#	54-56#	54-59#	54-71#
	54-73#	54-75#	56-21	56-21	56-21	56-21#	56-21#	56-21#	56-23#	56-25	56-25	56-25	56-25#	56-25#
	56-25#	56-48#	56-52#	56-55	56-55	56-55	56-55#	56-55#	56-55#	56-76#	56-80#	56-82	56-82	56-82
	56-82#	56-82#	56-82#	56-104#	56-109#	56-111	56-111	56-111	56-111#	56-111#	56-111#	56-132#	56-136#	56-138
	56-138	56-138	56-138#	56-138#	56-138#	56-144#	56-145#	56-148#	56-150#	58-15	58-15	58-15	58-15#	58-15#
	58-15#	58-17	58-17	58-17	58-17#	58-17#	58-17#	58-19#	58-27#	58-32#	58-39#	58-43#	58-46#	58-48#

CROSS REFERENCE TABLE (CREF V01-05)

	58-51	58-51	58-51	58-51#	58-51#	58-51#	58-53#	58-61#	58-66#	58-70#	58-74#	58-77#	58-79#	58-82#
	59-12	59-12	59-12	59-12#	59-12#	59-12#	59-14	59-14	59-14	59-14#	59-14#	59-14#	59-16#	59-26#
	59-28#	59-31	59-31	59-31	59-31#	59-31#	59-31#	59-33#	59-42#	59-46#	59-53#	59-55#	59-58#	60-10
	60-10	60-10	60-10#	60-10#	60-10#	60-13#	60-17#	60-18#	60-33#	60-40#	60-42#	60-44#	60-46#	62-18
	62-18	62-18	62-18#	62-18#	62-18#	62-21#	62-28#	62-33#	62-38#	62-41#	62-48#	62-51#	62-54#	63-13
	63-13	63-13	63-13#	63-13#	63-13#	63-17#	63-23#	63-24#	63-25#	63-44#	63-54#	63-57#	63-60#	63-62#
	63-63#	63-65#	64-29	64-29	64-29	64-29#	64-29#	64-29#	64-31	64-31	64-31	64-31#	64-31#	64-31#
	64-33#	64-37#	64-38#	64-54#	64-67#	64-72#	64-77#	64-81#	64-83	64-83	64-83	64-83#	64-83#	64-83#
	64-85#	64-90#	64-91#	64-107#	64-117#	64-124#	64-130#	64-138#	64-148#	64-151#	64-155	64-155	64-155	64-155#
	64-155#	64-155#	64-157#	64-162#	64-163#	64-179#	64-192#	64-199#	64-205#	64-208#	64-212#	65-13	65-13	65-13
	65-13#	65-13#	65-13#	65-16	65-16	65-16	65-16#	65-16#	65-16#	65-18#	65-24#	65-25#	65-26#	65-42#
	65-51#	65-57#	65-61#	65-63#	65-65#	65-66#	65-68#	65-70	65-70	65-70	65-70#	65-70#	65-70#	65-72#
	65-80#	65-81#	65-82#	65-98#	65-107#	65-114#	65-118#	65-120#	65-122#	65-123#	65-126#	65-130	65-130	65-130
	65-130#	65-130#	65-130#	65-132#	65-140#	65-141#	65-142#	65-158#	65-167#	65-173#	65-179#	65-181#	65-183#	65-187#
	65-190#	66-12	66-12	66-12	66-12#	66-12#	66-12#	66-15#	66-19#	66-20#	66-21#	66-43#	66-49#	66-53#
	66-55#	66-56#	66-60#	68-15	68-15	68-15	68-15#	68-15#	68-15#	68-20#	68-45#	68-65#	68-67#	69-23
	69-23	69-23	69-23#	69-23#	69-23#	69-26#	69-29#	69-30#	69-37	69-37	69-37	69-37#	69-37#	69-37#
	69-39#	69-50#	69-54#	69-57	69-57	69-57	69-57#	69-57#	69-57#	69-59#	69-70#	69-74#	69-78	69-78
	69-78	69-78#	69-78#	69-78#	69-80#	69-90#	69-94#	69-97	69-97	69-97	69-97#	69-97#	69-97#	69-99#
	69-110#	69-111#	69-116#	69-119#	69-122	69-122	69-122	69-122#	69-122#	69-122#	69-124#	69-135#	69-136#	69-141#
	69-144#	69-147	69-147	69-147	69-147#	69-147#	69-147#	69-149#	69-160#	69-161#	69-162#	69-167#	69-170#	69-175#
	69-177#	69-178#	69-181#	70-16	70-16	70-16	70-16#	70-16#	70-16#	70-19#	70-21	70-21	70-21	70-21#
	70-21#	70-21#	70-23#	70-29#	70-30#	70-31#	70-50#	70-52#	70-58#	70-61#	70-63#	70-64#	70-65#	70-67#
	70-69	70-69	70-69	70-69#	70-69#	70-69#	70-71#	70-77#	70-78#	70-79#	70-98#	70-100#	70-106#	70-109#
	70-111#	70-112#	70-113#	70-115#	70-117	70-117	70-117	70-117#	70-117#	70-117#	70-119#	70-125#	70-126#	70-127#
	70-146#	70-148#	70-150#	70-155#	70-158#	70-160#	70-161#	70-162#	70-164#	70-166#	72-24	72-24	72-24	72-24#
	72-24#	72-24#	72-26	72-26	72-26	72-26#	72-26#	72-26#	72-27	72-27	72-27	72-27#	72-27#	72-27#
	72-27#	72-29#	72-49#	72-52#	72-53#	72-55	72-55	72-55	72-55#	72-55#	72-55#	72-55#	72-57#	72-71#
	72-73#	72-74#	72-77	72-77	72-77	72-77#	72-77#	72-77#	72-78	72-78	72-78	72-78#	72-78#	72-78#
	72-78#	72-80#	72-101#	72-104#	72-105#	72-107	72-107	72-107	72-107#	72-107#	72-107#	72-107#	72-109#	72-123#
	72-124#	72-126#	72-128	72-128	72-128	72-128#	72-128#	72-128#	72-128#	72-130#	72-140#	72-143#	72-144#	72-145#
	72-148#	73-17	73-17	73-17	73-17#	73-17#	73-17#	73-18	73-18	73-18	73-18#	73-18#	73-18#	73-20#
	73-41#	73-43#	73-45	73-45	73-45	73-45#	73-45#	73-45#	73-47#	73-65#	73-67#	73-69#	74-13	74-13
	74-13	74-13#	74-13#	74-13#	74-16#	74-43#	75-12	75-12	75-12	75-12#	75-12#	75-12#	75-15#	75-38#
	75-45#	75-49#	76-13	76-13	76-13	76-13#	76-13#	76-13#	76-28#	76-39#	76-46#	76-56#	77-15	77-15
	77-15	77-15#	77-15#	77-15#	77-18#	77-37#	77-43#	78-12	78-12	78-12	78-12#	78-12#	78-12#	78-15#
	78-44#	79-12	79-12	79-12	79-12#	79-12#	79-12#	79-15#	79-44#	80-12	80-12	80-12	80-12#	80-12#
	80-12#	80-15#	80-43#	81-15	81-15	81-15	81-15#	81-15#	81-15#	81-18#	81-38#	81-41#	81-44#	83-15
	83-15	83-15	83-15#	83-15#	83-15#	83-19#	83-39#	83-42#	83-46#	84-21	84-21	84-21	84-21#	84-21#
	84-21#	84-23	84-23	84-23	84-23#	84-23#	84-23#	84-25#	84-47#	84-50#	84-52#	84-54	84-54	84-54
	84-54#	84-54#	84-54#	84-56#	84-80#	84-88#	84-90#	84-92#	85-12	85-12	85-12	85-12#	85-12#	85-12#
	85-16#	85-40#	85-44#	86-12	86-12	86-12	86-12#	86-12#	86-12#	86-16#	86-40#	86-44#	87-12	87-12
	87-12	87-12#	87-12#	87-12#	87-16#	87-43#	87-58#	87-79#	87-102#	88-12	88-12	88-12	88-12#	88-12#
	88-12#	88-16#	88-42#	89-12	89-12	89-12	89-12#	89-12#	89-12#	89-16#	89-42#	90-12	90-12	90-12
	90-12#	90-12#	90-12#	90-16#	90-44#	91-12	91-12	91-12	91-12#	91-12#	91-12#	91-16#	91-42#	93-14
	93-14	93-14	93-14#	93-14#	93-14#	93-18#	93-43#	94-12	94-12	94-12	94-12#	94-12#	94-12#	94-16#
	94-43#	95-12	95-12	95-12	95-12#	95-12#	95-12#	95-16#	95-43#	96-12	96-12	96-12	96-12#	96-12#
	96-12#	96-16#	96-46#	97-12	97-12	97-12	97-12#	97-12#	97-12#	97-16#	97-45#	98-12	98-12	98-12
	98-12#	98-12#	98-12#	98-16#	98-46#	99-12	99-12	99-12	99-12#	99-12#	99-12#	99-16#	99-43#	100-14
	100-14	100-14	100-14#	100-14#	100-14#	100-18#	100-38#	100-39#	100-40#	100-45#	100-52#	100-57#	100-61#	101-12
	101-12	101-12	101-12#	101-12#	101-12#	101-14#	101-36#	101-37#	101-38#	101-46#	101-57#	102-12	102-12	102-12
	102-12#	102-12#	102-12#	102-14#	102-35#	102-36#	102-37#	102-45#	102-57#	103-13	103-13	103-13#	103-13#	
MSIOSE	1-A00#	17-15#												
MSLDRO	1-C42#	17-15#	30-56	30-56#	30-112	30-112#	30-113	30-113#	40-10	40-10#	40-28	40-28#	40-30	40-30#
	40-32	40-32#	40-34	40-34#	40-36	40-36#	40-51	40-51#	41-22	41-22#	41-24	41-24#	53-43	53-43#
	53-47	53-47#	60-18	60-18#	60-42	60-42#	60-44	60-44#	63-25	63-25#	63-60	63-60#	63-62	63-62#
	63-63	63-63#	64-38	64-38#	64-91	64-91#	64-163	64-163#	65-26	65-26#	65-63	65-63#	65-65	65-65#

CROSS REFERENCE TABLE (CREF V01-05)

	65-66	65-66#	65-82	65-82#	65-120	65-120#	65-122	65-122#	65-123	65-123#	65-142	65-142#	65-181	65-181#
	65-183	65-183#	66-21	66-21#	66-53	66-53#	66-55	66-55#	66-56	66-56#	69-30	69-30#	69-175	69-175#
	69-177	69-177#	69-178	69-178#	70-31	70-31#	70-61	70-61#	70-63	70-63#	70-64	70-64#	70-79	70-79#
	70-109	70-109#	70-111	70-111#	70-112	70-112#	70-127	70-127#	70-158	70-158#	70-160	70-160#	70-161	70-161#
	100-40	100-40#	101-38	101-38#	102-37	102-37#								
MSMASK	1-a71#	17-15#												
MSMCHI	1-4#	17-15	17-15#	17-15#										
MSMCLO	1-a24#	17-15	17-15#	17-15#										
MSMSK1	1-a77#	17-15#												
MSPOP	1-B81#	17-15#	20-15	20-15#	37-10	37-10#	37-20	37-20#	37-25	37-25#	37-32	37-32#	37-39	37-39#
	37-45	37-45#	37-51	37-51#	37-57	37-57#	37-76	37-76#	37-81	37-81#	37-123	37-123#	37-131	37-131#
	37-135	37-135#	39-14	39-14#	40-126	40-126#	41-27	41-27#	42-14	42-14#	43-59	43-59#	44-74	44-74#
	45-38	45-38#	46-44	46-44#	47-66	47-66#	48-39	48-39#	49-49	49-49#	50-22	50-22#	51-13	51-13#
	53-49	53-49#	53-60	53-60#	54-52	54-52#	54-73	54-73#	54-75	54-75#	56-52	56-52#	56-80	56-80#
	56-109	56-109#	56-136	56-136#	56-148	56-148#	56-150	56-150#	58-48	58-48#	58-79	58-79#	58-82	58-82#
	59-28	59-28#	59-55	59-55#	59-58	59-58#	60-46	60-46#	62-54	62-54#	63-65	63-65#	64-81	64-81#
	64-151	64-151#	64-208	64-208#	64-212	64-212#	65-68	65-68#	65-126	65-126#	65-187	65-187#	65-190	65-190#
	66-60	66-60#	68-67	68-67#	69-54	69-54#	69-74	69-74#	69-94	69-94#	69-119	69-119#	69-144	69-144#
	69-170	69-170#	69-181	69-181#	70-67	70-67#	70-115	70-115#	70-164	70-164#	70-166	70-166#	72-53	72-53
	72-53#	72-73	72-73	72-73#	72-74	72-74#	72-105	72-105	72-105#	72-126	72-126	72-126#	72-144	72-144
	72-144#	72-145	72-145#	72-148	72-148#	73-43	73-43#	73-67	73-67#	73-69	73-69#	74-43	74-43#	75-49
	75-49#	76-56	76-56#	77-43	77-43#	78-44	78-44#	79-44	79-44#	80-43	80-43#	81-44	81-44#	83-46
	83-46#	84-52	84-52#	84-90	84-90#	84-92	84-92#	85-44	85-44#	86-44	86-44#	87-102	87-102#	88-42
	88-42#	89-42	89-42#	90-44	90-44#	91-42	91-42#	93-43	93-43#	94-43	94-43#	95-43	95-43#	96-46
	96-46#	97-45	97-45#	98-46	98-46#	99-43	99-43#	100-61	100-61#	101-57	101-57#	102-57	102-57#	103-20
	103-20#	103-39	103-39#											
MSPRIN	1-a36#	17-15#	27-49	27-49#	28-48	28-48#	32-36	32-36#	32-40	32-40#	32-44	32-44#	32-45	32-45#
	32-46	32-46#	32-55	32-55#	32-58	32-58#	32-70	32-70#	32-73	32-73#	33-33	33-33#	34-37	34-37#
	37-9	37-9#	37-16	37-16#	37-18	37-18#	37-19	37-19#	37-23	37-23#	37-24	37-24#	37-29	37-29#
	37-30	37-30#	37-31	37-31#	37-36	37-36#	37-37	37-37#	37-38	37-38#	37-42	37-42#	37-43	37-43#
	37-44	37-44#	37-48	37-48#	37-49	37-49#	37-50	37-50#	37-54	37-54#	37-55	37-55#	37-56	37-56#
	37-63	37-63#	37-65	37-65#	37-66	37-66#	37-67	37-67#	37-68	37-68#	37-69	37-69#	37-70	37-70#
	37-71	37-71#	37-72	37-72#	37-73	37-73#	37-74	37-74#	37-75	37-75#	37-79	37-79#	37-80	37-80#
	37-87	37-87#	37-93	37-93#	37-99	37-99#	37-100	37-100#	37-101	37-101#	37-108	37-108#	37-109	37-109#
	37-110	37-110#	37-111	37-111#	37-112	37-112#	37-116	37-116#	37-117	37-117#	37-118	37-118#	37-121	37-121#
	37-128	37-128#	37-130	37-130#	37-134	37-134#	40-57	40-57#	40-86	40-86#	51-11	51-11#	53-42	53-42#
	53-59	53-59#	56-145	56-145#	69-111	69-111#	69-136	69-136#	69-161	69-161#	69-162	69-162#	70-52	70-52#
	70-100	70-100#	70-148	70-148#	70-150	70-150#	101-46	101-46#	102-45	102-45#				
MSPUSH	1-a31#	17-15#	17-18	17-18#	20-8	20-8#	37-8	37-8#	37-13	37-13#	37-22	37-22#	37-28	37-28#
	37-35	37-35#	37-41	37-41#	37-47	37-47#	37-53	37-53#	37-60	37-60#	37-78	37-78#	37-83	37-83#
	37-125	37-125#	37-133	37-133#	39-8	39-8#	40-8	40-8#	41-8	41-8#	42-9	42-9#	43-30	43-30#
	44-24	44-24#	45-20	45-20#	46-22	46-22#	47-26	47-26#	48-18	48-18#	49-22	49-22#	50-18	50-18#
	51-8	51-8#	53-20	53-20#	53-52	53-52#	54-25	54-25#	54-26	54-26#	54-56	54-56#	56-21	56-21#
	56-25	56-25#	56-55	56-55#	56-82	56-82#	56-111	56-111#	56-138	56-138#	58-15	58-15#	58-17	58-17#
	58-51	58-51#	59-12	59-12#	59-14	59-14#	59-31	59-31#	60-10	60-10#	62-18	62-18#	63-13	63-13#
	64-29	64-29#	64-31	64-31#	64-83	64-83#	64-155	64-155#	65-13	65-13#	65-16	65-16#	65-70	65-70#
	65-130	65-130#	66-12	66-12#	68-15	68-15#	69-23	69-23#	69-37	69-37#	69-57	69-57#	69-78	69-78#
	69-97	69-97#	69-122	69-122#	69-147	69-147#	70-16	70-16#	70-21	70-21#	70-69	70-69#	70-117	70-117#
	72-24	72-24#	72-26	72-26#	72-27	72-27	72-27#	72-55	72-55	72-55#	72-77	72-77#	72-78	72-78
	72-78#	72-107	72-107	72-107#	72-128	72-128	72-128#	73-17	73-17#	73-18	73-18#	73-45	73-45#	74-13
	74-13#	75-12	75-12#	76-13	76-13#	77-15	77-15#	78-12	78-12#	79-12	79-12#	80-12	80-12#	81-15
	81-15#	83-15	83-15#	84-21	84-21#	84-23	84-23#	84-54	84-54#	85-12	85-12#	86-12	86-12#	87-12
	87-12#	88-12	88-12#	89-12	89-12#	90-12	90-12#	91-12	91-12#	93-14	93-14#	94-12	94-12#	95-12
	95-12#	96-12	96-12#	97-12	97-12#	98-12	98-12#	99-12	99-12#	100-14	100-14#	101-12	101-12#	102-12
	102-12#	103-13	103-13#											
MSPUT	1-C72#	17-15#	27-49	27-49	27-49#	28-48	28-48	28-48#	30-54	30-54	30-54	30-54	30-54#	30-55
	30-55	30-55	30-55	30-55#	32-36	32-36	32-36	32-36#	32-40	32-40	32-40#	32-44	32-44	32-44#

CROSS REFERENCE TABLE (CREF V01-05)

	32-45	32-45	32-45#	32-46	32-46	32-46#	32-55	32-55	32-55#	32-58	32-58	32-58#	32-70	32-70
	32-70	32-70#	32-73	32-73	32-73#	33-33	33-33	33-33	33-33	33-33#	34-37	34-37	34-37	34-37#
	37-9	37-9	37-9	37-9#	37-16	37-16	37-16	37-16#	37-18	37-18	37-18	37-18	37-18#	37-19
	37-19	37-19	37-19	37-19#	37-23	37-23	37-23	37-23#	37-24	37-24	37-24	37-24	37-24#	37-29
	37-29	37-29#	37-30	37-30	37-30	37-30	37-30#	37-31	37-31	37-31	37-31#	37-36	37-36	37-36#
	37-37	37-37	37-37	37-37	37-37#	37-38	37-38	37-38	37-38#	37-42	37-42	37-42#	37-43	37-43
	37-43	37-43	37-43#	37-44	37-44	37-44	37-44#	37-48	37-48	37-48#	37-49	37-49	37-49	37-49
	37-49#	37-50	37-50	37-50	37-50#	37-54	37-54	37-54#	37-55	37-55	37-55	37-55	37-55#	37-56
	37-56	37-56	37-56#	37-63	37-63	37-63	37-63#	37-65	37-65	37-65#	37-66	37-66	37-66	37-66
	37-66#	37-67	37-67	37-67	37-67#	37-68	37-68	37-68	37-68	37-68#	37-69	37-69	37-69	37-69#
	37-70	37-70	37-70	37-70	37-70#	37-71	37-71	37-71	37-71#	37-72	37-72	37-72	37-72	37-72#
	37-73	37-73	37-73	37-73#	37-74	37-74	37-74	37-74	37-74#	37-75	37-75	37-75	37-75#	37-79
	37-79	37-79	37-79#	37-80	37-80	37-80	37-80	37-80	37-80#	37-87	37-87	37-87#	37-93	37-93
	37-93#	37-99	37-99	37-99#	37-100	37-100	37-100#	37-101	37-101	37-101#	37-108	37-108	37-108#	37-109
	37-109	37-109#	37-110	37-110	37-110#	37-111	37-111	37-111	37-111	37-111#	37-112	37-112	37-112	37-112#
	37-116	37-116	37-116#	37-117	37-117	37-117	37-117	37-117#	37-118	37-118	37-118	37-118#	37-121	37-121
	37-121	37-121#	37-128	37-128	37-128	37-128#	37-130	37-130	37-130	37-130	37-130#	37-134	37-134	37-134
	37-134#	40-57	40-57	40-57	40-57	40-57#	40-86	40-86	40-86	40-86	40-86#	41-10	41-10	41-10
	41-10	41-10#	51-11	51-11	51-11	51-11#	53-22	53-22	53-22	53-22	53-22#	53-42	53-42	53-42#
	53-59	53-59	53-59	53-59	53-59#	56-145	56-145	56-145#	60-17	60-17	60-17	60-17	60-17#	63-23
	63-23	63-23	63-23	63-23#	63-24	63-24	63-24	63-24	63-24#	64-37	64-37	64-37	64-37	64-37#
	64-90	64-90	64-90	64-90	64-90#	64-162	64-162	64-162	64-162	64-162#	65-24	65-24	65-24	65-24
	65-24#	65-25	65-25	65-25	65-25	65-25#	65-80	65-80	65-80	65-80	65-80#	65-81	65-81	65-81
	65-81	65-81#	65-140	65-140	65-140	65-140	65-140#	65-141	65-141	65-141	65-141	65-141#	66-19	66-19
	66-19	66-19	66-19#	66-20	66-20	66-20	66-20	66-20#	69-29	69-29	69-29	69-29	69-29#	69-111
	69-111	69-111#	69-136	69-136	69-136#	69-161	69-161	69-161#	69-162	69-162	69-162#	70-29	70-29	70-29
	70-29	70-29#	70-30	70-30	70-30	70-30	70-30#	70-52	70-52	70-52#	70-77	70-77	70-77	70-77
	70-77#	70-78	70-78	70-78	70-78	70-78#	70-100	70-100	70-100#	70-125	70-125	70-125	70-125	70-125#
	70-126	70-126	70-126	70-126	70-126#	70-148	70-148	70-148#	70-150	70-150	70-150#	100-38	100-38	100-38
	100-38	100-38#	100-39	100-39	100-39	100-39	100-39#	101-36	101-36	101-36	101-36	101-36#	101-37	101-37
	101-37	101-37	101-37#	101-46	101-46	101-46#	102-35	102-35	102-35	102-35	102-35#	102-36	102-36	102-36
	102-36	102-36#	102-45	102-45	102-45#									
MSPUT1	1-C81#	17-15#	27-49	27-49	27-49#	27-49#	28-48	28-48	28-48#	28-48#	30-54	30-54	30-54	30-54
	30-54#	30-54#	30-54#	30-54#	30-55	30-55	30-55	30-55	30-55#	30-55#	30-55#	30-55#	32-36	32-36
	32-36	32-36#	32-36#	32-36#	32-40	32-40	32-40#	32-40#	32-44	32-44	32-44#	32-44#	32-45	32-45
	32-45#	32-45#	32-46	32-46	32-46#	32-46#	32-55	32-55	32-55#	32-55#	32-58	32-58	32-58#	32-58#
	32-70	32-70	32-70	32-70#	32-70#	32-70#	32-73	32-73	32-73#	32-73#	33-33	33-33	33-33	33-33
	33-33#	33-33#	33-33#	33-33#	34-37	34-37	34-37	34-37#	34-37#	34-37#	37-9	37-9	37-9	37-9#
	37-9#	37-9#	37-16	37-16	37-16	37-16#	37-16#	37-16#	37-18	37-18	37-18	37-18	37-18#	37-18#
	37-18#	37-18#	37-19	37-19	37-19	37-19	37-19#	37-19#	37-19#	37-19#	37-23	37-23	37-23	37-23#
	37-23#	37-23#	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-29	37-29	37-29#	37-29#
	37-30	37-30	37-30	37-30	37-30#	37-30#	37-30#	37-30#	37-31	37-31	37-31	37-31#	37-31#	37-31#
	37-36	37-36	37-36#	37-36#	37-37	37-37	37-37	37-37	37-37#	37-37#	37-37#	37-37#	37-38	37-38
	37-38	37-38#	37-38#	37-38#	37-42	37-42	37-42#	37-42#	37-43	37-43	37-43	37-43	37-43#	37-43#
	37-43#	37-43#	37-44	37-44	37-44	37-44#	37-44#	37-44#	37-48	37-48	37-48#	37-48#	37-49	37-49
	37-49	37-49	37-49#	37-49#	37-49#	37-49#	37-50	37-50	37-50	37-50#	37-50#	37-50#	37-54	37-54
	37-54#	37-54#	37-55	37-55	37-55	37-55	37-55#	37-55#	37-55#	37-55#	37-56	37-56	37-56	37-56#
	37-56#	37-56#	37-63	37-63	37-63	37-63#	37-63#	37-63#	37-65	37-65	37-65#	37-65#	37-66	37-66
	37-66	37-66	37-66#	37-66#	37-66#	37-66#	37-67	37-67	37-67	37-67#	37-67#	37-67#	37-68	37-68
	37-68	37-68	37-68#	37-68#	37-68#	37-68#	37-69	37-69	37-69	37-69#	37-69#	37-69#	37-70	37-70
	37-70	37-70	37-70#	37-70#	37-70#	37-70#	37-71	37-71	37-71	37-71#	37-71#	37-71#	37-72	37-72
	37-72	37-72	37-72#	37-72#	37-72#	37-72#	37-73	37-73	37-73	37-73#	37-73#	37-73#	37-74	37-74
	37-74	37-74	37-74#	37-74#	37-74#	37-74#	37-75	37-75	37-75	37-75#	37-75#	37-75#	37-79	37-79
	37-79	37-79#	37-79#	37-79#	37-80	37-80	37-80	37-80	37-80	37-80#	37-80#	37-80#	37-80#	37-80#
	37-87	37-87	37-87#	37-87#	37-93	37-93	37-93#	37-93#	37-99	37-99	37-99#	37-99#	37-100	37-100
	37-100#	37-100#	37-101	37-101	37-101#	37-101#	37-108	37-108	37-108#	37-108#	37-109	37-109	37-109#	37-109#
	37-110	37-110	37-110#	37-110#	37-111	37-111	37-111	37-111	37-111#	37-111#	37-111#	37-111#	37-112	37-112

CROSS REFERENCE TABLE (CREF V01-05)

	37-112	37-112#	37-112#	37-112#	37-116	37-116	37-116#	37-116#	37-117	37-117	37-117	37-117	37-117#	37-117#
	37-117#	37-117#	37-118	37-118	37-118	37-118#	37-118#	37-118#	37-121	37-121	37-121	37-121#	37-121#	37-121#
	37-128	37-128	37-128	37-128#	37-128#	37-128#	37-130	37-130	37-130	37-130	37-130#	37-130#	37-130#	37-130#
	37-134	37-134	37-134	37-134#	37-134#	37-134#	40-57	40-57	40-57	40-57	40-57#	40-57#	40-57#	40-57#
	40-86	40-86	40-86	40-86	40-86#	40-86#	40-86#	40-86#	41-10	41-10	41-10	41-10	41-10#	41-10#
	41-10#	41-10#	51-11	51-11	51-11	51-11#	51-11#	51-11#	53-22	53-22	53-22	53-22	53-22#	53-22#
	53-22#	53-22#	53-42	53-42	53-42#	53-42#	53-59	53-59	53-59	53-59	53-59#	53-59#	53-59#	53-59#
	56-145	56-145	56-145#	56-145#	60-17	60-17	60-17	60-17	60-17#	60-17#	60-17#	60-17#	63-23	63-23
	63-23	63-23	63-23#	63-23#	63-23#	63-23#	63-24	63-24	63-24	63-24	63-24#	63-24#	63-24#	63-24#
	64-37	64-37	64-37	64-37	64-37#	64-37#	64-37#	64-37#	64-90	64-90	64-90	64-90	64-90#	64-90#
	64-90#	64-90#	64-162	64-162	64-162	64-162	64-162#	64-162#	64-162#	64-162#	65-24	65-24	65-24	65-24
	65-24#	65-24#	65-24#	65-24#	65-25	65-25	65-25	65-25	65-25#	65-25#	65-25#	65-25#	65-80	65-80
	65-80	65-80	65-80#	65-80#	65-80#	65-80#	65-81	65-81	65-81	65-81	65-81#	65-81#	65-81#	65-81#
	65-140	65-140	65-140	65-140	65-140#	65-140#	65-140#	65-140#	65-141	65-141	65-141	65-141	65-141#	65-141#
	65-141#	65-141#	66-19	66-19	66-19	66-19	66-19#	66-19#	66-19#	66-19#	66-20	66-20	66-20	66-20
	66-20#	66-20#	66-20#	66-20#	69-29	69-29	69-29	69-29	69-29#	69-29#	69-29#	69-29#	69-111	69-111
	69-111#	69-111#	69-136	69-136	69-136#	69-136#	69-161	69-161	69-161#	69-161#	69-162	69-162	69-162#	69-162#
	70-29	70-29	70-29	70-29	70-29#	70-29#	70-29#	70-29#	70-30	70-30	70-30	70-30	70-30#	70-30#
	70-30#	70-30#	70-52	70-52	70-52#	70-52#	70-77	70-77	70-77	70-77	70-77#	70-77#	70-77#	70-77#
	70-78	70-78	70-78	70-78	70-78#	70-78#	70-78#	70-78#	70-100	70-100	70-100#	70-100#	70-125	70-125
	70-125	70-125	70-125#	70-125#	70-125#	70-125#	70-126	70-126	70-126	70-126	70-126#	70-126#	70-126#	70-126#
	70-148	70-148	70-148#	70-148#	70-150	70-150	70-150#	70-150#	100-38	100-38	100-38	100-38	100-38#	100-38#
	100-38#	100-38#	100-39	100-39	100-39	100-39	100-39#	100-39#	100-39#	100-39#	101-36	101-36	101-36	101-36
	101-36#	101-36#	101-36#	101-36#	101-37	101-37	101-37	101-37	101-37#	101-37#	101-37#	101-37#	101-46	101-46
	101-46#	101-46#	102-35	102-35	102-35	102-35	102-35#	102-35#	102-35#	102-35#	102-36	102-36	102-36	102-36
	102-36#	102-36#	102-36#	102-36#	102-45	102-45	102-45#	102-45#						
M$RADI	1-D77#	17-15#	103-15	103-15#	103-16	103-16#	103-17	103-17#	103-18	103-18#				
M$RBRO	1-C52#	17-15#												
M$RNRO	1-C62#	17-15#	40-51	40-51#										
M$SETS	1-D32#	17-15#	17-18	17-18#	20-8	20-8#	37-8	37-8#	37-13	37-13#	37-22	37-22#	37-28	37-28#
	37-35	37-35#	37-41	37-41#	37-47	37-47#	37-53	37-53#	37-60	37-60#	37-78	37-78#	37-83	37-83#
	37-125	37-125#	37-133	37-133#	39-8	39-8#	40-8	40-8#	41-8	41-8#	42-9	42-9#	43-30	43-30#
	44-24	44-24#	45-20	45-20#	46-22	46-22#	47-26	47-26#	48-18	48-18#	49-22	49-22#	50-18	50-18#
	51-8	51-8#	53-20	53-20#	53-52	53-52#	54-25	54-25#	54-26	54-26#	54-56	54-56#	56-21	56-21#
	56-25	56-25#	56-55	56-55#	56-82	56-82#	56-111	56-111#	56-138	56-138#	58-15	58-15#	58-17	58-17#
	58-51	58-51#	59-12	59-12#	59-14	59-14#	59-31	59-31#	60-10	60-10#	62-18	62-18#	63-13	63-13#
	64-29	64-29#	64-31	64-31#	64-83	64-83#	64-155	64-155#	65-13	65-13#	65-16	65-16#	65-70	65-70#
	65-130	65-130#	66-12	66-12#	68-15	68-15#	69-23	69-23#	69-37	69-37#	69-57	69-57#	69-78	69-78#
	69-97	69-97#	69-122	69-122#	69-147	69-147#	70-16	70-16#	70-21	70-21#	70-69	70-69#	70-117	70-117#
	72-24	72-24#	72-26	72-26#	72-27	72-27	72-27#	72-27#	72-55	72-55	72-55#	72-55#	72-77	72-77#
	72-78	72-78	72-78#	72-78#	72-107	72-107	72-107#	72-107#	72-128	72-128	72-128#	72-128#	73-17	73-17#
	73-18	73-18#	73-45	73-45#	74-13	74-13#	75-12	75-12#	76-13	76-13#	77-15	77-15#	78-12	78-12#
	79-12	79-12#	80-12	80-12#	81-15	81-15#	83-15	83-15#	84-21	84-21#	84-23	84-23#	84-54	84-54#
	85-12	85-12#	86-12	86-12#	87-12	87-12#	88-12	88-12#	89-12	89-12#	90-12	90-12#	91-12	91-12#
	93-14	93-14#	94-12	94-12#	95-12	95-12#	96-12	96-12#	97-12	97-12#	98-12	98-12#	99-12	99-12#
	100-14	100-14#	101-12	101-12#	102-12	102-12#	103-13	103-13#						
M$STAR	1-A33#	17-15#												
M$SVC	1-C33#	17-15#	27-41	27-41#	27-46	27-49	27-49#	28-37	28-48	28-48#	30-54	30-54#	30-55	30-55#
	30-56	30-56#	30-81	30-81#	30-89	30-93	30-100	30-112	30-112#	30-113	30-113#	31-48	31-55	31-72
	32-35	32-36	32-36#	32-40	32-40#	32-44	32-44#	32-45	32-45#	32-46	32-46#	32-55	32-55#	32-58
	32-58#	32-70	32-70#	32-73	32-73#	33-33	33-33#	34-37	34-37#	37-9	37-9#	37-10	37-10#	37-16
	37-16#	37-18	37-18#	37-19	37-19#	37-20	37-20#	37-23	37-23#	37-24	37-24#	37-25	37-25#	37-29
	37-29#	37-30	37-30#	37-31	37-31#	37-32	37-32#	37-36	37-36#	37-37	37-37#	37-38	37-38#	37-39
	37-39#	37-42	37-42#	37-43	37-43#	37-44	37-44#	37-45	37-45#	37-48	37-48#	37-49	37-49#	37-50
	37-50#	37-51	37-51#	37-54	37-54#	37-55	37-55#	37-56	37-56#	37-57	37-57#	37-63	37-63#	37-65
	37-65#	37-66	37-66#	37-67	37-67#	37-68	37-68#	37-69	37-69#	37-70	37-70#	37-71	37-71#	37-72
	37-72#	37-73	37-73#	37-74	37-74#	37-75	37-75#	37-76	37-76#	37-79	37-79#	37-80	37-80#	37-81

CROSS REFERENCE TABLE (CREF V01-05)

	37-81#	37-87	37-87#	37-93	37-93#	37-99	37-99#	37-100	37-100#	37-101	37-101#	37-108	37-108#	37-109
	37-109#	37-110	37-110#	37-111	37-111#	37-112	37-112#	37-116	37-116#	37-117	37-117#	37-118	37-118#	37-121
	37-121#	37-123	37-123#	37-128	37-128#	37-130	37-130#	37-131	37-131#	37-134	37-134#	37-135	37-135#	40-10
	40-10#	40-28	40-28#	40-30	40-30#	40-32	40-32#	40-34	40-34#	40-36	40-36#	40-51	40-51#	40-57
	40-57#	40-86	40-86#	40-126	40-126#	41-10	41-10#	41-22	41-22#	41-23	41-23#	41-24	41-24#	41-27
	41-27#	42-14	42-14#	51-10	51-10#	51-11	51-11#	51-13	51-13#	53-22	53-22#	53-42	53-42#	53-43
	53-43#	53-44	53-44#	53-47	53-47#	53-49	53-49#	53-56	53-59	53-59#	54-26	54-26#	54-28	54-28#
	54-50	54-52	54-52#	54-56	54-56#	54-59	54-59#	54-71	54-73	54-73#	54-75	54-75#	56-23	56-23#
	56-25	56-25#	56-48	56-52	56-52#	56-55	56-55#	56-76	56-80	56-80#	56-82	56-82#	56-104	56-109
	56-109#	56-111	56-111#	56-132	56-136	56-136#	56-138	56-138#	56-144	56-145	56-145#	56-148	56-148#	56-150
	56-150#	58-17	58-17#	58-19	58-19#	58-27	58-27#	58-32	58-39	58-39#	58-43	58-46	58-46#	58-48
	58-48#	58-51	58-51#	58-53	58-53#	58-61	58-61#	58-66	58-70	58-70#	58-74	58-77	58-77#	58-79
	58-79#	58-82	58-82#	59-14	59-14#	59-16	59-16#	59-26	59-28	59-28#	59-31	59-31#	59-33	59-33#
	59-42	59-42#	59-46	59-46#	59-53	59-55	59-55#	59-58	59-58#	60-13	60-13#	60-17	60-17#	60-18
	60-18#	60-33	60-40	60-42	60-42#	60-44	60-44#	60-46	60-46#	62-21	62-21#	62-28	62-28#	62-33
	62-33#	62-38	62-38#	62-41	62-48	62-51	62-54	62-54#	63-17	63-17#	63-23	63-23#	63-24	63-24#
	63-25	63-25#	63-44	63-54	63-57	63-60	63-60#	63-62	63-62#	63-63	63-63#	63-65	63-65#	64-31
	64-31#	64-33	64-33#	64-37	64-37#	64-38	64-38#	64-54	64-67	64-72	64-77	64-81	64-81#	64-83
	64-83#	64-85	64-85#	64-90	64-90#	64-91	64-91#	64-107	64-117	64-124	64-130	64-138	64-148	64-151
	64-151#	64-155	64-155#	64-157	64-157#	64-162	64-162#	64-163	64-163#	64-179	64-192	64-199	64-205	64-208
	64-208#	64-212	64-212#	65-16	65-16#	65-18	65-18#	65-24	65-24#	65-25	65-25#	65-26	65-26#	65-42
	65-51	65-57	65-61	65-63	65-63#	65-65	65-65#	65-66	65-66#	65-68	65-68#	65-70	65-70#	65-72
	65-72#	65-80	65-80#	65-81	65-81#	65-82	65-82#	65-98	65-107	65-114	65-118	65-120	65-120#	65-122
	65-122#	65-123	65-123#	65-126	65-126#	65-130	65-130#	65-132	65-132#	65-140	65-140#	65-141	65-141#	65-142
	65-142#	65-158	65-167	65-173	65-179	65-181	65-181#	65-183	65-183#	65-187	65-187#	65-190	65-190#	66-15
	66-15#	66-19	66-19#	66-20	66-20#	66-21	66-21#	66-43	66-49	66-53	66-53#	66-55	66-55#	66-56
	66-56#	66-60	66-60#	68-20	68-20#	68-45	68-65	68-67	68-67#	69-26	69-26#	69-29	69-29#	69-30
	69-30#	69-37	69-37#	69-39	69-39#	69-50	69-54	69-54#	69-57	69-57#	69-59	69-59#	69-70	69-74
	69-74#	69-78	69-78#	69-80	69-80#	69-90	69-94	69-94#	69-97	69-97#	69-99	69-99#	69-110	69-111
	69-111#	69-116	69-119	69-119#	69-122	69-122#	69-124	69-124#	69-135	69-136	69-136#	69-141	69-144	69-144#
	69-147	69-147#	69-149	69-149#	69-160	69-161	69-161#	69-162	69-162#	69-167	69-170	69-170#	69-175	69-175#
	69-177	69-177#	69-178	69-178#	69-181	69-181#	70-19	70-19#	70-21	70-21#	70-23	70-23#	70-29	70-29#
	70-30	70-30#	70-31	70-31#	70-50	70-52	70-52#	70-58	70-61	70-61#	70-63	70-63#	70-64	70-64#
	70-65	70-65#	70-67	70-67#	70-69	70-69#	70-71	70-71#	70-77	70-77#	70-78	70-78#	70-79	70-79#
	70-98	70-100	70-100#	70-106	70-109	70-109#	70-111	70-111#	70-112	70-112#	70-113	70-113#	70-115	70-115#
	70-117	70-117#	70-119	70-119#	70-125	70-125#	70-126	70-126#	70-127	70-127#	70-146	70-148	70-148#	70-150
	70-150#	70-155	70-158	70-158#	70-160	70-160#	70-161	70-161#	70-162	70-162#	70-164	70-164#	70-166	70-166#
	72-26	72-26#	72-27	72-27#	72-29	72-29#	72-49	72-49#	72-52	72-52#	72-53	72-53#	72-55	72-55#
	72-57	72-57#	72-71	72-73	72-73#	72-74	72-74#	72-77	72-77#	72-78	72-78#	72-80	72-80#	72-101
	72-101#	72-104	72-104#	72-105	72-105#	72-107	72-107#	72-109	72-109#	72-123	72-124	72-124#	72-126	72-126#
	72-128	72-128#	72-130	72-130#	72-140	72-140#	72-143	72-143#	72-144	72-144#	72-145	72-145#	72-148	72-148#
	73-18	73-18#	73-20	73-20#	73-41	73-43	73-43#	73-45	73-45#	73-47	73-47#	73-65	73-67	73-67#
	73-69	73-69#	74-16	74-16#	74-43	74-43#	75-15	75-15#	75-38	75-38#	75-45	75-49	75-49#	76-28
	76-28#	76-39	76-39#	76-46	76-56	76-56#	77-18	77-18#	77-37	77-37#	77-43	77-43#	78-15	78-15#
	78-44	78-44#	79-15	79-15#	79-44	79-44#	80-15	80-15#	80-43	80-43#	81-18	81-18#	81-38	81-38#
	81-41	81-44	81-44#	83-19	83-19#	83-39	83-39#	83-42	83-46	83-46#	84-23	84-23#	84-25	84-25#
	84-47	84-47#	84-50	84-52	84-52#	84-54	84-54#	84-56	84-56#	84-80	84-80#	84-88	84-90	84-90#
	84-92	84-92#	85-16	85-16#	85-40	85-44	85-44#	86-16	86-16#	86-40	86-44	86-44#	87-16	87-16#
	87-43	87-58	87-79	87-102	87-102#	88-16	88-16#	88-42	88-42#	89-16	89-16#	89-42	89-42#	90-16
	90-16#	90-44	90-44#	91-16	91-16#	91-42	91-42#	93-18	93-18#	93-43	93-43#	94-16	94-16#	94-43
	94-43#	95-16	95-16#	95-43	95-43#	96-16	96-16#	96-46	96-46#	97-16	97-16#	97-45	97-45#	98-16
	98-16#	98-46	98-46#	99-16	99-16#	99-43	99-43#	100-18	100-18#	100-38	100-38#	100-39	100-39#	100-40
	100-40#	100-45	100-45#	100-52	100-52#	100-57	100-57#	100-61	100-61#	101-14	101-14#	101-36	101-36#	101-37
	101-37#	101-38	101-38#	101-46	101-46#	101-57	101-57#	102-14	102-14#	102-35	102-35#	102-36	102-36#	102-37
	102-37#	102-45	102-45#	102-57	102-57#									
MSTLAB	1-C29#	17-15#	27-41#	27-46#	27-49#	28-37#	28-48#	30-54#	30-55#	30-56#	30-81#	30-89#	30-93#	30-100#
	30-112#	30-113#	31-48#	31-55#	31-72#	32-35#	32-36#	32-40#	32-44#	32-45#	32-46#	32-55#	32-58#	32-70#

CROSS REFERENCE TABLE (CREF V01-05)

	32-73#	33-33#	34-37#	37-9#	37-10#	37-16#	37-18#	37-19#	37-20#	37-23#	37-24#	37-25#	37-29#	37-30#
	37-31#	37-32#	37-36#	37-37#	37-38#	37-39#	37-42#	37-43#	37-44#	37-45#	37-48#	37-49#	37-50#	37-51#
	37-54#	37-55#	37-56#	37-57#	37-63#	37-65#	37-66#	37-67#	37-68#	37-69#	37-70#	37-71#	37-72#	37-73#
	37-74#	37-75#	37-76#	37-79#	37-80#	37-81#	37-87#	37-93#	37-99#	37-100#	37-101#	37-108#	37-109#	37-110#
	37-111#	37-112#	37-116#	37-117#	37-118#	37-121#	37-123#	37-128#	37-130#	37-131#	37-134#	37-135#	40-10#	40-28#
	40-30#	40-32#	40-34#	40-36#	40-51#	40-57#	40-86#	40-126#	41-10#	41-22#	41-23#	41-24#	41-27#	42-14#
	51-10#	51-11#	51-13#	53-22#	53-42#	53-43#	53-44#	53-47#	53-49#	53-56#	53-59#	54-26#	54-28#	54-50#
	54-52#	54-56#	54-59#	54-71#	54-73#	54-75#	56-23#	56-25#	56-48#	56-52#	56-55#	56-76#	56-80#	56-82#
	56-104#	56-109#	56-111#	56-132#	56-136#	56-138#	56-144#	56-145#	56-148#	56-150#	58-17#	58-19#	58-27#	58-32#
	58-39#	58-43#	58-46#	58-48#	58-51#	58-53#	58-61#	58-66#	58-70#	58-74#	58-77#	58-79#	58-82#	59-14#
	59-16#	59-26#	59-28#	59-31#	59-33#	59-42#	59-46#	59-53#	59-55#	59-58#	60-13#	60-17#	60-18#	60-33#
	60-40#	60-42#	60-44#	60-46#	62-21#	62-28#	62-33#	62-38#	62-41#	62-48#	62-51#	62-54#	63-17#	63-23#
	63-24#	63-25#	63-44#	63-54#	63-57#	63-60#	63-62#	63-63#	63-65#	64-31#	64-33#	64-37#	64-38#	64-54#
	64-67#	64-72#	64-77#	64-81#	64-83#	64-85#	64-90#	64-91#	64-107#	64-117#	64-124#	64-130#	64-138#	64-148#
	64-151#	64-155#	64-157#	64-162#	64-163#	64-179#	64-192#	64-199#	64-205#	64-208#	64-212#	65-16#	65-18#	65-24#
	65-25#	65-26#	65-42#	65-51#	65-57#	65-61#	65-63#	65-65#	65-66#	65-68#	65-70#	65-72#	65-80#	65-81#
	65-82#	65-98#	65-107#	65-114#	65-118#	65-120#	65-122#	65-123#	65-126#	65-130#	65-132#	65-140#	65-141#	65-142#
	65-158#	65-167#	65-173#	65-179#	65-181#	65-183#	65-187#	65-190#	66-15#	66-19#	66-20#	66-21#	66-43#	66-49#
	66-53#	66-55#	66-56#	66-60#	68-20#	68-45#	68-65#	68-67#	69-26#	69-29#	69-30#	69-37#	69-39#	69-50#
	69-54#	69-57#	69-59#	69-70#	69-74#	69-78#	69-80#	69-90#	69-94#	69-97#	69-99#	69-110#	69-111#	69-116#
	69-119#	69-122#	69-124#	69-135#	69-136#	69-141#	69-144#	69-147#	69-149#	69-160#	69-161#	69-162#	69-167#	69-170#
	69-175#	69-177#	69-178#	69-181#	70-19#	70-21#	70-23#	70-29#	70-30#	70-31#	70-50#	70-52#	70-58#	70-61#
	70-63#	70-64#	70-65#	70-67#	70-69#	70-71#	70-77#	70-78#	70-79#	70-98#	70-100#	70-106#	70-109#	70-111#
	70-112#	70-113#	70-115#	70-117#	70-119#	70-125#	70-126#	70-127#	70-146#	70-148#	70-150#	70-155#	70-158#	70-160#
	70-161#	70-162#	70-164#	70-166#	72-26#	72-27#	72-29#	72-49#	72-52#	72-53#	72-55#	72-57#	72-71#	72-73#
	72-74#	72-77#	72-78#	72-80#	72-101#	72-104#	72-105#	72-107#	72-109#	72-123#	72-124#	72-126#	72-128#	72-130#
	72-140#	72-143#	72-144#	72-145#	72-148#	73-18#	73-20#	73-41#	73-43#	73-45#	73-47#	73-65#	73-67#	73-69#
	74-16#	74-43#	75-15#	75-38#	75-45#	75-49#	76-28#	76-39#	76-46#	76-56#	77-18#	77-37#	77-43#	78-15#
	78-44#	79-15#	79-44#	80-15#	80-43#	81-18#	81-38#	81-41#	81-44#	83-19#	83-39#	83-42#	83-46#	84-23#
	84-25#	84-47#	84-50#	84-52#	84-54#	84-56#	84-80#	84-88#	84-90#	84-92#	85-16#	85-40#	85-44#	86-16#
	86-40#	86-44#	87-16#	87-43#	87-58#	87-79#	87-102#	88-16#	88-42#	89-16#	89-42#	90-16#	90-44#	91-16#
	91-42#	93-18#	93-43#	94-16#	94-43#	95-16#	95-43#	96-16#	96-46#	97-16#	97-45#	98-16#	98-46#	99-16#
	99-43#	100-18#	100-38#	100-39#	100-40#	100-45#	100-52#	100-57#	100-61#	101-14#	101-36#	101-37#	101-38#	101-46#
	101-57#	102-14#	102-35#	102-36#	102-37#	102-45#	102-57#							
MSTSTL	1-C21#	17-15#	27-41	27-41#	27-46	27-46#	27-46#	27-49	27-49#	28-37	28-37#	28-37#	28-48	28-48#
	30-54	30-54#	30-55	30-55#	30-56	30-56#	30-81	30-81#	30-89	30-89#	30-89#	30-93	30-93#	30-93#
	30-100	30-100#	30-100#	30-112	30-112#	30-113	30-113#	31-48	31-48#	31-48#	31-55	31-55#	31-55#	31-72
	31-72#	31-72#	32-35	32-35#	32-35#	32-36	32-36#	32-40	32-40#	32-44	32-44#	32-45	32-45#	32-46
	32-46#	32-55	32-55#	32-58	32-58#	32-70	32-70#	32-73	32-73#	33-33	33-33#	34-37	34-37#	37-9
	37-9#	37-10	37-10#	37-16	37-16#	37-18	37-18#	37-19	37-19#	37-20	37-20#	37-23	37-23#	37-24
	37-24#	37-25	37-25#	37-29	37-29#	37-30	37-30#	37-31	37-31#	37-32	37-32#	37-36	37-36#	37-37
	37-37#	37-38	37-38#	37-39	37-39#	37-42	37-42#	37-43	37-43#	37-44	37-44#	37-45	37-45#	37-48
	37-48#	37-49	37-49#	37-50	37-50#	37-51	37-51#	37-54	37-54#	37-55	37-55#	37-56	37-56#	37-57
	37-57#	37-63	37-63#	37-65	37-65#	37-66	37-66#	37-67	37-67#	37-68	37-68#	37-69	37-69#	37-70
	37-70#	37-71	37-71#	37-72	37-72#	37-73	37-73#	37-74	37-74#	37-75	37-75#	37-76	37-76#	37-79
	37-79#	37-80	37-80#	37-81	37-81#	37-87	37-87#	37-93	37-93#	37-99	37-99#	37-100	37-100#	37-101
	37-101#	37-108	37-108#	37-109	37-109#	37-110	37-110#	37-111	37-111#	37-112	37-112#	37-116	37-116#	37-117
	37-117#	37-118	37-118#	37-121	37-121#	37-123	37-123#	37-128	37-128#	37-130	37-130#	37-131	37-131#	37-134
	37-134#	37-135	37-135#	40-10	40-10#	40-28	40-28#	40-30	40-30#	40-32	40-32#	40-34	40-34#	40-36
	40-36#	40-51	40-51#	40-57	40-57#	40-86	40-86#	40-126	40-126#	41-10	41-10#	41-22	41-22#	41-23
	41-23#	41-24	41-24#	41-27	41-27#	42-14	42-14#	51-10	51-10#	51-11	51-11#	51-13	51-13#	53-22
	53-22#	53-42	53-42#	53-43	53-43#	53-44	53-44#	53-47	53-47#	53-49	53-49#	53-56	53-56#	53-56#
	53-59	53-59#	54-26	54-26#	54-28	54-28#	54-50	54-50#	54-50#	54-52	54-52#	54-56	54-56#	54-59
	54-59#	54-71	54-71#	54-71#	54-73	54-73#	54-75	54-75#	56-23	56-23#	56-25	56-25#	56-48	56-48#
	56-48#	56-52	56-52#	56-55	56-55#	56-76	56-76#	56-76#	56-80	56-80#	56-82	56-82#	56-104	56-104#
	56-104#	56-109	56-109#	56-111	56-111#	56-132	56-132#	56-132#	56-136	56-136#	56-138	56-138#	56-144	56-144#
	56-144#	56-145	56-145#	56-148	56-148#	56-150	56-150#	58-17	58-17#	58-19	58-19#	58-27	58-27#	58-32

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	58-53#	58-61	58-61#	58-66	58-66#	58-66#	58-70	58-70#	58-74	58-74#	58-74#	58-77	58-77#	58-79
	58-79#	58-82	58-82#	59-14	59-14#	59-16	59-16#	59-26	59-26#	59-26#	59-28	59-28#	59-31	59-31#
	59-33	59-33#	59-42	59-42#	59-46	59-46#	59-53	59-53#	59-53#	59-55	59-55#	59-58	59-58#	60-13
	60-13#	60-17	60-17#	60-18	60-18#	60-33	60-33#	60-33#	60-40	60-40#	60-40#	60-42	60-42#	60-44
	60-44#	60-46	60-46#	62-21	62-21#	62-28	62-28#	62-33	62-33#	62-38	62-38#	62-41	62-41#	62-41#
	62-48	62-48#	62-48#	62-51	62-51#	62-51#	62-54	62-54#	63-17	63-17#	63-23	63-23#	63-24	63-24#
	63-25	63-25#	63-44	63-44#	63-44#	63-54	63-54#	63-54#	63-57	63-57#	63-57#	63-60	63-60#	63-62
	63-62#	63-63	63-63#	63-65	63-65#	64-31	64-31#	64-33	64-33#	64-37	64-37#	64-38	64-38#	64-54
	64-54#	64-54#	64-67	64-67#	64-67#	64-72	64-72#	64-72#	64-77	64-77#	64-77#	64-81	64-81#	64-83
	64-83#	64-85	64-85#	64-90	64-90#	64-91	64-91#	64-107	64-107#	64-107#	64-117	64-117#	64-117#	64-124
	64-124#	64-124#	64-130	64-130#	64-130#	64-138	64-138#	64-138#	64-148	64-148#	64-148#	64-151	64-151#	64-155
	64-155#	64-157	64-157#	64-162	64-162#	64-163	64-163#	64-179	64-179#	64-179#	64-192	64-192#	64-192#	64-199
	64-199#	64-199#	64-205	64-205#	64-205#	64-208	64-208#	64-212	64-212#	65-16	65-16#	65-18	65-18#	65-24
	65-24#	65-25	65-25#	65-26	65-26#	65-42	65-42#	65-42#	65-51	65-51#	65-51#	65-57	65-57#	65-57#
	65-61	65-61#	65-61#	65-63	65-63#	65-65	65-65#	65-66	65-66#	65-68	65-68#	65-70	65-70#	65-72
	65-72#	65-80	65-80#	65-81	65-81#	65-82	65-82#	65-98	65-98#	65-98#	65-107	65-107#	65-107#	65-114
	65-114#	65-114#	65-118	65-118#	65-118#	65-120	65-120#	65-122	65-122#	65-123	65-123#	65-126	65-126#	65-130
	65-130#	65-132	65-132#	65-140	65-140#	65-141	65-141#	65-142	65-142#	65-158	65-158#	65-158#	65-167	65-167#
	65-167#	65-173	65-173#	65-173#	65-179	65-179#	65-179#	65-181	65-181#	65-183	65-183#	65-187	65-187#	65-190
	65-190#	66-15	66-15#	66-19	66-19#	66-20	66-20#	66-21	66-21#	66-43	66-43#	66-43#	66-49	66-49#
	66-49#	66-53	66-53#	66-55	66-55#	66-56	66-56#	66-60	66-60#	68-20	68-20#	68-45	68-45#	68-45#
	68-65	68-65#	68-65#	68-67	68-67#	69-26	69-26#	69-29	69-29#	69-30	69-30#	69-37	69-37#	69-39
	69-39#	69-50	69-50#	69-50#	69-54	69-54#	69-57	69-57#	69-59	69-59#	69-70	69-70#	69-70#	69-74
	69-74#	69-78	69-78#	69-80	69-80#	69-90	69-90#	69-90#	69-94	69-94#	69-97	69-97#	69-99	69-99#
	69-110	69-110#	69-110#	69-111	69-111#	69-116	69-116#	69-116#	69-119	69-119#	69-122	69-122#	69-124	69-124#
	69-135	69-135#	69-135#	69-136	69-136#	69-141	69-141#	69-141#	69-144	69-144#	69-147	69-147#	69-149	69-149#
	69-160	69-160#	69-160#	69-161	69-161#	69-162	69-162#	69-167	69-167#	69-167#	69-170	69-170#	69-175	69-175#
	69-177	69-177#	69-178	69-178#	69-181	69-181#	70-19	70-19#	70-21	70-21#	70-23	70-23#	70-29	70-29#
	70-30	70-30#	70-31	70-31#	70-50	70-50#	70-50#	70-52	70-52#	70-58	70-58#	70-58#	70-61	70-61#
	70-63	70-63#	70-64	70-64#	70-65	70-65#	70-67	70-67#	70-69	70-69#	70-71	70-71#	70-77	70-77#
	70-78	70-78#	70-79	70-79#	70-98	70-98#	70-98#	70-100	70-100#	70-106	70-106#	70-106#	70-109	70-109#
	70-111	70-111#	70-112	70-112#	70-113	70-113#	70-115	70-115#	70-117	70-117#	70-119	70-119#	70-125	70-125#
	70-126	70-126#	70-127	70-127#	70-146	70-146#	70-146#	70-148	70-148#	70-150	70-150#	70-155	70-155#	70-155#
	70-158	70-158#	70-160	70-160#	70-161	70-161#	70-162	70-162#	70-164	70-164#	70-166	70-166#	72-26	72-26#
	72-27	72-27#	72-29	72-29#	72-49	72-49#	72-52	72-52#	72-53	72-53#	72-55	72-55#	72-57	72-57#
	72-71	72-71#	72-71#	72-73	72-73#	72-74	72-74#	72-77	72-77#	72-78	72-78#	72-80	72-80#	72-101
	72-101#	72-104	72-104#	72-105	72-105#	72-107	72-107#	72-109	72-109#	72-123	72-123#	72-123#	72-124	72-124#
	72-126	72-126#	72-128	72-128#	72-130	72-130#	72-140	72-140#	72-143	72-143#	72-144	72-144#	72-145	72-145#
	72-148	72-148#	73-18	73-18#	73-20	73-20#	73-41	73-41#	73-41#	73-43	73-43#	73-45	73-45#	73-47
	73-47#	73-65	73-65#	73-65#	73-67	73-67#	73-69	73-69#	74-16	74-16#	74-43	74-43#	75-15	75-15#
	75-38	75-38#	75-45	75-45#	75-45#	75-49	75-49#	76-28	76-28#	76-39	76-39#	76-46	76-46#	76-46#
	76-56	76-56#	77-18	77-18#	77-37	77-37#	77-43	77-43#	78-15	78-15#	78-44	78-44#	79-15	79-15#
	79-44	79-44#	80-15	80-15#	80-43	80-43#	81-18	81-18#	81-38	81-38#	81-41	81-41#	81-41#	81-44
	81-44#	83-19	83-19#	83-39	83-39#	83-42	83-42#	83-42#	83-46	83-46#	84-23	84-23#	84-25	84-25#
	84-47	84-47#	84-50	84-50#	84-50#	84-52	84-52#	84-54	84-54#	84-56	84-56#	84-80	84-80#	84-88
	84-88#	84-88#	84-90	84-90#	84-92	84-92#	85-16	85-16#	85-40	85-40#	85-40#	85-44	85-44#	86-16
	86-16#	86-40	86-40#	86-40#	86-44	86-44#	87-16	87-16#	87-43	87-43#	87-43#	87-58	87-58#	87-58#
	87-79	87-79#	87-79#	87-102	87-102#	88-16	88-16#	88-42	88-42#	89-16	89-16#	89-42	89-42#	90-16
	90-16#	90-44	90-44#	91-16	91-16#	91-42	91-42#	93-18	93-18#	93-43	93-43#	94-16	94-16#	94-43
	94-43#	95-16	95-16#	95-43	95-43#	96-16	96-16#	96-46	96-46#	97-16	97-16#	97-45	97-45#	98-16
	98-16#	98-46	98-46#	99-16	99-16#	99-43	99-43#	100-18	100-18#	100-38	100-38#	100-39	100-39#	100-40
	100-40#	100-45	100-45#	100-52	100-52#	100-57	100-57#	100-61	100-61#	101-14	101-14#	101-36	101-36#	101-37
	101-37#	101-38	101-38#	101-46	101-46#	101-57	101-57#	102-14	102-14#	102-35	102-35#	102-36	102-36#	102-37
	102-37#	102-45	102-45#	102-57	102-57#									
MSWORD	1-C94#	17-15#	18-11	18-11#	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8
	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8

CROSS REFERENCE TABLE (CREF V01-05)

	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8	19-8
	19-8	19-8	19-8	19-8	19-8	19-8	19-8#	27-46	27-46	27-46	27-46#	28-37	28-37	28-37
	28-37#	30-89	30-89	30-89	30-89#	30-93	30-93	30-93	30-93#	30-100	30-100	30-100	30-100#	31-48
	31-48	31-48	31-48#	31-55	31-55	31-55	31-55#	31-72	31-72	31-72	31-72#	32-35	32-35	32-35
	32-35#	53-56	53-56	53-56	53-56#	54-50	54-50	54-50	54-50#	54-71	54-71	54-71	54-71#	56-48
	56-48	56-48	56-48#	56-76	56-76	56-76	56-76#	56-104	56-104	56-104	56-104#	56-132	56-132	56-132
	56-132#	56-144	56-144	56-144	56-144#	58-32	58-32	58-32	58-32#	58-43	58-43	58-43	58-43#	58-66
	58-66	58-66	58-66#	58-74	58-74	58-74	58-74#	59-26	59-26	59-26	59-26#	59-53	59-53	59-53
	59-53#	60-33	60-33	60-33	60-33#	60-40	60-40	60-40	60-40#	62-41	62-41	62-41	62-41#	62-48
	62-48	62-48	62-48#	62-51	62-51	62-51	62-51#	63-44	63-44	63-44	63-44#	63-54	63-54	63-54
	63-54#	63-57	63-57	63-57	63-57#	64-54	64-54	64-54	64-54#	64-67	64-67	64-67	64-67#	64-72
	64-72	64-72	64-72#	64-77	64-77	64-77	64-77#	64-107	64-107	64-107	64-107#	64-117	64-117	64-117
	64-117#	64-124	64-124	64-124	64-124#	64-130	64-130	64-130	64-130#	64-138	64-138	64-138	64-138#	64-148
	64-148	64-148	64-148#	64-179	64-179	64-179	64-179#	64-192	64-192	64-192	64-192#	64-199	64-199	64-199
	64-199#	64-205	64-205	64-205	64-205#	65-42	65-42	65-42	65-42#	65-51	65-51	65-51	65-51#	65-57
	65-57	65-57	65-57#	65-61	65-61	65-61	65-61#	65-98	65-98	65-98	65-98#	65-107	65-107	65-107
	65-107#	65-114	65-114	65-114	65-114#	65-118	65-118	65-118	65-118#	65-158	65-158	65-158	65-158#	65-167
	65-167	65-167	65-167#	65-173	65-173	65-173	65-173#	65-179	65-179	65-179	65-179#	66-43	66-43	66-43
	66-43#	66-49	66-49	66-49	66-49#	68-45	68-45	68-45	68-45#	68-65	68-65	68-65	68-65#	69-26#
	69-50	69-50	69-50	69-50#	69-70	69-70	69-70	69-70#	69-90	69-90	69-90	69-90#	69-110	69-110
	69-110	69-110#	69-116	69-116	69-116	69-116#	69-135	69-135	69-135	69-135#	69-141	69-141	69-141	69-141#
	69-160	69-160	69-160	69-160#	69-167	69-167	69-167	69-167#	70-19#	70-50	70-50	70-50	70-50#	70-58
	70-58	70-58	70-58#	70-98	70-98	70-98	70-98#	70-106	70-106	70-106	70-106#	70-146	70-146	70-146
	70-146#	70-155	70-155	70-155	70-155#	72-71	72-71	72-71	72-71#	72-123	72-123	72-123	72-123#	73-41
	73-41	73-41	73-41#	73-65	73-65	73-65	73-65#	75-45	75-45	75-45	75-45#	76-46	76-46	76-46
	76-46#	81-41	81-41	81-41	81-41#	83-42	83-42	83-42	83-42#	84-50	84-50	84-50	84-50#	84-88
	84-88	84-88	84-88#	85-40	85-40	85-40	85-40#	86-40	86-40	86-40	86-40#	87-43	87-43	87-43
	87-43#	87-58	87-58	87-58	87-58#	87-79	87-79	87-79	87-79#	103-15	103-15#	103-16	103-16#	103-17
	103-17#	103-18	103-18#	103-41	103-41									
MSXFER	1-@82#	17-15#												
MANUAL	1-;62#	17-15#												
MEMORY	1-;66#	17-15#												
OPEN	1-;71#	17-15#												
POINTE	1-;76#	17-15#	17-34											
POP	25-40#	27-51	44-46											
PRINTB	1-<39#	17-15#	27-49	28-48	32-36	32-40	32-44	32-45	32-46	32-55	32-58	32-70	32-73	37-9
	37-16	37-18	37-19	37-23	37-24	37-29	37-30	37-31	37-36	37-37	37-38	37-42	37-43	37-44
	37-48	37-49	37-50	37-54	37-55	37-56	37-63	37-65	37-66	37-67	37-68	37-69	37-70	37-71
	37-72	37-73	37-74	37-75	37-79	37-80	37-87	37-93	37-99	37-100	37-101	37-108	37-109	37-110
	37-111	37-112	37-116	37-117	37-118	37-121	37-128	37-130	37-134	40-57	40-86	69-111	69-136	69-161
	69-162	70-52	70-100	70-148	70-150									
PRINTF	1-<79#	17-15#	51-11											
PRINTS	1-=19#	17-15#												
PRINTX	1-=59#	17-15#	33-33	34-37	53-42	53-59	56-145	101-46	102-45					
PUSH	25-30#	27-34	44-37											
READBU	1-=99#	17-15#												
READEF	1->03#	17-15#	40-30	40-32	40-34	40-36								
RFLAGS	1->08#	17-15#												
SETPRI	1->13#	17-15#	30-56	40-10	60-18	60-42	63-25	63-60	64-38	64-91	64-163	65-26	65-63	65-82
	65-120	65-142	65-181	66-21	66-53	69-30	69-175	70-31	70-61	70-79	70-109	70-127	70-158	100-40
	101-38	102-37												
SETVEC	1->18#	17-15#	30-54	30-55	41-10	53-22	60-17	63-23	63-24	64-37	64-90	64-162	65-24	65-25
	65-80	65-81	65-140	65-141	66-19	66-20	69-29	70-29	70-30	70-77	70-78	70-125	70-126	100-38
	100-39	101-36	101-37	102-35	102-36									
SLASH	1->24#	17-15#												
STARS	1->38#	17-15#												
SVC	1->52#	17-14#	17-15											

CROSS REFERENCE TABLE (CREF V01-05)

WAIT	25-52#	58-26	58-38	58-60	59-41	59-45	62-27	62-32	62-37
XFER	1-a12#	17-15#	69-26#	70-19#					
XFERF	1-a16#	17-15#							
XFERT	1-a20#	17-15#							