Floppy drives & Controller

PRODUCT CODE: MAINDEC-08-DIRXA-D-D

PRODUCT NAME: RX8/RX01 DIAGNOSTIC PROGRAM

DATE: JUNE, 1977

MAINTAINER: DIAGNOSTIC ENGINEERING

1. ABSTRACT

2. REQUIREMENTS

    2.1 EQUIPMENT
    2.2 STORAGE
    2.3 PRELIMINARY DIAGNOSTIC PROGRAMS

3. LOADING PROCEDURE

4. STARTING PROCEDURE

    4.1 STARTING ADDRESS LOCATIONS
    4.2 OPERATOR ACTION
    4.3 PROGRAM ACTION
    4.4 TEST PARAMETER SELECTIONS

        4.4.1 RESTRICTIONS

5. OPERATING PROCEDURE

6. ERROR DETECTION

    6.1 PROGRAM DEFINITIONS OF:

        6.1.1 WRITE ERROR
        6.1.2 READ ERROR (CRC)
        6.1.3 CRC AND DATA ERROR
        6.1.4 NO CRC BUT DATA ERROR
        6.1.5 CRC BUT NO DATA ERROR

            6.1.5.1 SUMCHECK ERROR

        6.1.6 SEEK ERROR
        6.1.7 PARITY ERROR

    6.2 DIFINITIVE ERROR CODES

    6.3 UNEXPECTED OR MISSING ERROR CONDITIONS:

        6.3.1 MISSING D.D. MARK
        6.3.2 UNEXPECTED D.D. MARK
        6.3.3 MISSING ERROR FLAG
        6.3.4 UNEXPECTED RX01 IRQ
        6.3.5 DEVICE TEST HUNG

    6.4 SYSTEM FAILURES: (UNKNOWN IRQ)

7. ERROR REPORTING

7.1 EXAMPLES

7.1.1 EXAMPLES OF INTERFACE / CONTROL RELATED ERRORS
7.1.2 EXAMPLES OF DRIVE / DATA RELATED ERRORS

7.1.2.1 SEEK ERROR
7.1.2.2 WRITE-CRC AND DATA ERROR
7.1.2.3 READ-CRC AND DATA ERROR
7.1.2.4 WRITE-CRC BUT NO DATA ERROR

7.2 ERROR RECOVERY
7.3 FATAL ERROR RECOVERY

8. MANUAL INTERVENTION

8.1 FIELD ENGINEERING TROUBLE SHOOTING AIDS

9. DIAGNOSTIC TEST STRATEGY

10. CONSOLE PACKAGE ADDENDUM

11. APT-8 INTERFACES

12. PROGRAM LISTING

1. ABSTRACT

THIS PROGRAM IS DESIGNED TO TEST THE RX01 FLEXIBLE DISKETTE SUBSYSTEM CONFIGURED AS A COMPLETE SUBSYSTEM, (RX8 INTERFACE, RX01 CONTROL, AND DISKETTE DRIVES), OR AS A PARTIAL SUBSYSTEM (INTERFACE, AND/OR CONTROL). OBVIOUSLY THE MAXIMUM RESOLUTION POSSIBLE IS ACHIEVED BY TESTING THE RX01 DISKETTE SUBSYSTEM CONFIGURED AS A COMPLETE SUBSYSTEM.

***
REVISION C

THE ADDITION OF THE CONSOLE PACKAGE.
THE REMOVAL OF TEST THREE (3).
SEE LISTING LOCATION FOR EXPLINATION
THE REMOVAL OF DECIMAL CONVERSION ROUTINES.
THE ADDITION OF API-8 INTERFACES.

***
REVISION D

THE ADDITION OF THE NEW CONSOLE PACKAGE.
COMPATABILITY FOR VT78 SYSTEMS.
ABILITY TO TEST 2 RX01 UNITS(4 DRIVES).
INTERLEAVING WAS MODIFIED FOR VT78.

2. REQUIREMENTS

2.1 EQUIPMENT

A PDP-8/E TYPE GENERATION COMPUTER WITH 4K OF CORE, CONSOLE SWITCHES, TELETYPE, AND AN RX01 DISKETTE SUBSYSTEM.

THE DIAGNOSTIC CAN RUN WITHOUT HARDWARE SWITCH IF THE CONSOLE PACKAGE IS USED. IF THE CONSOLE PACKAGE IS ACTIVE 8K OF CORE IS NEEDED.

2.2 STORAGE

THIS PROGRAM IS DESIGNED TO BE RUN STAND ALONE AND MUST OCCUPY PROGRAM LOCATIONS 0 THRU 7577 OF FIELD 0.

THE CONSOLE PACKAGE OCCUPIES FIELD 1 LOCATIONS 0 TO 1100.

FIELD 1 IS NEEDED ONLY IF THE CONSOLE PACKAGE IS BEING USED.

2.3 PRELIMINARY DIAGNOSTIC PROGRAMS

THIS PROGRAM ASSUMES THAT THE HOST PDP IS FUNCTIONING CORRECTLY.

3. LOADING PROCEDURE

THIS PROGRAM IS IN BINARY FORMAT. TO LOAD THIS PROGRAM INTO CORE, FOLLOW THE INSTRUCTIONS PUBLISHED FOR THE PARTICULAR BINARY FORMAT LOADER BEING USED.

4. STARTING PROCEDURE

4.1 STARTING ADDRESS LOCATIONS

THIS PROGRAM HAS 2 STARTING ADDRESS LOCATIONS:

200 * DIAGNOSTIC PROGRAM *

STARTING THIS PROGRAM AT PROGRAM LOCATION 200, AND SUCCESSFULLY SUPPLYING THE NECESSARY TEST PARAMETERS REQUESTED, DIRECTS THIS PROGRAM TO BEGIN TESTING THE RX01 SUBSYSTEM AS A SUBSYSTEM OR PARTIAL SUBSYSTEM. THE ADDRESS THAT THE CONSOLE PACKAGE WILL START THE DIAGNOSTIC AT IS LOCATION 200.

201 * RESTART OF DIAGNOSTIC PROGRAM *

STARTING THIS PROGRAM AT PROGRAM LOCATION 201 DIRECTS THE PROGRAM TO CONTINUE TESTING THE RX01 SUBSYSTEM AS A SUBSYSTEM OR PARTIAL SUBSYSTEM USING THE PARAMETERS SUPPLIED AT STARTING ADDRESS 200.

4.2 OPERATOR ACTION

CONFIGURE THE ACCUMULATOR SWITCHES TO REPRESENT THE OCTAL PROGRAM STARTING ADDRESS LOCATION DESIRED, PRESS " LOAD ADDRESS ", PRESS " CLEAR ", AND FINALLY PRESS " CONT " INUE. IF THE CONSOLE PACKAGE IS ACTIVE

THEN ISSUEING THE R DIRXA COMMAND WILL LOAD THE PROGRAM FROM A DISKETTE.

loads and starts

4.3 PROGRAM ACTION
//////////////////

THE PROGRAM PRINTS THE TITLE OF THE PROGRAM AND THE PRESENT MAINDEC REVISION. IF THE PROGRAM STARTING ADDRESS IS 200 THE PROGRAM WILL REQUEST TEST PARAMETER INFORMATION TO BE SUPPLIED BY BY THE OPERATOR VIA THE PDP SWITCHES.

* 201 *

THE PROGRAM HAS RECONFIRMED PREVIOUS TEST PARAMETER SELECTIONS BY PRINTING APPROPRIATE MESSAGES ON THE TELEPRINTER, AND HAS RESUMED TESTING.

4.4 TEST PARAMETER SELECTIONS
//////////////////////////////

AFTER STARTING THIS PROGRAM AT STARTING ADDRESS 200, THE PROGRAM WILL PRINT "REMOVE DIAGNOSTIC DISKETTE" (REMOVE AND REPLACE WITH SCRATCH DISKETTE) " SELECT PARAMETERS (INCLUDING DEVICE CODE) " ~~AND HALT OR~~ PRINT THE SWITCH REGISTER QUESTION IF THE CONSOLE PACKAGE IS ACTIVE.

blank in each drive

THE OPERATOR WILL THEN CONFIGURE CONSOLE SWITCHES 0-2 TO REPRESENT DISKETTE UNIT/DRIVE SELECTION, CONSOLE SWITCHES 3, 4, AND 5 TO REPRESENT RX8 INTERFACE IOT DEVICE CODE, AND FINALLY CONSOLE SWITHCHES 7 - 11 TO REPRESENT THE (STARTING) TEST , AND THEN PRESS " CONT " INUE.(SEE RESTRICTIONS)

"return"

Put in: 0000 for all tests of both drives

```
        C O N S O L E
        S W I T C H E S

0  1  2    3  4  5    6  7  8    9 10 11
U  U  U/C  X  X  X    U  T  T    T  T  T

X=DEVICE CODE (0 DEFAULTS TO 75)
T=TESTS (0 FOR ALL TESTS)
C=RX01 MICROCONTROL CABLED TO RX8 INTERFACE
U=UNIT/DRIVES SELECTED FOR TEST
WHERE:  UNIT    DRIVE(S)
0000 =  A       0,1
1000 =  B       0,1
2000 =  A       0
3000 =  B       0
4000 =  A       1
5000 =  B       1
6000 =  TEST CONTROL AND INTERFACE ONLY (NO DRIVES)
7000 =  TEST CONTROL ONLY (NO CONTROL OR DRIVES)
0040 =  TEST UNITS A AND B (ALL DRIVES)
2040 =  DRIVES 0 BOTH UNITS
4040 =  DRIVES 1 BOTH UNITS
```

THE PROGRAM WILL PRINT A CONFIRMATION MESSAGE, THEN BEGIN TESTING THE RX01 SUBSYSTEM AS A SUBSYSTEM OR PARTIAL SUBSYSTEM WITH THE FIRST TEST CONFIGURED WITHIN CONSOLE SWITCHES 7 THRU 11.

TO TEST THE RX01 DISKETTE SUBSYSTEM(RXA) AS A COMPLETE SUBSYSTEM, CONFIGURE CONSOLE SWITCHES 0, 1, AND 2 TO REPRESENT ZERO. THE PROGRAM WILL ASSUME ALL DRIVE(S) ARE READY (POWER APPLIED / DOOR CLOSED).

NOTE, HOWEVER, THAT TESTING THE RX01 DISKETTE SUBSYSTEM AS A PARTIAL SUBSYSTEM IS MORE THAN MERELY CONFIGURING CONSOLE SWITCHES 0, 1, AND 2 TO REPRESENT VALUES OTHER THAN ZERO.

IF ONLY THE CONTROL / INTERFACE PARTIAL SUBSYSTEM (NO DRIVES) IS THE THE UNIT UNDER TEST (UUT), THEN THE DISKETTE DRIVE(S) CABLE (IF ANY) MUST BE PHYSICALLY REMOVED FROM THE RX01 CONTROLLER, OR, THE DRIVES MUST BE RENDERED " NOT READY " (DOOR OPEN), THEN THE CONSOLE SWITCHES 0, AND 1 EACH MUST BE CONFIGURED TO REPRESENT A " 1 ".

IF ONLY THE INTERFACE PARTIAL SUBSYSTEM (NO DRIVES AND CONTROL) IS THE UUT THEN THE BC05-L CABLE FROM THE INTERFACE TO THE CONTROL MUST BE PHYSICALLY

REMOVED, ONLY THEN MAY CONSOLE SWITCHES 0, 1, AND 2 BE CONFIGURED TO RE-PRESENT A " 1 ".

4.4.1 RESTRICTIONS

A SELECT GROUP OF TESTS ARE DESIGNED TO CONFIRM THE RESULTS OF PREVIOUS TESTS. THE FOLLOWING IS AN OVERVIEW OF THOSE TESTS WHICH REQUIRE A PREVIOUS TESTS TO HAVE EXECUTED CORRECTLY.

...FOR THIS TEST TO FUNCTION CORRECTLY...		...THIS TEST MUST HAVE PREVIOUSLY EXECUTED CORRECTLY...
T14, T15	/	T13

TEST 14, AND TEST 15 EMPTY THE SECTOR BUFFER IN 12-BIT MODE COMPARING THE CONTENTS TO THE EXPECTED DATA PATTERN FILLED BY TEST 13.

T17, T20	/	T16

TEST 17, AND TEST 20 EMPTY THE SECTOR BUFFER IN 8-BIT MODE COMPARING THE CONTENTS TO THE EXPECTED DATA PATTERN FILLED WITHIN TEST 16.

T24, T25, T26	/	T22

THE SECTOR BUFFER SHOULD REMAIN UNCHANGED AND CONTAIN THE DATA PATTERN FILLED WITHIN TEST 22 AFTER THE RX01 CONTROL ATTEMPTS TO SEEK SECTOR 0.

T27	/	T22

THE CONTENTS OF THE SECTOR BUFFER SHOULD REMAIN UNCHANGED AND CONTAIN THE DATA PATTERN FILLED WITHIN TEST 22 AFTER THE RX01 CONTROLLER ATTEMPTS TO SEEK AN ILLEGAL TRACK GREATER THAN 114.

T32	/	T31

TEST 32 ISSUES AN INITIALIZE WHICH PERFORMS AN " IMPLIED READ " OF TRACK 1 / SECTOR 1. THE PROGRAM COMPARES THE DATA FROM THE SECTOR BUFFER WHICH SHOULD BE EQUIVALENT TO THE DATA WRITTEN WITHIN TEST 31 (FIRST WRITE EVER).

T33 / T31

TEST 33 ISSUES THE FIRST READ EVER OF THE TRACK / SECTOR WRITTEN WITHIN TEST 31 AND COMPARES THE DATA EXPECTING THE DATA PATTERN OF TEST 31.

5. OPERATING PROCEDURE

THE OPERATOR MAY CONTROL THE DYMANIC ACTION OF THE PROGRAM BY APPROPRIATELY CONFIGURING THE ACCUMULATOR SWITCHES AS DESCRIBED BELOW.

IF THE CONSOLE PACKAGE IS ACTIVE THEN THE SETTING OF THE SWITCH REGISTER UNDER DYMANIC CONDITIONS IS POSSIBLE BY TYPING CONTROL G THIS WILL PRINT THE SWITCH REGISTER QUESTION AND ALLOW CHANGES TO IT THEN CONTINUE RUNNING.

0 = 1 - INHIBIT ERROR HALT
1 = 1 - LOCK SCOPE LOOP ON ERROR
2 = 1 - LOCK SCOPE LOOP ON TEST (OK OR NOT)
3 = 1 - HALT AT THE END OF A TEST PASS
4 = 1 - INHIBIT ERROR PRINTOUTS
5 = 1 - (LONG) DATA COMPARISON ERROR PRINTOUT
6 = 1 - INHIBIT THE ISSUING OF [INIT] AT ERROR
11= 1 - DISABLE THE RINGING OF THE BELL AT AN ERROR

6. ERROR DETECTION

6.1 PROGRAM DEFINITIONS

THIS PROGRAM HAS DEFINED THE FOLLOWING AS ERRORS:

6.1.1 WRITE ERROR

A WRITE ERROR IS A READ ERROR IF THE DATA BEING READ IS OF UNKNOWN QUALITY (THE DATA BEING READ IS BEING READ FOR THE FIRST TIME AFTER ITS WRITING) .

6.1.2 READ (CRC) ERROR - (TRANSFER REGISTER STATUS BIT 11 = 1)

A READ ERROR IS A READ ERROR WHERE THE QUALITY OF THE DATA BEING READ IS KNOWN (THE DATA BEING READ HAD BEEN READ SUCCESSFULLY SOME TIME PREVIOUSLY).

6.1.3 CRC AND DATA ERROR
////////////////////////

6.1.4 NO CRC BUT DATA ERROR
///////////////////////////

6.1.5 CRC BUT NO DATA ERROR
///////////////////////////

THESE DATA ERRORS ARE DETECTED WHEN THE PROGRAM IS VERIFYING THE DATA THAT " SHOULD HAVE BEEN READ " WITH THE DATA THAT " ACTUALLY WAS READ " BY COMPARING THE " BAD " COLUMN TO THE " GOOD " COLUMN.

WORD#	GOOD	BAD
1	(TRACK IDENTIFICATION BITS 5-11)	
2	(SECTOR IDENTIFICATION BITS 8-11)	

WORDS 3 THRU 62 (IF 12-BIT MODE), OR
BYTES 3 THRU 126 (IF 8-BIT MODE) CONTAIN
THE OPERATORS PPP SELECTION.

63 (OR BYTE 127) = THE SUM OF ALL WORDS 1 THRU 62
OR BYTES 1 THRU 127.

64 OR (BYTE 128) = THE NEGATIVE OF 2 TIMES
THE VALUE OF WORD # 63 OR BYTE # 127.

6.1.5.1 SUM-CHECK ERROR
///////////////////////

THE PROGRAM DETECTS A " SUM-CHECK " ERROR BY SUMMING ALL THE ACTUAL (BAD) DATA COLUMN AND COMPARING THAT SUM TO 0.

THE REASON FOR THE FIRST 2 WORDS/BYTES CONTAINING TRACK / SECTOR IDENTIFICATION CODES IS TO DETECT ADDRESSING ERRORS.

THE REASON FOR THE LAST 2 WORDS/BYTES CONTAINING CHECKSUM INFORMATION IS TO DISTINGUISH BETWEEN WHAT MIGHT RESEMBLE AN ADDRESSING ERROR (IF THE PROGRAM DETECTED AN ERROR WHEN COMPARING THE FIRST 2 WORDS/BYTES) AND A CRC ERROR.

6.1.6 SEEK ERROR - (NO ALLOCATED TRANSFER REGISTER STATUS BIT)
////////////////

A SEEK ERROR HAS BEEN DEFINED AS " NOT A CRC ", AND " NOT A PARITY " ERROR.

6.1.7 PARITY ERROR - (TRANSFER REGISTER STATUS BIT 10 = 1)
////////////////////

A PARITY ERROR IS AN ERROR WHICH RESULTS FROM AN INCORRECT TRANSFER OF THE COMMAND WORD FORM THE RX8 INTERFACE TO THE RX01 MICROPROCESSOR CONTROL.

6.2 DEFINITIVE ERROR CODES
//////////////////////////

THE RX01 MICROCONTROLLER HAS DEFINED ERROR CODES AND MEANINGS WHICH ARE AVAILABLE TO THE PROGRAM BY ISSUING COMMAND #7 TO " READ THE B-CODE ".

A DEFINITIVE ERROR CODE REPRESENTS [WHERE] WITHIN A MICRO-FUNCTION THE ERROR WAS DETECTED.

THE FOLLOWING ARE THE DEFINITIVE ERROR CODES AND MEANINGS:

0	-	NO ERROR
10	-	DRIVE 0 FAILED TO SEE HOME FROM INITIALIZE
20	-	DRIVE 1 FAILED TO SEE HOME FROM INITIZLIAE
30	-	HOME FOUND WHEN STEPPING OUT 10 TRACKS FROM INIT
40	-	TRIED TO ACCESS A TRACK GREATER THAN 77(DECIMAL)
50	-	HOME WAS FOUND BEFORE DESIRED TRACK
60	-	SELF DIAGNOSTIC ERROR
70	-	DESIRED SECTOR NOT FOUND AFTER SAMPLING 52 HEADERS
100	-	WRITE PROTECT ERROR
110	-	MORE THAN 40US AND NO SEP CLOCK DETECTED
120	-	A PREAMBLE COULD NOT BE FOUND
130	-	PREAMBLE FOUND BUT NO ID MARD FOUND IN TIME
140	-	CRC ERROR ON SUPPOSIDLY GOOD HEADER
150	-	GOOD HEADER(NO CRC ERROR) BUT TRACK COMPARE ERROR
160	-	IDAM NOT FOUND IN TOME
170	-	DATA AM NOT FOUND IN TIME
200	-	DATA CRC ERROR
210	-	ALL PARITY ERRORS

6.3 UNEXPECTED OR MISSING ERROR CONDITIONS

6.3.1 MISSING DD MARK

THIS ERROR MAY OCCUR WHEN THE PROGRAM EXPECTED A DELETED DATA MARK BUT NONE OCCURED.

6.3.2 UNEXPECTED DD MARK

THIS ERROR MAY OCCUR WHEN THE PROGRAM HAD NOT EXPECTED A DELETED DATA MARK BUT ONE OCCURED.

6.3.3 MISSING ERROR FLAG

THIS ERROR MAY OCCUR WHEN THE CONTENTS OF THE TRANSFER REGISTER AT DONE TIME ARE NOT 0, AND THE ERROR FLAG IS CLEARED.

6.3.4 UNEXPECTED RX01 IRQ

THIS ERROR MAY OCCUR WHEN THE PROGRAM HAS NOT YET ENABLED THE RX8 INTERRUPT ENABLE FLIP-FLOP BUT AN INTERRUPT OCCURED.

6.3.5 DEVICE TEST HUNG

THIS ERROR MAY OCCUR WHEN THE PROGRAM EXPECTS BUT FAILED TO RECIEVE A PROGRAM INTERRUPT REQUEST FROM THE RX01 SUBSYSTEM WITHIN AN ALLOTTED PERIOD OF TIME (APPROXIMATELY 4 SECONDS).

6.4 UNKNOWN IRQ

THIS ERROR MAY OCCUR WHEN THE PROGRAM HAS FAILED TO IDENTIFY THE DEVICE ISSUING A PROGRAM INTERRUPT REQUEST.

7. ERROR REPORTING
////////////////////

ALL ERRORS DETECTED WILL BE REPORTED IF AC SW 3 = 0. THE PROGRAM HAS TWO ERROR REPORTING SCHEMES.

7.1.1 EXAMPLES IF INTERFACE / CONTROL RELATED ERRORS

THE FOLLOWING INFORMATION IS PRINTED FOR ALL INTERFACE / CONTROL RELATED ERRORS.

```
ERR     FAT     FAST    *       EAC     GOOD    PASS

        ERR     - PROGRAM ADDRESS OF THE ERROR
        FAT     - FIRST ADDRESS OF THE TEST IN ERROR
        FAST    - FIRST ADDRESS OF THE SUBTEST WITHIN THE TEST
        *       - SEE ASSEMBLY LISTING FOR MAP
        EAC     - ERROR AC (ACTUAL) RESULT OF TEST
        GOOD    - EXPECTED RESULT OF TEST
        PASS    - PASS # AT ERROR
```

7.1.2 EXAMPLES OF DRIVE / DATA RELATED ERRORS

THE FOLLOWING INFORMATION IS PRINTED FOR ALL DRIVE / DATA RELATED ERRORS.

```
CMND    XDR    CODE    RSTA    START      TARGET    PASS

        CMND    - COMMAND TO THE RX01 MICROCONTROLLER
        XDR     - CONTENTS OF THE TRANSFER REGISTER AT ERROR/DONE
        CODE    - DEFINITIVE ERROR CODE (VIA COMMAND #7)
        RSTA    - STATUS (VIA COMMAND #5)
        START   - STARTING TRACK/SECTOR ACTUATOR POSITION
        TARGET  - TARGET TRACK/SECTOR ACTUATOR POSITION
        PASS    - PASS # AT ERROR (TO 16777215 DECIMAL)
```

7.1.2.1 SEEK ERROR

```
CMND    XDR     CODE    RSTA    START   TARGET  PASS
0014    0100    0120    0300    [HOME]  1    1
INIT    0       0120    0200    [HOME]  [HOME]
```

A SEEK ERROR OCCURED WHILE TRYING TO " WRITE DELETED DATA " (CMND #14) ONTO TRACK 1 SECTOR 1.

```
        COMD    - WRITE DELETED DATA
        XDR     - DELETED DATA MARK
        CODE    - A PREAMBLE COULD NOT BE FOUND
        RSTA    - DRIVE READY + DELETED DATA
        START   - HOME POSITION
        TARGET  - TRACK 1, SECTOR 1
```

THEN THE PROGRAM ISSUED AN INITIALIZE AT AN ATTEMPT TO RECOVER FROM THE " SEEK " ERROR.

```
CMND    - MEANS IOT 67X7 (INIT) WAS ISSUED
XDR     - MUST BE SEEK (NOT CRC OR PARITY)
CODE    - A PREAMBLE COULD NOT BE FOUND
RSTA    - DRIVE READY
START   - HOME POSITION
TARGET  - HOME POSITION
```

7.1.2.2 WRITE-CRC AND DATA ERROR

```
CMND    XDR     CODE    RSTA    START   TARGET  PASS
0026    0001    3200    0201    100,30  100,1
WRITE-CRC AND DATA ERROR
WORD    GOOD    BAD
4       5435    5473
5       6617    5437
6       6303    4606
SUMCHECK IS 1253
TOTAL BAD=60
```

WHILE READING SECTOR 7 OF TRACK 100 THE PROGRAM DETECTED A CRC ERROR.

THE PROGRAM EXPANDS THE STANDARD ERROR FORMAT TO INCLUDE DATA COMPARISON INFORMATION IF THE TEST IS A DATA COMPARISON TEST.

IF AC SWITCH 2 =1 THEN A (LONG) DATA COMPARISON PRINTOUT WOULD HAVE OCCURRED OF (ALL) THE WORDS/BYTES IN ERROR.

THE WORD " WRITE " WITHIN THE EXPANSION MEANS THAT THE DATA OF SECTOR 7 HAD NEVER BEEN READ BEFORE, THEREFORE THE PROGRAM ASSUMED IT WAS WRITTEN INCORRECTLY.

7.1.2.3 READ-CRC AND DATA ERROR

```
CMND    XDR     CODE    RSTA    START   TARGET  PASS
0026    0001    0200    0201    100,30  100,1
READ-CRC AND DATA ERROR
WORD    GOOD    BAD
4       5435    5477
5       6617    5437
6       6303    5406
SUM-CHECK IN 1257
TOTAL BAD=60
```

WHILE SEEKING SECTOR 1 OF TRACK 100 THE PROGRAM DETECTED A CRC ERROR.

THE PROGRAM EXPANDS THE STANDARD ERROR FORMAT TO INCLUDE DATA COMPARISON INFORMATION IF THE TEST IS A DATA COMPARISON TEST.

IF AC SWITCH 2 = 1 THEN A (LONG) DATA COMPARISON ERROR PRINTOUT WOULD HAVE OCCURRED OF (ALL) THE WORDS/BYTES IN ERROR.

THE WORD " READ " WITHIN THE EXPANSION MEANS THAT THE DATA OF SECTOR 7 HAD BEEN READ SOME TIME PREVIOUSLY, THEREFORE THE PROGRAM ASSUMES THAT THE DATA WAS WRITTEN CORRECTLY BUT READ INCORRECTLY.

7.1.2.4 WRITE-CRC BUT NO DATA ERROR

CMND	XDR	CODE	RSTA	START	TARGET	PASS
0020	0001	0200	0201	100,30	100,1	

WRITE - CRC BUT NO DATA ERROR

A CRC ERROR WAS DETECTED AFTER READING SECTOR 1 OF TRACK 100.

THE WORD " WRITE " WITHIN THE DATA EXPANSION MEANS THAT THE DATA OF SECTOR 1 TRACK 100 HAD NEVER BEEN READ BEFORE THEREFORE THE PROGRAM ASSUMED IT WAS WRITTEN INCORRECTLY, AND BECAUSE THE PROGRAM DID NOT DETECT A DATA COMPARISON ERROR, IT ASSUMED THAT THE 2 CRC CHARACTERS WERE WRITTEN INCORRECTLY.

7.2 ERROR RECOVERY

THE PROGRAM WILL ATTEMPT TO RETRY ALL ERRORING FUNCTIONS 10 TIMES. A RECOVERABLE ERROR (SOFT) IS ONE WHICH DISAPPEARS WITHIN 10 PROGRAM RETRYS. AN UNRECOVERABLE ERROR (HARD) IS ONE WHICH REMAINS AFTER 10 PROGRAM RETRYS.

THE PROGRAM WILL ISSUE IOT 67X7 (INIT) FOR ALL ERRORS BUT DEFINITIVE ERROR CODES 140, 200, AND 210.

140 - CRC ERROR ON SUPPOSIDELY GOOD HEADER
200 - DATA CRC ERROR
210 - PARITY ERROR

THESE ERRORS ARE (NOT) SEEK TYPE ACTUATOR RELATED ERRORS.

IF A HARD WRITE ERROR IS DETECTED THE PROGRAM ABORTS FURTHER TESTING THIS PASS OF THAT TRACK/SECTOR BUT CONTINUES TESTING TRACKS. ON THE REMAINING

A SYMPATHETIC HARD READ ERROR MAY OCCUR (PATTERN DEPENDENT) IF THE HARD WRITE ERROR HAD OCCURRED WITHIN A TEST WHICH WOULD EVENTUALLY READ THAT SECTOR AND A SYMPATHETIC HARD DATA COMPARISON ERROR MAY OCCUR IF THAT TEST WAS TO VERIFY THE DATA TO A KNOWN PATTERN.

7.3 FATAL ERROR RECOVERY

IF THE PROGRAM DETECTS ANY OF THE SUCCEDING FATAL ERROR CONDITIONS, THE PROGRAMS RECOVERY WILL BE THAT OF EXITING THE PRESENT TEST.

(A) HARD PARITY ERROR
(B) A SELECTED DRIVE BECOMING NOT READY
(C) NO EXPECTED RX01 INTERRUPT REQUEST
(D) MISSING ERROR FLAG
(E) LOG OVERFLOW
(F) DEVICE TEST HUNG.

8. MANUAL INTERVENTION

8.1 FIELD ENGINEERING TROUBLE SHOOTING AIDS

THE FIELD ENGINEER, BY ALTERING THE CONTENTS OF SPECIFIC PROGRAM MAINTENANCE LOCATIONS, IS ABLE TO DIRECT THE PROGRAM TO PERFORM TESTING UPON A PARTICULAR AREA [WINDOW] OF THE DISKETTE INSTEAD OF THE ENTIRE SURFACE. THESE PROGRAM LOCATIONS ARE LABLED "OD" "ID", "FIRST, AND "LAST".

"OD" (OUTSIDE DIAMETER), PROGRAM LOCATION 30, IS THE INITIAL OUTERMOST TRACK THE PROGRAM WILL ACCESS.

"ID" (INSIDE DIAMETER), PROGRAM LOCATION 31, IS THE FINAL INNERMOST INNERMOST TRACK THE PROGRAM WILL ACCESS.

"FIRST", PROGRAM LOCATION 32, IS THE FIRST SECTOR TO BE ACCESSED OF A TRACK.

"LAST", PROGRAM LOCATION 33, IS THE LAST SECTOR TO BE ACCESSED OF A TRACK.

THE STANDARD ASSEMBLED CONTENTS OF THESE FIELD ENGINEERING MAINTENANCE LOCATIONS ARE:

```
        *30

OD,     52      /INITIAL TRACK TO TEST
ID,     53      /FINAL TRACK TO TEST
FIRST,  1       /FIRST SECTOR OF A TRACK
LAST,   32      /LAST SECTOR OF A TRACK
```

THESE ARE THE ONLY FIELD ENGINEERING MAINTENANCE PROGRAM LOCATIONS DESIGNED TO BE EXTERNALLY ALTERED.

THE PROGRAM WILL PRINT A MAINTENANCE VERIFICATION MESSAGE IF THE CONTENTS OF THE MAINTENANCE LOCATIONS ARE NOT THE ASSEMBLED STANDARDS.

THE OCTAL CONTENTS OF THESE MAINTENANCE LOCATIONS MUST BE WITHIN THE RESTRICTED LIMITS WHICH ARE:

```
0 <= OD <= ID
0 <= ID <= 114
1 <= FIRST <= LAST
1 <= LAST <= 32
```

THE PROGRAM VERIFIES THE CONTENTS OF EACH MAINTENANCE LOCATION. THE PROGRAM WILL SET INTO THE MAINTENANCE LOCATION THE STANDARD VALUE IF THE DESIRED CONTENTS WERE NOT WITHIN THE REQUIRED SPECIFIED LIMITS.

NOTE, THAT TRACK 0 IS NOT INCLUDED WITHIN THE STANDARD [WINDOW] OF TESTABLE TRACKS. THE REASONE FOR THIS IS NOT TO INADVERENTLY DESTROY THE FORMATTED CONTENTS OF TRACK 0.

TO EXPAND THE WINDOW OF TESTABLE TRACKS INCLUDING TRACK 0, THE CONTENTS OF PROGRAM LOCATIONS " OD " MUST BE ZERO.

IN SUMMARY, IF THE CONTENTS OF PROGRAM LOCATIONS OD, ID, FIRST, AND LAST WERE 30, 30, 1, 1, RESPECTIVELY, THE PROGRAM WOULD PERFORM SELECTED TESTING ONLY UPON TRACK 30, SECTOR 1.

9. DIAGNOSTIC TEST STRATEGY

THE PDP-8 DIAGNOSTIC PACKAGE, WHICH CONTAINS THE RX8/RX01 DIAGNOSTIC PROGRAM, "MAINDEC-08-DIRXA-", AND THE RX8/RX01 DATA RELIABILITY/EXERCISER PROGRAM, "MAINDEC-08-DIRXB-", IS DESIGNED TO COMPLETELY TEST THE RX8/RX01 SUBSYSTEM WHEN EACH PROGRAM IS RUN TO ITS NATURAL COMPLETION COMMENCING WITH THE RX8/RX01 DIAGNOSTIC PROGRAM.

THE RX8 DIAGNOSTIC PROGRAM CONTAINS EFFICIENT MAINTENANCE SCOPING LOOPS, WHILE THE RX8/RX01 DATA RELIABILITY/EXERCISER PROGRAM CONTAINS DISKETTE COMPATABILITY VERIFICATION.

10. CONSOLE PACKAGE

TABLE OF CONTENTS

10.1. ABSTRACT

10.2. REQUIREMENTS

10.3. RESTRICTIONS

10.4. STANDARD OPERATING PROCEDURE
10.4.1 INITIALIZATION
10.4.2 CONTROL CHARACTERS
10.4.3
10.4.4 SWITCH REGISTER MESSAGE
10.4.5 END OF PASS MESSAGE

10.5. ERRORS
10.5.1 ERROR HALTS

10.6. SWITCH REGISTER SETTINGS
10.6.1 OPERATING SWITCHES
10.6.2 ERROR SWITCHES

10.7. LOCATION CHANGES

10.8. PROGRAM DESCRIPTION

10.9. DIALOGUE FOR CONSOLE PACKAGE

10.10. LISTING

10.1. ABSTRACT

THE CONSOLE PACKAGE HAS BEEN ADDED TO THIS DIAGNOSTIC TO ALLOW THE PROGRAM TO RUN WITH NO HARDWARE SWITCH REGISTER AND TO HAVE COMMUNICATIONS WITH THE DIAGNOSTIC VIA A TERMINAL.
THE DIAGNOSTIC CAN BE RUN IN TWO MODES WITH THE CONSOLE PACKAGE . 1) RUNNING WITH THE CONSOLE PACKAGE ACTIVE - THIS ALLOWS THE OPERATOR CONTROL OF THE DIAGNOSTIC THROUGH THE TERMINAL. THE DIAGNOSTIC WILL ASK FOR THE VALUE OF THE PSEUDO SWITCH REGISTER,BEFORE COTINUING WITH EXECUTION OF THE DIAGNOSTIC ALL ERROR WILL BE PRINTED ON THE TERMINAL AND THE NUMBER OF PASSES WILL BE PRINTED. THERE WILL BE NO HALTS EXECUTIED .

2) CONSOLE PACKAGE NOT ACTIVE-THIS WILL RESULT IN THE USE OF HALTS FOR ERROR, HALTS AT END OF PASS IF SELECTED,USE OF THE HARDWARE SWITCH REGISTER ,NOT ASKING THE SWITCH QUESTION.

VT7@ MUST ALWAYS BE RUN WITH ACTIVE CONSOLE PACKAGE.

10.2. REQUIREMENTS

10.3. RESTRICTIONS

1) RUNNING THE CONSOLE PACKAGE REQUIRES THAT THE PSEUDO SWITCH REGISTER BE USED.

2) ONCE RUNNING THE CONSOLE PACKAGE NONACTIVE AND NOW DESIRE TO RUN IT ACTIVE, ONE MUST RELOAD THE DIAGNOSTIC AND INITILIZE FOR A ACTIVE CONSOLE PACKAGE.

3.) THE CONSOLE PACKAGE IS LOCATED IN FIELD 1 THERE MUST BE 8K OF CORE TO RUN THE CONSOLE PACKAGE.

10.4. STANDARD OPERATION PROCEDURE

10.4.1 INITIALIZATION

FOR A ACTIVE CONSOLE PACKAGE

1.) LOAD ADDRESS 0021

2.) SET TO 0000 INDICATOR FOR USING THE PSEUDO SWITCH REGISTER

3.) LOAD ADDRESS 0022

4.) SET SR3=1 (400) INDICATOR FOR USING A ACTIVE CONSOLE PACKAGE

5.) LOAD STARTING ADDRESS OF PROGRAM AND BEGIN

FOR A NON ACTIVE CONSOLE PACKAGE

1.) LOAD ADDRESS 0021

2.) SET SR0=1 (4000) TO INDICATE A HARDWARE SWITCH REGISTER

3.) LOAD ADDRESS 0022

4.) SET TO 0000 TO INDICATE A DEACTIVE CONSOLE PACKAGE

5.) LOAD STARTING ADDRESS OF PROGRAM AND BEGIN

FOR VT78

1) LOAD PROGRAM INTO CORE.

2) USING ODT SET LOC 21 TO 0000
   LOC 22 TO 1400.

3) SAVE

10.4.2 CONTROL CHARACTERS

CONTROL CHARACTERS ARE USED TO GIVE THE OPERATOR THE ABILITY TO PERFORM THE FOLLOWING FUNCTIONS.
NOTE: THE PROGRAM WILL RESPOND TO THE CONTROL CHARACTER IN FIVE (5) SECONDS OR LESS.

CONTROL G	PRINT UPARROW G, DO A CARRIAGE RETURN AND LINE FEED, AND PRINT SR=XXXX, WAIT FOR INPUT FROM OPERATOR.
CONTROL C	RETURN TO MONITOR
CARRIAGE RETURN	RETURN TO PROGRAM, NO CHANGE TO PSEUDO SWITCH REGISTER.
LINE FEED	RESTART PROGRAM , NO CHANGE TO PSEUDO SWITCH REGISTER.
1 TO 4 OCTAL DIGITS AND CARRIAGE RETURN	CHANGE PSEUDO SWITCH REGISTER AND RETURN TO THE PROGRAM.
1 TO 4 OCTAL DIGITS AND A LINE FEED	CHANGE PSEUDO SWITCH REGISTER AND RESTART THE PROGRAM.

1 TO 4 OCTAL DIGITS AND A CONTROL G	NO CHANGE TO PSEUDO SWITCH REGISTER SAME RESPONSE AS A CONTROL G.
ALL OTHER INPUT (ILLEGAL CHARACTERS OR 5 DIGITS)	NO CHANGE TO PSEUDO SWITCH REGISTER, ECHO THE CHARACTER, PRINT A QUESTION MARK, DO A CARRIAGE RETURN LINE FEED, PRINT SR=XXXX, WAIT FOR OPERATOR INPUT.
CONTROL S	THIS IS USED TO INHIBIT TRANSMISSION OF DATA TO THE OPERATORS TERMINAL. WHEN TYPED WHILE THE PROGRAM IS RUNNING MESSAGE PRINTING IS INHIBITED, BUT THE PROGRAM WILL CONTINUE TO RUN UNTIL A MESSAGE IS PENDING. IF TYPED WHILE A MESSAGE IS IN PROGRESS, THE PRINTOUT WILL BE INTERRUPTED. A CONTROL Q OR CONTROL C WILL RESUME PROGRAM ACTIVITY. THIS IS A NONPRINTING CHARACTER.
CONTROL Q	THIS ENABLES DATA TRANSMISSION TO OPERATORS TERMINAL IF A PREVIOUS CONTROL S WAS IN EFFECT. THIS IS A NONPRINTING CHARACTER.

10.4.4

SWITCH REGISTER MESSAGE

THIS MESSAGE IS USED TO SETUP THE PSEUDO SWITCH REGISTER
BEFORE PROGRAM EXECUTION TAKES PLACE (OR IN RESPONSE TO A "G).
THE SWITCH REGISTER IS SETUP WHEN A CARRIAGE
RETURN IS TYPED

```
**************************************************************
SR=^000 4000
        ----
```

UNDER SCORING INDICATES OPERATOR RESPONCE

10.4.5

END OF PASS

A INDICATION WILL BE GIVEN WHEN THE DIAGNOSTIC HAS MADE A
SUCCESSFULL PASS, THE PRINT OUT WILL INDICATE THE DIAGNOSTIC
MAINDEC NUMBER THE WORD PASS AND A FOUR DIGIT PASS NUMBER.
A PASS WILL BE A TIME PERIOD RATHER THAN A PROGRAM PASS
OF THE DIAGNOSTIC, THE TIME PERIOD WILL BE IN THE RANGE OF
ONE (1) TO FIVE (5) MINUTES, IF THE DIAGNOSTIC MAKES A PROGRAM
PASS IN THE 1 TO 5 MINUTE RANGE THEN THE PASS COUNT WILL BE THE
SAME AS THE NUMBER OF PROGRAM PASSES,IF THE PROGRAM MAKES A
PROGRAM PASS IN LESS THEN ONE MINUTE THEN THE PASS COUNT WILL
NOT BE THE SAME AS THE PASS COUNTER THE PASS COUNTER WILL
REFLECT MORE THEN ON PROGRAM PASS.
THE NUMBER OF PROGRAM PASSES REQUIRED FOR "A PASS MESSAGE
CAN BE FOUND IN LOCATION CALLED "CNTVAL".
IF HALT AT END OF PASS IS SET THEN THE PASS MESSAGE WILL BE
PRINTED AND A WAITING STATEMENT WILL ALSO BE PRINTED.
A CONTROL CHARACTER IS NEEDED TO CONTINUE FROM THIS MESSAGE.
THE FORMAT OF THE END OF PASS MESSAGE IS

```
NAME PASS 0001 ( * OR I OR C OR D )
                * AN ERROR OCCURED DURING I,C,D
                I INTERFACE TEST OK RX8
                C RX8 AND RX01 TESTED OK
                D RX8 AND RX01 AND DRIVE TESTED OK
**************************************************************
```

10.5. ERRORS

UPON DETECTION OF A ERROR THE DIAGNOSTIC WILL DO ONE OF THE FOLLOWING OPERATIONS:

1.) PRINT THE ERROR MESSAGE FOR THE ERROR CONDITION
    CHECK THE SWITCH REGISTER TO SEE IF THE PROGRAM SHOULD HALT
    IF HALT ON ERROR IS SELECTED THEN THE PSR WILL BE PRINTED.

REFER TO THE LISTING AT THE LOCATION PRINTED IN THE ERROR PC FOR THE CAUSE OF THE ERROR.

10.5.1 ERROR HALTS

CONSOLE PACKAGE DEACTIVE WILL CAUSE NO ERROR MESSAGE TO BE PRINTED.A HALT WILL REPLACE THE ERROR CALL IN THE CODE AND THE DIAGNOSTIC WILL THEN GO TO THAT HALT. REFER TO THE LISTING FOR THE CAUSE OF THE ERROR.THE ERROR LOCATION WILL BE THE SAME IF THE CONSOLE PACKAGE WAS ACTIVE.

10.6. SWITCH REGISTER SETTINGS

THE FOLLOWING SWITCH REGISTER SETTINGS ARE USED BY THE CONSOLE PACKAGE. THESE SWITCH REGISTER SETTINGS ARE VALID WHEN USING THE HARDWARE SWITCH REGISTER AND THE PSEUDO SWITCH REGISTER.

10.6.1 OPERATING SWITCHES

THE CONSOLE PACKAGE USES THE LOCATIONS 20 21 22 FOR THE FOLLOWING PURPOSES.

LOCATION 20
PSEUDO SWITCH REGISTER

LOCATION 21
HARDWARE IDENTIFIER 1

LOCATION 22
HARDWARE IDENTIFIER 2

LOCATION 0022

BIT	OCTAL VALUE	FUNCTION WHEN 0	FUNCTION WHEN 1
0	4000	NOT ON ACT8A LINE	ON ACT 8A LINE
1	2000	NOT ON ACT 8E LINE	ON ACT 8E LINE
2	1000	NOT ON VT78	ON VT78
3	400	DEACTIVE CONSOLE PACKAGE	ACTIVE CONSOLE PACKAGE

6.2 ERROR RELATED SWITCHES

THESE ARE THE SWITCH REGISTER SETING THAT THE CONSOLE PACKAGE WILL RECOGNISE.

BIT	OCTAL VALUE	FUNCTION WHEN 0	FUNCTION WHEN 1
0	4000	STOP AFTER ERROR	CONT AFTER ERROR
1	2000	NO SCOPE LOOP ON ERROR	LOCK SCOPE LOOP ON ERROR
2	1000	NO SCOPE LOOP ON TEST	LOCK SCOPE LOOP ON TEST(OK OR NOT)
3	0400	CONTINUE AFTER END OF PASS	STOP AFTER END OF PASS
4	0200	PRINT ERROR MESSAGES	DO NOT PRINT ERRORS
5	0100	SHORT ERROR PRINTOUT	LONG DATA COMPARISON
6	0040	ISSUE(INIT)AT ERROR	DO NOT ISSUE (INIT) AT ERROR
11	0001	RING BELL ON ERROR	NO BELL RINGING

10.7. LOCATION CHANGES

THE FOLLOWING LOCATIONS CAN BE CHANGED TO MEET THE SPECIFIC NEED FOR MODIFICATION OF THE DIAGNOSTIC.

CNTVAL — IS THE LOCATION FOR THE VALUE OF THE NUMBER OF PROGRAM PASSES NEED TO PRINT THE END OF PASS MESSAGE.

FILLER — IS THE LOCATION SET FOR THE NUMBER OF FILLER CHARACTERS AFTER A CRLF SET TO FOUR (4)

10.8. PROGRAM DESCRIPTION

PARAMETER SELECTIONS:
BITS 0-1
SELECT DRIVES: 0000 =SELECT DRIVES 0 AND 1(RXA)

SEE SECTION 4.4 TEST PARAMETER SELECTION

BITS 3-5
DEVICE CODE SELECTION
PUT ONE DIGITE DEVICE CODE IN HERE
THE PROGRAM ASSUMES THE FIRST DIGIT TO BE 7

EXAMPLE :IF DEVICE CODE IS 75 ENTER A 500
BITS 7-11

TEST SELECTION
PUT IN TEST YOU WISH TO RUN
A 00 TEST SELECTION IS ALL TESTS

10.9. DIALOGUE FOR CONSOLE PACKAGE

THE DIALOGUE FOR THIS DIAGNOSTIC IS:

```
R DTRXA (CR)

MAINDEC-08-DIRXA-D                  /THE -D IS THE REVISION LEVEL

REMOVE DIAGNOSTIC DISKETTE          /REMOVE AND REPLACE
                                    /WITH A SCRATCH DISKETTE

SELECT PARAMETERS(INCLUDING DEVICE CODES)
SR=0000                             /DEVICE CODE SELECTED IS 75
                                    /RXA DRIVES 0 AND 1
                                    /AND ALL TESTS SELECTED

TEST PARAMETERS: 0000               /VERIFICATION FOR PARAMETERS

OD=0001 ID=0114 FIRST= 0001 LAST= 0032  /DISKETTE RANGE SELECTED

SR=0000 0400                        /0400= SWITCH SETTING STOP ON ERROR AND
                                    /AT END OF PASS
```

11. APT-8 INTERFACES

11.1 DESCRIPTION

TWO INTERFACES HAVE BEEN PROVIDED WHICH WILL ALLOW THIS DIAGNOSTIC TO RUN UNDER THE STANDARD APT-8 SYSTEM, THESE INTERFACES ARE:

1. TIMING INTERFACE

2. ERROR INTERFACE

EACH WILL BE EXPLAINED IN MORE DETAIL.

11.2 SETUP

IN ORDER TO RUN UNDER APT-8, ADDRESSES 20 AND 22 MUST BE ESTABLISHED PRIOR TO RUNNING THE PROGRAM UNDER APT-8 CONTROL. THE FOLLOWING INFORMATION MUST BE INDICATED:

1. DEVICE CODE OF RX01 CONTROLLER UNDER TEST.

2. RX01 CONTROLLER CABLED TO INTERFACE.

3. DRIVE OR DRIVES TO BE TESTED.

4. DIAGNOSTIC RUNNING UNDER THE APT-8 SYSTEM.

5. STARTING TEST NUMBER IF OTHER THEAN THAT FOR ACCEPTANCE.

ADDRESS 20

ADDRESS 20 IS USED TO ESTABLISH ALL BUT ITEM 4.
THE SET UP IS THE SAME FOR THAT OF THE STANDARD SWITCH REGISTER FUNCTION.

```
0  1  2  3  4  5  6  7  8  9 10 11

U  U  C  X  X  X  =  T  T  T  T  T
                       (STARTING TEST)

          0 = 0   = DISKETTE DRIVE(S) IS READY
          1 = 0   = (POWER APPLIED / DOOR CLOSED)

          2 = 0   = RX01 MICROCONTROL CABLED TO
                    RX8 INTERFACE


          3 =     = FOR STANDARD DEVICE CODE
          4 =     = POSITION CONSOLE SWITCHES
          5 =     = 3-4-5 = 0

          7 =     = TO EXECUTE ALL TESTS
          8 =     = CONFIGURE CONSOLE SWITCHES
          9 =     = 7 THRU 11
          10=     = EQUIVALENT TO ZERO
          11=     = (THIS IS THE STARTING TEST)
```

NOTE: IF MORE THAN ONE DEVICE CODE IS AVAILABLE ON THE SYSTEM THE DIAGNOSTIC WILL HAVE TO RELOADED AND THE PROPER DEVICE CODE SELECTED.

ADDRESS 22

THIS ADDRESS IS USED TO INDICATE THAT THE PROGRAM IS RUNNING ON APT-8, THE NUMBER OF DRIVES TO BE DONE, AND IF SINGLE DRIVE TESTING.

BIT ZERO MUST BE A ONE (1) TO INDICATE THAT THE DIAGNOSTIC IS RUNNING ON APT-8.

CAUTION:

WHILE UNDER APT-8 CONTROL THE HARDWARE SWITCH REGISTER IS FUNCTIONAL, IT IS RECOMMENDED THAT THE SWITCH REGISTER BE SET TO ZERO PRIOR TO START-UP.

11.3 APT-8 INTERFACES.

11.3.1 TIMING

APT-8 IS NOTIFIED OF PROGRAM RUN BETWEEN .2 SECONDS AND 2.0 SECONDS. THIS WILL ALLOW THE DIAGNOSTIC TO RUN UNDER THE MUCH SLOWER MOS MEMORY WITHOUT CAUSING APT-8 TO GIVE A TIMEOUT ERROR.

11.3.2 ERRORS

ONLY THE ERROR PC IS REPORTED TO APT-8. THE TYPE OF ERROR CAN BE DETERMINED FROM THE CORRESPONDING ADDRESS IN THE PROGRAM LISTING. THERE IS A POSSIBILITY THAT A TIMEOUT ERROR MAY OCCUR. THIS IS CAUSED BY THE ERROR "HUNG DEVICE". THE PROGRAM WILL HAVE TO BE RERUN IN DUMP MODE IF THIS SHOULD HAPPEN.

11.4 LOADING PRECAUTIONS

THIS PROGRAM SHOULD BE LOADED IN SRCIPT MODE INDICATING TO APT-8 THAT CORE SUMCHECKS ARE TO BE IGNORED.

12. PROGRAM LISTING

```
                        /RX8 RX01 DIAGNOSTIC DIRXA-D
                0001            FIELD 1
                        / CONSOL PACKAGE
                        /PROGRAM SHOULD CHECK FOR A CONTROL CHARACTER FROM THE CONSOL
                        /EVERY FIVE SECONDS OR LESS
                        /SETUP CNTVAL FOR A RANGE OF 1 TO 4(8/E)  MINUTES FOR C8PASS TO PRINT PASS
                        /SETUP OF CNTVAL WILL BE FOUND IN C8PASS
                        /THIS VALUE SHOULD BE A POSITIVE NUMBER.
                        /CHANGE 1-7 APRIL ,1975
                        /VIT8 MODIFICATIONS JUNE ,1977
                        /       1, NEW CONSOLE PACKAGE
                        /       2, CAPABILITY OF TESTING 2 FLOPPY UNITS(4 DRIVES)
                        /       3, MODIFIED INTERLEAVING
        6661            PSKF=   6661
        6662            PCLF=   6662
        6663            PSKE=   6663
        6664            PSI8=   6664
        6665            PSIE=   6665
        6004            GTF=    6004
        7701            ACL=    7701
        6007            CAF=    6007
        7421            MQL=    7421
        4461            HLT=    HALT
                        /#6
        7501            MQA=    7501
                        /#6
                        /XLIST
                        /IFDEF CONSOL <
                        /XLIST
        0024            *24
        4424            C8PASS= JMS I   .
0024    0600                    XC8PAS          /C8 PASS COMPLETION ROUTINE
        4425            C8CKSW= JMS I   .
0025    0673                    XC8SW           /CHECK SW REG SETTING
        4426            C8PRNT= JMS I   .
0026    1000                    XC8PNT          /C8 PRINT A BUFFER
        4427            C8OCTA= JMS I   .
0027    1035                    XC8OCT          /CONVERT TO ASCII AND PRINT
                        /*20                   /PSEUDO SWITCH REGISTER
                                                /4000=DO NOT INHIBIT ERROR HALT
                                                /2000=LOOP ON ERROR
                                                /1000=LOOP ON TEST IN SR 4-11
```



```
                                                /400=HALT AT END OF PASS
                        /*21                   /HARDWARE INDICATORS
                                                /4000=USE FRONT PANEL SWITCH REGISTER
                        /*22                   /SYSTEM CONFIGURATION
                                                /400=CONSOL PACKAGE SET ACTIVE
                        /*23                   /RESERVED FOR FUTURE USE
                        /XLIST>
                        /       C O N S O L E   P A C K A G E
                        /
                        /
                        /IF ENTERED WITH C8CHAR=0000 THE SWITCH REGISTER
                        /MODIFICATION ROUTINE IS ENTERED AUTOMATICALLY.
                        /IF ENTERED WITH C8CHAR NOT EQUAL TO 0000, THE
                        /KEYBOARD INPUT DECODER IS ENTERED AND IT IS ASSUMED
                        /THAT THE AC CONTAINS THE ASCII CODE TO BE
                        /CHECKED FOR A VALID CONTROL CHARACTER.
                        /
                        /
                        /
                        /
                        /
        7002            BSW=7002
                        /
0030    0000    C8TEMP, 0                       /TEMPORARY WORK AREA
0031    0000    C8CHAR, 0
0032    6203    C8CDI,  CIF CDF                 /USED TO CREATE CDI TO PROGRAM FIELD
0033    6201    C8CDF,  CDF                     /USED TO CREATE CDF TO CONSOLE FIELD
0034    0000    C8SWR,  0                       /SWITCH REGISTER SAVE AREA
0035    0000    C8MODE, 0                       /PRINT MODE SWITCH
0036    0000    C8CNTR, 0                       /USED AS COUNTER
0037    7775    C8M3,   -3                      /CONSTANT
0040    7774    C8M4,   -4                      /CONSTANT
0041    7773    C8M5,   -5                      /CONSTANT
0042    7770    C8M10,  -10                     /CONSTANT
0043    7520    C8M260, -260                    /CONSTANT
0044    0007    C8K7,   0007                    /CONSTANT
0045    0240    C8K240, 0240                    /CONSTANT
0046    0260    C8K260, 0260                    /CONSTANT
0047    0275    C8K275, 0275                    /CONSTANT
0050    0277    C8K277, 0277                    /CONSTANT
0051    0322    C8K322, 0322                    /CONSTANT
0052    0323    C8K323, 0323                    /CONSTANT
                        /
                        /
        0200    *200

0200    0000    C8ENTR, 0
0201    1777            TAD I   (21             /GET HCW1 FROM PROGRAM FIELD
0202    7710            SPA CLA                 /SKIP IF USING PSEUDO SWR
0203    7614            7614                    /GET HARDWARE SWR AND SKIP
0204    1776            TAD I   (20             /GET PSEUDO SWR
0205    3034            DCA     C8SWR           /SAVE SWITCH REGISTER
0206    1775            TAD I   (INMODE         /GET MESSAGE ACTIVE FLAG
0207    3035            DCA     C8MODE          /SAVE IT
```

```
                                CDF 10                  /CHANGE DATA FIELD TO CONSOLE PACKAGE
                                TAD     C8ENTR          /GET RETURN ADDRESS
                                DCA     C8RTN           /SAVE FOR EXIT
                                TAD     C8CHAR          /GET CHARACTER SAVED IN MAIN PROGRAM
                                SZA                     /SKIP IF IT WAS ZERO
                                JMP     C8CNTL          /AC NOT ZERO, GO CHECK CTRL CHAR
                        /
                        /PRINT OUT SR=XXXX WHERE XXXX IS THE CURRENT CONTENTS
                        /OF THE SWITCH REGISTER BEING USED (EITHER PSEUDO OR HARDWARE)
                        /
C8PSW,  JMS     C8CRLF          /DO A <CR> AND <LF>
                TAD     C8K323          /GET ASCII CODE FOR "S"
                JMS     C8TYP           /PRINT "S"
                TAD     C8K322          /GET ASCII CODE FOR "R"
                JMS     C8TYP           /PRINT "R"
                TAD     C8K275          /GET ASCII CODE FOR "="
                JMS     C8TYP           /PRINT "="
                TAD     C8M4            /AC=-4
                DCA     C8CNTR          /SET UP OCTAL DIGIT COUNTER
                TAD     C8SWR           /GET SWITCH REGISTER
                RAL                     /EXTRA ROTATE FOR LINK
C8LOPA, RAL
                RTL                     /ROTATE OCTAL DIGITS FOR PRINTING
                DCA     C8SWR           /SAVE ROTATED SWR
                TAD     C8SWR           /GET ROTATED SWR
                AND     C8K7            /MASK OFF DIGIT TO PRINT
                TAD     C8K260          /ADD ASCII BASE CODE
                JMS     C8TYP           /PRINT AN OCTAL DIGIT
                TAD     C8SWR           /GET SWR
                ISZ     C8CNTR          /INCREMENT LOOP COUNTER
                JMP     C8LOPA          /GO PRINT NEXT DIGIT
                        /
                        /ACCEPT KEYBOARD INPUT OF OCTAL DIGITS, <CR>, <LF>
                        /CTRL/C OR CTRL/G.  ALL OTHER CHARACTERS ARE INVALID
                        /AND WILL BE ECHOED, FOLLOWED BY A "?",
                        /A CARRIAGE RETURN, LINE FEED, AND A RESTART OF
                        /THE SR=XXXX ROUTINE
                        /

                CLA CLL
                TAD     C8M5            /AC=-5
                DCA     C8CNTR          /SET UP TO ACCEPT 5 CHARACTERS
                DCA     C8BLD           /CLEAR SWITCH REG. BUILD AREA
                DCA     C8FLG           /CLEAR SWR CHANGE SWITCH
                TAD     C8K240          /GET ASCII CODE FOR SPACE
                JMS     C8TYP           /SPACE OVER ONE POSITION
C8SRLP, JMS     C8TIY           /GO WAIT FOR KEYBOARD INPUT

                DCA     C8TEMP          /SAVE INPUT CHARACTER
                TAD     C8TEMP          /GET CHARACTER
                TAD     I C203
                SNA                     /SKIP IF NOT CTRL/C
                JMP     C8CILC          /GO TO CTRL/C ROUTINE
                TAD     C8M4            /AC=-4
                SNA                     /SKIP IF NOT CTRL/G
                JMP     C8CTLG          /GO TO CTRL/G ROUTINE
```



```
                TAD     C8M3            /SUBTRACT 3
                SNA                     /SKIP IF NOT LINE FEED
                JMP     C8EXT1          /GO TO LINE FEED EXIT
                TAD     C8M3            /SUBTRACT 3
                SNA CLA                 /SKIP IF NOT CARRIAGE RETURN
                JMP     C8EXT2          /GO TO CARRIAGE RETURN EXIT
                TAD     C8TEMP          /GET CHARACTER
                JMS     C8TYP           /ECHO IT
                TAD     C8TEMP          /GET CHARACTER
                TAD     C8M260
                SPA                     /SKIP IF >= TO ASCII CODE FOR ZERO
                JMP     C8ERR           /INVALID CHARACTER  NOT OCTAL DIGIT
                TAD     C8M10
                SMA CLA                 /SKIP IF <= ASCII CODE FOR SEVEN
                JMP     C8ERR           /INVALID CHARACTER  NOT OCTAL DIGIT
                STA                     /AC=7777
                DCA     C8FLG           /SET SWR CHANGE FLAG
                TAD     C8TEMP          /GET CHARACTER
                AND     C8K7            /MASK TO 3 BITS
                DCA     C8TEMP          /SAVE OCTAL DIGIT
                TAD     C8BLD           /GET SWR BUILD AREA CONTENTS
                CLL RTL
                RAL                     /ROTATE TO BUILD SWR
                TAD     C8TEMP          /ADD NEXT OCTAL DIGIT
                DCA     C8BLD           /SAVE NEW SWR
                ISZ     C8CNTR          /INCREMENT OCTAL DIGIT COUNTER
                JMP     C8SRLP          /CONTINUE ACCEPTING OCTAL DIGITS
                        /
C8ERR,  CLA CLL
                TAD     C8K277          /GET ASCII CODE FOR "?"
                JMS     C8TYP           /PRINT "?"
                JMS     C8CRLF          /DO A <CR> AND <LF>
                JMP     C8PSW           /GO START OVER
                        /
                        /
0361  0541
0362  0531
0363  0457
0364  0465
0365  7575
0366  0514
0367  0403
0370  0400
0371  0502
0372  0523
0373  0420
0374  0402
0375  0351
0376  0020
0377  0021
      0400      PAGE
                        /
0400  0000  C8BLD,  0                       /SWITCH REGISTER BUILD AREA
0401  0200  C8STRT, RSTART                  /ADDRESS OF START OF PROGRAM
0402  0000  C8RTN,  0                       /STORAGE FOR RETURN ADDRESS
```

```
0403  0000  C8FLG,  0                       /SWR CHANGE SWITCH
0404  0000  C8SFLG, 0                       /CTRL/S ACTIVE FLAG
0405  0177  C8K177, 0177                    /CONSTANT
0406  0200  C8K200, 0200                    /CONSTANT
0407  0077  C8K77,  0077                    /CONSTANT
0410  7740  C8M40,  -40                     /CONSTANT
0411  0100  C8K100, 0100                    /CONSTANT
0412  0215  C8K215, 0215                    /CONSTANT
0413  0212  C8K212, 0212                    /CONSTANT
0414  0303  C8K303, 0303                    /CONSTANT
0415  0307  C8K307, 0307                    /CONSTANT
0416  0336  C8K336, 0336                    /CONSTANT
0417  7600  C87600, 7600
                    /
                    /       C O N T R O L   C H A R A C T E R
                    /
                    /       D E C O D E   R O U T I N E
                    /
0420  1377  C8CNTL, TAD     (-203
0421  7450          SNA                     /SKIP IF NOT CTRL/C
0422  5265          JMP     C8CTLC          /CTRL/C TYPED  EXIT TO MONITOR
0423  1376          TAD     (-4
0424  7450          SNA                     /SKIP IF NOT CTRL/G
0425  5257          JMP     C8CTLG          /CTRL/G TYPED  GO PRINT "^G"
0426  1375          TAD     (-12
0427  7450          SNA                     /SKIP IF NOT CTRL/Q
0430  5255          JMP     C8CTLQ          /CTRL/Q TYPED
0431  1374          TAD     (-2
0432  7450          SNA                     /SKIP IF NOT CTRL/S
0433  5237          JMP     C8CTLS          /CTRL/S TYPED
0434  3035          DCA     C8MODE          /SET MESSAGE ACTIVE FLAG
0435  2204          ISZ     C8SFLG          /TEST CTRL/S ACTIVE FLAG
0436  5275          JMP     C8ECHO          /GO ECHO CHARACTER AND RETURN TO PROGRAM
                    /
                    /CTRL/S HANDLER
                    /
0437  7240  C8CTLS, STA                     /AC=7777
0440  3204          DCA     C8SFLG          /SET CTRL/S ACTIVE FLAG
0441  1035          TAD     C8MODE          /GET MESSAGE ACTIVE FLAG
0442  7650          SNA CLA                 /SKIP IF CTRL/S TYPED WHILE MESSAGE ACTIVE
0443  5342          JMP     C8PFLD-1        /RETURN TO PROGRAM
                    /
0444  7240  C8WAIT, STA                     /AC=7777
0445  3204          DCA     C8SFLG          /SET CTRL/S ACTIVE FLAG
0446  4314          JMS     C8TTY           /WAIT FOR KEYBOARD INPUT
0447  1377          TAD     (-203
0450  7450          SNA                     /SKIP IF NOT CTRL/C

0451  5265          JMP     C8CTLC          /CTRL/C TYPED  EXIT TO MONITOR
0452  1373          TAD     (-16
0453  7640          SZA CLA                 /SKIP IF CTRL/Q
0454  5244          JMP     C8WAIT          /NOT CTRL/C OR CTRL/Q  CONTINUE WAITING
0455  3204  C8CTLQ, DCA     C8SFLG          /CLEAR CTRL/S ACTIVE FLAG
0456  5342          JMP     C8PFLD-1        /RETURN TO MAIN PROGRAM
                    /
                    /CONTROL G HANDLER
```



```
                    /
0457  4373  C8CTLG, JMS     C8CRLF          /DO A <CR> AND <LF>
0460  1216          TAD     C8K336          /GET ASCII CODE FOR UP ARROW
0461  4302          JMS     C8TYP           /PRINT UP ARROW
0462  1215          TAD     C8K307          /GET ASCII CODE FOR "G"
0463  4302          JMS     C8TYP           /PRINT "G"
0464  5772*         JMP     C8PS#           /GO TO "SP#XXXX" ROUTINE
                    /
                    /CONTROL C HANDLER
                    /
0465  3204  C8CTLC, DCA     C8SFLG          /CLEAR CTRL/S ACTIVE FLAG
0466  1216          TAD     C8K336          /GET ASCII CODE FOR UP ARROW
0467  4302          JMS     C8TYP           /PRINT UP ARROW
0470  1214          TAD     C8K303          /GET ASCII CODE FOR "C"
0471  4302          JMS     C8TYP           /PRINT "C"
0472  6203          CIF CDF                 /CHANGE TO IF AND DF ZERO
0473  6007          CAF
0474  5617          JMP I   C87600          /RETURN TO MONITOR
                    /
0475  1031  C8ECHO, TAD     C8CHAR          /GET CHARACTER
0476  4302          JMS     C8TYP           /ECHO IT
0477  1050          TAD     C8K277          /CODE FOR ?
0500  4302          JMS     C8TYP           /TYPE QUESTION MARK
0501  5342          JMP     C8PFLD-1        /RETURN TO PROGRAM
                    /
                    /
                    /
                    /
                    /PRINT ONE CHARACTER
                    /
0502  0000  C8TYP,  0
0503  2204          ISZ     C8SFLG          /TEST CTRL/S ACTIVE FLAG
0504  7410          SKP                     /SKIP IF CTRL/S NOT ACTIVE
0505  5244          JMP     C8WAIT          /GO WAIT FOR CTRL/Q OR CTRL/C
0506  6046          TLS                     /TRANSMIT CHARACTER
0507  6041          TSF                     /TEST TTY FLAG
0510  5307          JMP     .-1             /WAIT FOR TTY FLAG
0511  6042          TCF                     /CLEAR TTY FLAG
0512  7200          CLA                     /CLEAR AC DO NOT CLEAR LINK

0513  5702          JMP I   C8TYP           /RETURN
                    /
                    /WAIT FOR KEYBOARD INPUT THEN EXIT WITH ASCII CODE IN AC
                    /
0514  0000  C8TTY,  0
0515  6031          KSF                     /SKIP IF KEYBOARD FLAG SET
0516  5315          JMP     .-1             /WAIT FOR KEYBOARD INPUT
0517  6036          KRB                     /READ KEYBOARD BUFFER  CLEAR FLAG
0520  0205          AND     C8K177          /MASK TO 7 BITS
0521  1206          TAD     C8K200          /SET BIT 4
0522  5714          JMP I   C8TTY           /RETURN
                    /
                    /EXECUTE A CARRIAGE RETURN AND LINE FEED
                    /
0523  0000  C8CRLF, 0
```

```
0524  1212          TAD     C8K215          /GET ASCII CODE FOR CARRIAGE RETURN
0525  4302          JMS     C8TYP           /GO EXECUTE THE CARRIAGE RETURN
0526  1213          TAD     C8K212          /GET ASCII CODE FOR LINE FEED
0527  4302          JMS     C8TYP           /GO EXECUTE THE LINE FEED
0530  5723          JMP I   C8CRLF          /RETURN
                /
                /CONSOLE PACKAGE EXIT IF TERMINATED WITH LINE FEED
                /
0531  4323  C8EXI1, JMS     C8CRLF          /DO A <CR> AND <LF>
0532  3031          DCA     C8CHAR          /CLEAR IT
0533  6203          CDF CIF 00              /MODIFIED CDI TO PROGRAM FIELD
0534  2203          ISZ     C8FLG           /TEST SWR CHANGE FLAG
0535  5601          JMP I   C8STRT          /RESTART PROGRAM WITHOUT CHANGE OF SWR
0536  1200          TAD     C8BLD           /GET NEW SWITCH REGISTER
0537  3771          DCA I   (20             /SAVE IT IN PROGRAM FIELD
0540  5601          JMP I   C8STRT          /RESTART PROGRAM WITH NEW PSEUDO SWR
                /
                /EXIT FROM CONSOLE PACKAGE IF TERMINATED WITH CARRIAGE RETURN
                /
0541  4323  C8EXI2, JMS     C8CRLF          /DO A <CR> AND <LF>
0542  3031          DCA     C8CHAR          /CLEAR IT
0543  6203  C8PFLD, CDF CIF 00              /MODIFIED CDI TO PROGRAM FIELD
0544  7300          CLA CLL                 /CLEAR AC AND LINK FOR RETURN
0545  2203          ISZ     C8FLG           /TEST SWR CHANGE FLAG
0546  5602          JMP I   C8RTN           /RETURN TO PROGRAM WITHOUT CHANGE OF SWR
0547  1200          TAD     C8BLD           /GET NEW SWITCH REGISTER
0550  3771          DCA I   (20             /SAVE IT IN PROGRAM FIELD
0551  5602          JMP I   C8RTN           /RETURN TO PROGRAM
                /
                /
                /
0571  0020
0572  0216
0573  7762
0574  7726
0575  7706
0576  7774
0577  7575
      0600          PAGE
                /*********************************************************************
                /C8PASS
                /THIS IS CALLED AT THE END OF EACH PROGRAM COMPLETION
                /THE VALUE OF** CNTVAL** WILL BE DETERMINED BY THE TIME IT TAKES
                /THE PROGRAM TO COMPLEATE THIS MANY C8PASS TO BE IN THE 1 TO 4 MINUTE
                /RANGE
                /       C8PASS=JMS      XC8PAS
                /EX,            C8PASS

                /               HLT                     /HALT IF NON CONSOL PACKAGE
                /               JMP     START1          /CONTINUE RUNNING THIS PROGRAM
                /RETURN TO LOCATION CALL PLUS ONE WITH THE AC=0 IF NON CONSOL PACKAGE AND HLT
                /IF CONTINUE TO RUN THEN RETURN TO CALL PLUS2 AC=0


0600  0000    XC8PAS, 0
0601  6211            CDF 10                  /CHANGE DATA FIELD TO CONSOLE PACKAGE
```



```
0602  4777'           JMS     C8CK22          /CHECK IF CONSOL IS ACTIVE
0603  5211           JMP     DOPACK          /IS CLASSIC
0604  4273           JMS     XC8SW                   /CHECK SR SETTING
0605  0376           AND     (400            /FOR HALT ON END OF C8PASS
0606  7640           SZA CLA                 /1= HALT 0 CONTINUE
0607  4461           HLT
0610  5240           JMP     C8BY1           /CONTINUE ON RUNNING PROGRAM
0611  4242   DOPACK, JMS     CKCOUT          /CLASS CHECK C8PASS COUNT
0612  5240           JMP     C8BY1           /C8PASS COUNT NOT DONE REDO PROGRAM
0613  2261           ISZ     PASCNT          /C8PASS COUNT DONE SET C8PASS COUNT
                /#2
0614  4775'          JMS     C8CRLF
                /#2
0615  4774'          JMS     XC8PNT                  /C8PRNT BUFFER
0616  0664           MESPAS                  /
0617  1261           TAD     PASCNT          /GET NUMBER
0620  4773'          JMS     XC8OCT                  /CONVERT IT TO ASCII
0621  6201           CDF 0
0622  1657           TAD I   XMX             /GET THE CHAR TO PRINT
0623  6211           CDF 10
0624  3742           DCA     CKCOUT          /STORE FOR PRINTING
0625  4774'          JMS     XC8PNT          /PRINT IT
0626  0642           CKCOUT
0627  4775'          JMS     C8CRLF                  /DO A CARRIAGE RETURN
0630  4273           JMS     XC8SW                   /CHECK A HALT AT END OF C8PASS
0631  0376           AND     (400            /MASK BIT
0632  7650           SNA CLA                 /HALT =1 NO SKIP CONTINUE =0
0633  5240           JMP     C8BY1           /NO HALT
0634  1200           TAD     XC8PAS          /GET RETURN ADDRESS
0635  3772'          DCA     C8ENTR          /PLACE IT AT START OF CONSOLE PACKAGE
                                               /ROUTINE = NEEDED FOR SETUP OF C8RTN
0636  6201           CDF 00
0637  5771'          JMP     C8ENTR+1        /GO TO CONSOLE PACKAGE TO PRINT PSR
0640  6203   C8BY1,  CDF CIF 00
0641  5600           JMP I   XC8PAS
0642  0000   CKCOUT, 0
0643  1262           TAD     DOSET           /CHECK IF SET UP NEEDED
0644  7640           SZA CLA                 /0=SET UP C8PASS COUNT VALUE
                                               /1=C8PASS COUNT VALUE OK
0645  5252           JMP     NOSET           /C8PASS COUNT VALUE ON
0646  1263           TAD     CNTVAL          /GET COUNT VALUE FOR THIS PROG
0647  7040           CMA                     /SET TO NEGATIVE
0650  3260           DCA     DOCNT           /STORE IN HERE
0651  2262           ISZ     DOSET           /INDICATE VALUE SET UP
                /#2
0652  2260   NOSET,  ISZ     DOCNT           /COUNT THE NUMBER OF PASSES
                /#2
0653  5240           JMP     C8BY1           /EXIT FOR ANOTHER PASS
0654  3262           DCA     DOSET           /SET TO C8PRNT C8PASS
0655  2242           ISZ     CKCOUT          /BUMP RETURN FOR
0656  5642           JMP I   CKCOUT          /C8PASS C8TYPE OUT
0657  0522   XMX,    MX              /LOCATION OF CHAR TO PRINT AT PASS FROM FLD 0
0660  0000   DOCNT,  0
0661  0000   PASCNT, 0                       /
0662  0000   DOSET,  0
```

```
0663  0000    CNTVAL, 0
0664  0411    MESPAS, TEXT    "DIRXA-D PASS "
0665  2230
0666  0155
0667  0440
0670  2001
0671  2323
0672  4000


                /*****************************************************************
                /CRCK8W
                /ROUTINE THAT WILL CHECK WHERE TO READ THE
                /C8 SWITCHES FROM IE, FROM PANEL OR PSEUDO C8SWIT REGISTER
                /
                /RETURN WITH AC = TO CONTENTS OF SWITCH REGISTER

0673  0000    XC8SW,  0
0674  7200            CLA                     /CLEAR AC
0675  6201            CDF 00
0676  1770            TAD I   (21             /GET WD FOR INDICATOR
0677  6211            CDF 10
0700  7710            SPA CLA                 /CHECK IF FROM PANEL 4000
0701  7614            7614                    /DO LAS AND SKIPGET FROM PANEL WITH LAS
0702  5304            JMP     C8GET1          /GET CONTENTS OF LOC 20 FLD 00
0703  5307            JMP     C8EXT8          /EXIT COMMON
0704  6201    C8GET1, CDF 00
0705  1767            TAD I   (20             /PSEUDO SW
0706  6211            CDF 10
0707  5673    C8EXT8, JMP I   XC8S#           /EXIT WITH STATUS BIT IN AC,


0767  0020
0770  0621
0771  0201
0772  0200
0773  1035
0774  1006
0775  0523
0776  0400
0777  1060
      1000              PAGE

                /*****************************************************************

                /*****************************************************************
                /C8PRNT

                /THIS ROUTINE WILL TYPE THE CONTENTS OF THE C8 PRINT BUFFER, THE LOCATION
                /OF THE BUFFER WILL BE IN THE ADDRS FOLLOWING THE CALL.  C8 PRINTING OF THE BUFFER
                /WILL STOP WHEN A 00 CHAR IS DETECTED, CHARACTERS ARE PACKED 2 PER WORD,
```



```
                /       C8PRNT= JMS XC8PNT


                /EX,    C8PRNT                  /C8PRNT THE CONTENTS OF THE FOLLOWING BUFFER
                /       MESS77                  /LOCATION OF C8PRNT BUFFER
                /C8PRNT WILL USE THE LOCATION FOLLOWING THE CALL AS THE POINTER FOR THE
                /C8PRNT ROUTINE,RETURN TO CALL PLUS TWO WITH AC= 0


1000  0000    XC8PNT, 0
1001  7300            CLA CLL
1002  1600            TAD I   XC8PNT          /GET C8PRNT BUFFERS STARTING LOCATION
1003  3233            DCA     PTSTOR          /STORE IN PTSTOR
1004  2200            ISZ     XC8PNT          /BUMP RETURN
1005  1633    C8D01,  TAD I   PTSTOR          /GET DATA WORD
1006  0377            AND     (7700           /MASK FOR LEFT BYTE
1007  7450            SNA                     /CHECK IF 00 TERMINATE
1010  5600            JMP I   XC8PNT          /EXIT
1011  7500            SMA                     /IS AC MINUS
1012  7020            CML                     /MAKE CHAR A 300 AFTER ROTATE
1013  7001            IAC                     /MAKE CHAR A 200 AFTER ROTATE
1014  7012            RTR
1015  7012            RTR
1016  7012            RTR                     /PUT CHAR IN BITS 4-11 MAKE IT 8 BIT ASCII
1017  4776*           JMS     C8TYP                   /C8PRNT IT ON CONSOLE
1020  1633            TAD I   PTSTOR          /GET DATA WORD
1021  0375            AND     (0077           /MASK FOR RIGHT BYTE
1022  7450            SNA                     /CHECK IF 00 TERMINATOR
1023  5600            JMP I   XC8PNT          //EXIT
1024  1374            TAD     (3740           /ADD FUDGE FACTOR TO DETERMINE IF 200
1025  7500            SMA                     /OR 300 IS TO BE ADD TO CHAR
1026  1373            TAD     (100            /ADD 100
1027  1372            TAD     (240            /ADD 200
1030  4776*           JMS     C8TYP                   /C8TYPE ONLY BITS 4-11
1031  2233            ISZ     PTSTOR          /BUMP POINTER FOR NEXT WORD
1032  5205            JMP     C8D01           /DO AGAIN
1033  0000    PTSTOR, 0                       /STOR FOR C8PRNT BUFFER
1034  0000    STOPNI, 0                       /0000 C8PRNT 7777#00 NOT C8PRNT


                /*****************************************************************

                /*****************************************************************
                /C8OCTA
                /OCTAL TO ASCII CONVERSION
                /THIS ROUTINE WILL TAKE THE OCTAL NUMBER IN THE AC AND CONVERT IT TO ASCII
                /THE RESULT WILL BE PRINTED ON THE CONSOL DISPLAY
                /       C8OCTA= JMS XC8OCT
                /
                /EX,    C8OCTA          /AC CONTAINS NUMBER TO BE CHANGE
                /
```

```
                                XC8OCT, 0
                                        CLL RTL
                                        RTL                     /POSITION THE FIRST CHAR FOR PRINTING
                                        DCA     C8TMP1          /SAVE CORRECT POSITIONED WORD HERE
                                        TAD     (-4
                                        DCA     C8CKP           /STORE COUNTER IN HERE
                                C8004,  TAD     C8TMP1          /GET FIRST NUMBER
                                        AND     (0007           /MASK
                                        TAD     (260            /ADD THE PRINT CONSTANT
                                        JMS     C8TYP           /TYPE THE NUMBER
                                        TAD     C8TMP1          /
                                        RTL
                                        RAL                     /PUT NEXT NUMBER IN POSITION
                                        DCA     C8TMP1          /STORE IT
                                        ISZ     C8CKP           /DONE YET WITH FOUR NUMBERS
                                        JMP     C8004           /NOT YET DO MORE
                                        JMP I   XC8OCT          /DONE WITH FOUR
                                C8TMP1, 0
                                C8CKP,  0

                        /*****************************************************************

                        /*************************************
                                /CHECK LOCATION 22 FIELD 0


                                C8CK22, 0
                                        CLA
                                        CDF 00
                                        TAD I   (22             /GET LOC 22 FIELD 0
                                        CDF 10
                                        AND     (400
                                        SWA CLA
                                        ISZ     C8CK22
                                        JMP I   C8CK22          /EXIT


                                /
                                0400
                                0922
                                0260
                                0007
                                7774

                                0240
                                0100
                                3740
                                0077
                                0502
                                7700
                                0000    FIELD 0
```



```
0000  00000000  00000000  00001111  11111111  11111111  11100000  00000000  00000000
0100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11100000  00000000  00000000  00000000  01111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11000000  00000000  01111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  00000000  00000000  00000000  00000000  00000000  00000001  11111111


1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10000000
1100  00000000  00000000  00000000  00000000  00000000  00000000  00000111  11111111

1200
1300

1400
1500

1600
1700


2000
2100

2200
2300

2400
2500

2600
2700


3000
3100

3200
3300

3400
3500

3600
3700
```

4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700


```
                / RX8/RX01 DIAGNOSTIC * MAINDEC-08-DIRXA-D
                /
                /STARTING ADDRESS 200 = (AC) = STARTUP SWITCHES
                /
                /STARTING ADDRESS 201 = RESTART (PARAMETERS ALREADY SELECTED AT START 200)
                /
                /STARING ADDRESS 202 = CHANGE DEVICE CODES.
                /
                /START-UP AC SWITCH DEFINITIONS (WHEN THE STARTING ADDRESS IS 200)
                /
                / AC   0 1 2   3 4 5   6 7 8   9 10 11
                /      U U U/C X X X   U T T   T T  T
                /
                /       X=DEVICE CODE (0 DEFAULTS TO 75)
                /       T=TESTS (0 FOR ALL TESTS)
                /       C=RX01 MICROCONTROL CABLED TO RX8 INTERFACE
                /       U=UNIT/DRIVES SELECTED FOR TEST
                /         WHERE:      UNIT      DRIVE(S)
                /               0000 = A        0,1
                /               1000 = B        0,1
                /               2000 = A        0
                /               3000 = B        0
                /               4000 = A        1
                /               5000 = B        1
                /               6000 = TEST CONTROL AND INTERFACE ONLY (NO DRIVES)
                /               7000 = TEST INTERFACE ONLY (NO CONTROL OR DRIVES)
                /       VT78    0040 = TEST UNITS A & B (ALL DRIVES)
                /               4040 = DRIVES 1 BOTH UNITS
                /               2040 = DRIVES 0 BOTH UNITS
                /
                /THE PRETEST IS NOT SWITCH SELECTABLE - THIS PRETEST IS ALWAYS
                /EXECUTED PRIOR TO THE FIRST TTTTT SELECTION
                /
                /PRETEST - VERIFICATION OF INIT (KEY)
                /
                /    (PRETEST)  I8      - INIT PART I (KEY) / FLAG DETECTION PART I
                /
                /INTERFACE / CONTROL TESTS
                /
                /NOTE: * THE KEYBOARD IS " ALIVE " DURING TESTS 6, 7, 10, AND 11, AND 12
                /IF A CHARACTER IS STRUCK AN ERROR MAY OCCUR
                /
                /     TTTTT
                /
                /       0       I       - FLAG DETECTION PART II / " C " LINES PART I
                /       1       I8      - DIRECTION OF IOT XDR PART I / IOT DECODING PART I
                /                         - " C " LINES PART II
                /       2       I8      - FLAG DETECTION PART II / " C " LINES PART III
                /       3       I8      - IOT DEVICE CODE VERIFICATION
                /       4       I8      - DIRECTION OF IOT XDR PART II / " C " LINES PART IV
                /       5       I       - IOT DECODING PATH II
```

```
                /    *  6       IB/I    - INTERRUPT TESTING PART I / IOT DECODING PART III
                /    *  7       IB      - INTERRUPT TESTING PART II
                /    *  10      IB      - INTERRUPT TESTING PART III
                /    *  11      I       - INTERRUPT TESTING PART IV
                /    *  12      IB/I    - INIT PART II (PROGRAMMED) / INTERRUPT TEST PART V
                /RX01 CONTROL TESTS
                /
                /       13      C       - FILL BUFFER 12-BIT MODE
                /       14      C       - EMPTY BUFFER 12-BIT MODE
                /       15      C       - VERIFICATION OF PREVIOUS TEST
                /       16      C       - FILL BUFFER 8-BIT MODE
                /       17      C       - EMPTY BUFFER 8-BIT MODE
                /       20      C       - VERIFICATION OF PREVIOUS TEST
                /       21      C       - FILL BUFFER 8-BIT MODE (ALL 0'S)
                /       22      C       - FILL BUFFER 8-BIT MODE (ALL 1'S)
                /
                /DISKETTE DRIVE TESTS
                /
                /       23      D       - STATUS BIT "DRIVE READY"
                /       24      D       - 8-CODE VERIFICATION (70) PART I
                /       25      D       - 8-CODE VERIFICATION (70) PART II
                /       26      D       - 8-CODE VERIFICATION (70) PART III
                /       27      D       - 8-CODE VERIFICATION (40) PART IV
                /       30      D       - SEEK AND CRC VERIFICATION
                /       31      D       - WRITE TEST
                /       32      D       - INIT PART III (PROGRAMMED) IMPLIED READ TRACK 1 SECTOR 1
                /       33      D       - READ TEST
                /       34      D       - WRITE-READ-PROGRAM VERIFY 12 BIT MODE
                /       35      D       - WRITE-READ-PROGRAM VERIFY  8 BIT MODE
                /       36      D       - WRITE-READ-PROGRAM VERIFY 12 BIT MODE WITH DELETED DATA
                /       37      D       - WRITE-READ-PROGRAM VERIFY  8 BIT MODE WITH DELETED DATA
                /
                /       I = MEANS RX8 INTERFACE TEST
                /       B = MEANS RX01 MAY BE CABLED TO RX8
                /       C = MEANS AN RX01 MUST BE CABLED TO THE RX8
                /       D = MEANS A DRIVE MUST BE READY
                /
                /OPERATIONAL AC SWITCH DEFINITIONS
                /
                /  AC 0 = (1) CONTINUE ON DETECTION OF ERROR
                /  AC 1 = (1) LOCK SCOPE LOOP ON ERROR
                /  AC 2 = (1) LOCK SCOPE LOOP ON TEST
                /  AC 3 = (1) HALT AT END OF PASS
                /  AC 4 = (1) DON'T PRINT AN ERROR MESSAGE
                /  AC 5 = (1) LONG DATA COMPARISON ERROR PRINTOUT
                /  AC 6 = (1) DISABLE THE ISSUING OF (INIT)
                /  AC 7 = (1) HALT AT END OF A TEST

                /  AC 8 =
                /  AC 9 =
                /  AC 10=
                /  AC 11= (1) DISABLE RINGING OF BELL AT ERROR
                /THE FOLLOWING MAP IS A SUMMARY OF ALL ERRORS.
                /
                /
                /       ERR     TEST    BLANK   EAC     GOOD    COMMENTS
```



```
                /
                /
 1200  0412             E0PRE / PRETEST -       -       -       UNEXPECTED TRANSFER REQUEST FLAG
 1201  0415             E2PRE /         -       -       -       UNEXPECTED ERROR FLAG
 1202  0425             E3PRE /         -       -       -       MISSING DONE FLAG
 1203  0445             E1PRE /         STATUS  STATUS
                /                       FROM    MINUS   4,      STATUS NOT = INIT DONE, OR
                /                       TR      DEL     204     DRIVE READY + INIT DONE
                /                               DATA
 1204  0450             E4PRE /         -       -       -       UNEXPECTED DONE FLAG
                /
                /
 1205  0607             E0 /    T0      -       X       0       IOT 67X1 DIDN'T CLEAR AC
 1206  0613             E1 /            -       -       -       UNEXPECTED TRANSFER REQUEST FLAG
 1207  0617             E2 /            -       -       -       UNEXPECTED ERROR FLAG
 1210  0623             E3 /            -       -       -       UNEXPECTED DONE FLAG
                /
                /
                /
 1211  0647             E11 /   T1      -       X       0       IOT 67X1 FAILED TO CLEAR AC
                E10 /           -       X       200     TR NOT = 200 (DRIVE READY)
                /
                /
                /       E20 /   T2      -       -       -       MISSING DONE FLAG
 1212  0660             E21 /           -       -       -       MISSING TR FLAG
 1213  0663             E22 /           -       -       -       MISSING ERROR FLAG
 1214  0666             E23 /           -       -       -       MISSING DONE FLAG
 1215  0671             E24 /           -       -       -       MISSING TR FLAG
 1216  0674             E25 /           -       -       -       MISSING ERROR FLAG
 1217  0704             E26 /           -       X       7777    IOT 67X6 CLEARED AC
 1220  0712             E27 /           -       X       7777    IOT 67X3 CLEARED AC
 1221  0720             E28 /           -       X       7777    IOT 67X4 CLEARED AC
                /
                /
                /
 1222  0744             E30 /   T3      -       X       67X5    (EAC) = ILLEGAL DEVICE CODE
                /
                /
                /
 1223  1021             E42 /   T4      7776    X       200     IOT 67X1 CLEARED AC
                /
                /
 1224  1044             E40 /           T0              376
                /                                       375     DATA TO TR NOT =
                /                                       373     DATA FROM TR
 1225  1060             E41 /           7677            367     OR,
                /                                       357     DATA FROM TR NOT =
                /                                       337     DATA FROM TR PREVIOUSLY
                /                                       7677
 1226  1102             E56 /   T5      -       X       0       (TR) NOT = 0
 1227  1105             E50 /           -       -       -       MISSING DONE FLAG
 1230  1111             E53 /           -       -       -       UNEXPECTED DONE FLAG
 1231  1114             E51 /           -       -       -       MISSING TR FLAG
 1232  1120             E54 /           -       -       -       UNEXPECTED TR FLAG
 1233  1123             E52 /           -       -       -       MISSING ERROR FLAG
 1234  1127             E55 /           -       -       -       UNEXPECTED ERROR FLAG
```

```
                        /
                        /
                        /
 1035  1142             E60 /  T6      -       -       -       UNEXPECTED RX01 IRQ
 1236  1154             E61 /          -       -       -       MISSING DONE FLAG
 1237  1157             E62 /          -       -       -       MISSING TR FLAG
 1240  1162             E63 /          -       -       -       MISSING ERROR FLAG
                        /
                        /
                        /
 1241  1212             E70 /  T7      -       -       -       MISSING RX01 IRQ
                        /
                        /
                        /
 1242  1226             E100 /  T10    -       -       -       UNEXPECTED RX01 IRQD
                        /
                        /
                        /
 1243  1252             E110 /  T11    -       -       -       UNXPECTED RX01 IRQ
                        /
                        /
                        /
 1244  1276             E124 /  T12    -       -       -       UNEXPECTED RX01 IRQ
 1245  1311             E120 /         -       -       -       UNEXPECTED DONE FLAG
 1246  1315             E121 /         -       -       -       UNEXPECTED TR FLAG
 1247  1321             E122 /         -       -       -       UNEXPECTED ERROR FLAG
 1250  1326             E123 /         -       X       0       (TR) NOT = 0
 1251  1412             EA120 / ALT 12 -       -       -       UNEXPECTED TR FLAG
 1252  1416             EA121 /        -       -       -       UNEXPECTED DONE FLAJG
 1253  1440             EA122 /        ACTUAL  ACTUAL  4 OR
                        /              STATUS  MINUS   204     STATUS NOT = 4, OR 204
                        /                      DEL DAT
 1254  1451             EA123 /        -       X       0       THE B=CODE NOT = 0
                       /THE " XRSTB " SUBROUTINE WHICH READS THE B=CODE STATUS BY ISSUING
                       /COMMAND # 7 IS ENTERED FROM TESTS:  ***  ALT12, (T24, T25, T26), AND T27
                       /
                       /THE CONTENTS OF " BLANK " = THE CONTENTS OF GOOD FROM TEST: ALT12
                       /
 1255  2405             E7000 /        4/204   -       -       UNEXPECTED TR FLAG
 1256  2416             E7001 /        4/204   STATUS  -       UNEXPECTED ERROR FLAG
 1257  2432             E7002 /        4/204   X       7000    SHIFT REGISTER NOT SHIFTING
                        /
                        /
                        /
                       /THE " XRST " SUBROUTINE TO READ THE STATUS REGISTER BY ISSUING COMMAND # 5
                       /IS ENTERED FROM TESTS:  ***  ALT12, AND T23
                       /
 1260  2446             E7003 /        4/204   -       -       UNEXPECTED TR FLAG
 1261  2457             E7004 /        4/204   STATUS  -       UNEXPECTED ERROR FLAG
 1262  2473             E7006 /        4/204   STATUS  5000    SHIFT REGISTER NOT SHIFTING
 1263  2511             E7005 /        4/204   STATUS  0/200
                        /
                        /
                        /
                       /SUBROUTINE " FBEB " TO FILL AND EMPTY THE BUFFER IS ENTEHED FROM TESTS:
```



```
                       / T13, T16 (FILL THE BUFFER) / T14, T17 (EMPTY THE BUFFER)
                       /
 1264  1513             E130 /         COMMAND -       -       UNEXPECTED ERROR FLAG
 1265  1526             E131 /         COMMAND ACTUAL  EXPECT  # OF TR FLAGS NOT OK
                        /                                      (EAC) = # OF FLAGS
                        /                                      NEG, # MEANS NOT ENOUGH
                        /                                      >0 MEANS TO MANY
                        /
                        /
                        /
                       /ERROR # 140 MAY OCCUR WITHIN TESTS T14, T17, T15, AND T20
                       /
                       /THE CONTENTS OF " BLANK " IS EQUIVALENT TO THE WORD/BYTE COUNT AT THE ERROR
                       /
                       /THE CONTENTS OF THE " EAC " IS EQUIVALENT TO THE ACTUAL DATA FROM THE SECTOR
                       /BUFFER (8 OR 12-BIT MODE)
                       /
                       /THE CONTENTS OF " GOOD " IS EQUIVALENT TO THE EXPECTED CONTENTS OF THE
                       /SECTOR BUFFER
                       /
 1266  1661             E140 /  *      #       ACTUAL  EXPECT  DATA COMPARISON ERROR
                       / " FB128BYTES " IS A SUBROUTINE WHICH FILLS THE SECTOR BUFFER WITH 128 BYTES
                       /OF DATA (ALL 1'S OR ALL 0'S) AND IS ENTERED FROM TESTS T21, AND T22
                       /
 1267  4557             E210 /  *      -       -       -       UNEXPECTED ERROR FLAG
                        /
                        /
                       /SUBROUTINE " IX " EMPTIES THE SECTOR BUFFER AND COMPARES THE DATA TO AN
                       /EXPECTED PATTERN
                       /
                       /THIS SUBROUTINE IS ENTERED FROM TESTS: *** T21, T22, (T24, T25, T26), AND T27
                       /
 1270  2320             E211 /         #       ACAUAL  EXPECT  DATA COMPARISON ERROR
 1271  2332             E212 /         -       -       -       UNEXPECTED ERROR FLAG
                        /
                        /
                        /
                       /ERRORS E240, E245, E241, AND E242 MAY OCCUR WITHIN TESTS: T24, T25, T26
                       /
                       /
                       /
 1272  2030             E240 /  *      CMND    X       2       # OF TR FLAGS NOT OK
 1273  2033             E245 /         CMND    -       -       MISSING ERROR FLAG
 1274  2070             E241 /         ACTUAL  X       T24/200,300
                        /                                      T25/200
                        /                                      T26/300
 1275  2101             E242 /         -       X       70      B=CODE NOT = 70
                        /
                        /
                        /
 1276  2135             E270 /  T27    115     # OF    2       # OF TR FLAGS NOT OK
                        /                      XFERS
 1277  2140             E271 /         -       -       -       MISSING ERROR FLAG
 1300  2151             E272 /         -       X       40      B=CODE NOT = 40
       0000             *0
```

```
0000  0303          303             / C  IS THE REVESION
0001                *1
0001  5402          JMP I IPI
                    /
                    /PROGRAM LOCATION 2 CONTAINS THE INTERRUPT RETURN ADDRESS
                    /
                    /PROGRAM LOCATION 2 IS MODIFIED WITHIN CERTAIN TESTS
                    /
0002  5417    IPI,  PI
                    /
                    /
                    /AUTO INDEX REGISTER DEFINITION,
                    /
0010                *10
0010  0000    A10,  0
0011  0000    A11,  0
0012  0000    A12,  0
0013  0000    A13,  0                         /TEST Q
0020                *20
                    /
                    /THE FOLLOWING PROGRAM LOCATIONS (20, 21, AND 22, 23) ARE RESERVED FOR ACT8/A
                    /
0020  0000          0000            /SET FOR DRIVES 0 AND 1 DEVICE CODE 75
0021  4000          4000            /0000=PSEUDO SWITCH REGISTER IF ON ACTIVE CONSOLE
                                    /0000=VT78
                                    /4000=USE HARDWARE SWITCH REGISTER

0022  0000          0000            /0000=NOT ACTIVE CONSOLE PACKAGE
                                    /0400= ACTIVE CONSOLE PACKAGE
                                    /1400= VT78
0024                *24

                    /*****************************************************************

                    /THE FOLLOWING CALLS ARE USED FOR THE CONSOLE PACKAGE

4424    CHECKC8=    JMS I   .
0024  4516          XCHECK                  /USED TO CHECK IF THE CONSOLE IS ACTIVE

4425    XC8ENTR=    JMS I   .
0025  0200          C8ENTR
4426    C8PASS=     JMS I   .
0026  0400          XC8PASS                 /END OF PASS FOR CONSOL

0200    PSTART=200                          /RESTART ADDRESS FOR CONSOLE PACKAGE
                    /*****************************************************************

                    /
                    /THE FOLLOWING PROGRAM LOCATIONS "OD", "ID", "FIRST", AND "LAST" MAY BE
                    /CHANGED BY THE OPERATOR MANUALLY HOWEVER FOLLOWING THESE RESTRICTIONS,
                    /
                    /               1.  THE CONTENTS OF " OD " (MIN VAL 0) MUST BE <= THE
                    /                   CONTENTS OF " ID " (MAX VAL 114),
                    /
                    /               2.  THE CONTENTS OF "FIRST" (MIN VAL 1) MUST BE <= THE
```



```
                    /                   CONTENTS OF "LAST" (MAX VAL 32)
                    /
                    /THE PROGRAM INITIALLY SETS THESE VALUES AT PROGRAM LOAD TIME
                    /
                    / (OD) = 52, AND (ID) = 53
                    /
                    /BECAUSE TRACK 53 IS THE TRACK AT WHICH THE RX01 MICROCONTROLLER WILL
                    /DECREASE THE WRITE CURRENT IN HALF
                    /
0027  0001    OD,   1                       /OUTSIDE DIAMETER (MIN VALUE 0)
0030  0114    ID,   114                     /INSIDE DIAMETER (MAX VALUE 114)
0031  0001    FIRST,  1                     /FIRST SECTOR TO ACCESS (MIN VAL 1)
0032  0032    LAST,   32                    /LAST SECTOR TO ACCESS (MAX VAL 32)
                    /
                    /PDP-8/E AUGMENTED INSTRUCTIONS
                    /
4433    BSW=JMS I   .
0033  2600          XBSW          /BYTE SWAP
6001    ION=6001
6002    IOF=6002
4572    LAS=CKSWIT
7501    MQA=7501                            / "OR" (MQ) WITH (AC)
7421    MQL=7421                            /MQ=AC (THEN CLEAR AC)
                    /
                    /DISKETTE IOT SUBROUTINES
                    /
4434    TYSOCT=JMS I   .
0034  5200          XTYSOCT                 /TYPE EIGHT OCTAL DIGITS,
4435    SEL=JMS I,
0035  6200          XSEL
4436    LCD=JMS I   .
0036  6203          XLCD
4437    LCDA=JMS I   .
0037  6210          XLCDA
4440    LCDB=JMS I   .
0040  6235          XLCDB
4441    XDRIN=JMS I   .
0041  6400          XXDRIN
4442    XDROUT=JMS I   .
0042  6403          XXDROUT
4443    STR=JMS I   .
0043  6407          XSTR
4444    SER=JMS I   .
0044  6414          XSER
4445    SDN=JMS I   .
0045  6421          XSDN
4446    INTR=JMS I   .
0046  6426          XINTR
4447    INIT=JMS I   .
0047  6434          XINIT
4450    INITB=JMS I   .
0050  6450          XINITB
4451    CKUNIT=JMS I   .
0051  2335          XCKUNT
                    /OPERATING SYSTEM SUBROUTINES
```

```
                        /
                4452    ERROR=JMS I .
          0052  2625            XERROR
                5453    EXIT=JMP I .
          0053  0452            MORETESTS               /EXIT FROM A TEST (IF RX8 ONLY )
                4454    DONE=JMS I .
          0054  4243            XDONE           /               FORM: "DONE; NO; YES"
                4455    GETAPATTERN=JMS I .
          0055  3035            XGETAPATTERN
                4456    GETASECTOR=JMS I .
          0056  4607            XGETASECTOP
                4457    GETATRACK=JMS I .
          0057  4261            XGETATRACK      /GET A TRACK FOR IOT LCD=B (TRACK #)
                4460    GETUNIT=JMS I .
          0060  4200            XGETUNIT        /SELECT A DISKETTE DRIVE
                4461    HLT=HALT
                4461    HALT=JMS I .
          0061  4121            XHALT
                4462    INITSECTORS=JMS I .
          0062  4600            XINITSECTORS
                4463    INITTRACKS=JMS I .
          0063  4250            XINITTRACKS
                4464    LOCKUP=JMS I .
          0064  2545            XLOCKUP
                5453    NOTEST=EXIT
                4465    OK=JMS I .
          0065  6123            XOK                             /SKIP IF NOT ON APT.
                4466    TICK=JMS I .
          0066  4133           XTICK
                4467    AERROR=JMS I .
          0067  4346            XAERRO
                4470    APT8=JMS I .
          0070  1545            XAPT8
                4471    WAIT=JMS I .
          0071  1722           XWAIT
                4472    CHEK22=JMS I .
          0072  5144            XCHK22                          /CHECK FOR APT SYSTEM.
                4473    PRINT=JMS I .
          0073  5244            XPRINT          /PRINT A MESSAGE; FORM: "PRINT; MESSAGE"
                4474    READ=JMS I .
          0074  3416            XREAD
                4475    READCOMPARE=JMS I .
          0075  3412            XREADCOMPARE
                4476    RST=JMS I .
          0076  2441            XRST            /STATUS AFTER "RST" COMMAND (12)  /  5 TIMES 2
                4477    RSTB=JMS I .
          0077  2400            XRSTB           /STATUS AFTER READ B-CODES COMMAND (16)  ? X 2

                4500    SETUP=JMS I .
          0100  4103            XSETUP
                4501    SPECIALTYPE=JMS I .
          0101  5352            XSPECIALTYPE
                4502    SCOPE=JMS I .
          0102  1333            XSCOPE
                4503    SUBSCOPE=JMS I .
          0103  1343            XSSCOPE
```



```
                4504    TAB=JMS I .
          0104  5215            XTAB            /               FORM: " TAB; N "
                4505    TY4OCT=JMS I .
          0105  5000            XTY4OCT                 /TYPE (4) OCTAL ; FORM: " TY4OCT; OCTAL "
                4506    TYPEIT=JMS I .
          0106  5305           XTYPEIT                          /TYPE 1 8 BIT ASCII,AC =ASCII.
                4507    WAITTY=JMS I .
          0107  5412            XWAITTY
                4510    WRITE=JMS I .
          0110  3200            XWRITE
                        /
                        /ACCUMULATOR SWITCH REGISTER DEFINITIONS
                        /
                0000    SW0=4000
                2000    SW1=2000
                1000    SW2=1000
                0400    SW3=400
                0200    SW4=200
                0100    SW5=100
                0040    SW6=40
                0020    SW7=20
                0010    SW8=10
                0004    SW9=4
                0002    SW10=2
                0001    SW11=1
                        /OPERATING SYSTEM ALLOCATED STORAGE REFERENCES
                        /
          0111  0000    BUSY,           0               / = 1 - PROCESSING AN RX01 PROGRAM INTERRUPT
          0112  0000    COMMAND,        0               /DISKETTE COMMAND ; (AC) AT LCD
          0113  0000    COMPRERROR,     0               /PROGRAM DATA COMPARE ERRORS
          0114  0000    DTESTP,         0               /DIAGNOSTIC TEST PARAMETERS (SELECTED AT L/S )
          0115  7777    FIRSTERROP,     7777            / (7777) IF 1ST ERROR ; (0) IF NOT
          0116  0000    HANGER,         0               /COUNTER TO DETECT DEVICE TEST HUNG
          0117  7777    K7777,          -1              /
          0120  0000    RDC,            0               / = 0 IF A RDC TEST, = 7777 IF NOT
          0121  7765    RETRY,          -13             / 1 ORIGINAL TRY + 10 RETRYS
          0122  7746    SECTORS,        -32             /NEGATIVE # OF SECTORS PER TRACK (1-32 OCTAL)
          0123  0000    SSTART,         0               /SECTOR LAST ACCESSED ( 0 = "HOME" )
          0124  0000    STARGET,        0               /TARGET SECTOR OF (UNITX)
          0125  0000    START,          0               /TRACK LAST ACCESSED
          0126  0000    ASTATUS,        0               /DISKETTE STATUS AT ERROR OR DONE
          0127  0000    BSTATUS,        0               /RX01 DEFINITIVE ERROR CODE REGISTER
          0130  0000    CSTATUS,        0               /STATUS FROM THE "READ STATUS" COMMAND
          0131  0000    TARGET,         0               /TARGET TRACK OF (UNITX)
          0132  0000    TESTP,          0               /TEST PARAMETERS (DYNAMIC BY PROGRAM)
          0133  0000    XA10,           0
          0134  0000    XA11,           0
          0135  0000    UNITCK, 0               /VT78/AC11 (0)=RXA (1)=RXB
          0136  7677    MASK,   7677            /VT78/ 7677 FOR STANDARD 8 = 277 FOR VT78
                        /
                        /PROGRAM LOCATION XXX IS A TEMPORARY STORAGE REGISTER FOR DATA
                        /OR ADDRESSES OF DATA WHICH ARE CALLED WITHIN SUBROUTINES WHICH
                        /DO NOT CALL SUBROUTINES WHICH CALL THESE STORAGE REGISTERS
                        /
                        /XXX IS CALLED WITHIN THE FOLLOWING SUBROUTINES
```

```
1090                    /
1091                    /D,D/RX-ERROR (2)
1092                    /COMPARE (2)
1093                    /XGETAPATTERN (6)
1094                    /RDDRWR (2)
1095                    /
1096    0137  0000      XXX,            0
1097                    /
1098    0140  7765      R1RETRY,        -13     /WERRORS        /WRITE ERROR RECOVERY
1099    0141  7765      R2RETRY,        -13     /RERRORS        /READ ERROR RECOVERY
1100    0142  0000      DWSLOG,         0       /DATAERRORS     /DATA ERROR WITH CRC STATUS ERROR
1101    0143  0000      DNSLOG,         0       /DNSERRORS      /DATA ERROR BUT NO CRC STATUS ERROR
1102    0144  0000      SNDLOG,         0       /SNDERRORS      /CRC STATUS ERROR BUT NO DATA ERROR
1103    0145  7765      SRETRY,         -13     /SERRORS        /SEEK ERROR RECOVERY
1104    0146  7765      PRETRY,         -13     /PERRORS        /PARITY ERROR RECOVERY
1105                    / (TRACKS) ARE SET TO THE NEGATIVE DIFFERENCE BETWEEN (DD), AND (ID)
1106                    / IN THE SUBROUTINE "INITTRACKS "
1107                    /
1108    0147  7663      TRACKS,         -115            / -# OF TRACKS PER DISKETTE (-115 TO -1 DYNAMIC DECREMENT)
1109    0150  0115      TTRACKS,        115             / # OF TRACKS PER DISKETTE (115 TO 1 STATIC)
1110    0151  0000      XTARGET,        0               / ; (AC) = TRACK+SECTOR AT IOT LCD-B ; DESTINATION
1111    0152  0000      ECOMMAND,       0
1112    0153  0000      HI,             0
1113    0154  0000      GOBIT,          0               / > 0 MEANS EXPECTING AN RX01 PI, <= 0 MEANS NOT EXPECTING
1114
1115                    /
1116                    / (PAT-SUMCHECK) IS A NUMBER GENERATED WITHIN SUBROUTINE " XGETAPATTERN"
1117                    /EQUIVALENT TO SUMCHECK OF 60/124  ( 12/8 BIT MODE) DATA WORDS
1118                    /
1119    0155  0000      PATSUMCHECK,    0
1120                    /
1121                    / (WORDX) IS AN ADDRESS WHOSE CONTENTS = ; (PAT-SUMCHECK) + (WBUFFER) + (WBUFFER+1)
1122                    /
1123                    / (WORDY) IS AN ADDRESS FOR WHICH THE CONTENTS REPRESENT THE NEGATIVE-1
1124                    /OF 2 TIMES THE CONTENTS OF THE ADDRESS WITHIN PROGRAM LOCATION " WORDX "
1125                    /
1126                    /THE CONTENTS OF BOTH WORDX AND WORDY ARE GENERATED WITHIN SUBROUTINE " XGETASECTOR "
1127                    /
1128    0156  0000      WORDX,          0
1129    0157  0000      WORDY,          0
1130    0160  0000      LSB,            0
1131    0161  0000      MSB,            0
1132    0162  0000      TTYBUSY,        0
1133    0163  0000      PASS,           0
1134    0164  0000              0               /PASS COUNT TO A MAGNITUDE OF 16777215(10)
1135    0165  0000      RXHERE,         0               / = 7000 IF AN RX01 IS NOT CABLED TO THE RX8
1136    0166  0000      GOOD,           0               /EXPECTED RESULT

1137    0167  0000      EAC,            0               / (AC) AT ERROR "BAD" (ACTUAL RESULT)
1138    0170  0000      BLANK,          0
1139    0171  0600      TEST,           TO              /ADDRESS OF STARTING ADDRESS OF TEST
1140                    /*****************************************************************
1141                    /ADDITIONAL CALL FOR CONSOLE PACKAGE
1142
1143
1144          4572      CK$WIT=         JMS I   .
```



```
1145    0172  3400              XCKSWIT                 /CHECK IF LAS TO USE LOC 22 OR HARD-ARE
1146    0173  7000      K7000,  7000
1147    0174  0007      K0007,  0007
1148    0175  7777      XCNT,   -1
1149          4576      FORCE=JMS I .
1150    0176  5525              XXFORCE
1151                    /STARTING ADDRESS 200 = (AC) = STARTUP SWITCHES
1152                    /
1153                    /STARTING ADDRESS 201 = RESTART (PARAMETERS ALREADY SELECTED AT START 200)
1154                    /
1155                    /
1156          0200      *200
1157                    /
1158                            /*************
1159                            /CONSOLE
1160                            /*************
1161    0200  5202      C8START,        JMP     .+2                             /NORMAL PROGRAM ACTIVITY.
1162    0201  5203              JMP     .+2                             /RESTART WITH SAME PARAMETERS.
1163                    /THIS SECTION IS NORMAL PROGRAM ACTIVITY.
1164                    /DEVICE  CODE 75 IS  ASSUMED. ANY OTHER WILL CAUSE ERRORS.
1165    0202  7240              STA
1166    0203  3010              DCA     A10
1167    0204  3162              DCA TTYBUSY
1168    0205  3111              DCA BUSY
1169    0206  3154              DCA GOBIT
1170    0207  3163              DCA PASS
1171    0210  3164              DCA PASS+1
1172    0211  6211              CDF 10                  /CHANGE TO DATA FIELD OF CONSOLE PACKAGE
1173    0212  3777'             DCA PASCNT              /CLEAR CONSOLE PASS COUNTER
1174    0213  6201              CDF 0                   /CHANGE BACK TO PROGRAM DATA FIELD
1175    0214  1376              TAD (-40)
1176    0215  3116              DCA HANGER
1177    0216  3123              DCA SSTART
1178    0217  3131              DCA TARGET
1179    0220  1010              TAD     A10
1180    0221  7650              SNA CLA
1181    0222  5233              JMP     AROUND                  /USE EXISTING PARAMETERS.
1182
1183                            /***********************
1184    0223  4775'             JMS     PNTID           /PRINT ID AND REMOVE DIAGNOSTIC
1185                            /***********************
1186    0224  4424              CHECKC8                 /CONSOLE ACTIVE
1187    0225  4425              XC8ENTR                 /ASK SR QUESTION.
1188    0226  5230              JMP     .+2
1189    0227  4461              HLT
1190    0230  4572              LAS                             /GET PARAMETERS.
1191    0231  3114              DCA     DTESTP
1192    0232  4774'             JMS     CHNDEV                  /CHANGE DEVICE  CODES.
1193    0233  1114    AROUND, TAD DTESTP              /GET PARAMETERS
1194    0234  7040              CMA
1195    0235  0373              AND (7000                       /MASK BITS 0-2
1196    0236  7650              SNA CLA
1197    0237  1373              TAD (7000
1198    0240  3165              DCA RXHERE/ = 0 IF RX01 CABLED TO RX8
1199    0241  1114              TAD DTESTP
```

```
1200  0342  7040          CMA
1201  0343  0372          AND (SW0+SW1)
1202  0344  3771'         DCA UNITS       / # UNITS(DRIVES) TO TEST
1203  0345  4770'         JMS SELUNT              /VT78/SELECT WHICH FLOPPY TO TEST
1204  0346  4473          PRINT
1205  0347  6533          MDTESTP                 /TEST PARAMETER CONFIRMATION MESSAGE
1206  0350  4505          TY4OCT
1207  0351  0114          DTESTP
1208                /THE PROGRAM WILL VERIFY THAT THE CONTENTS OF PROGRAM LOCATIONS:
1209                /
1210                /               OD, ID, FIRST, AND LAST
1211                /
1212                /WHICH ARE VARIABLE BY THE USER ARE WITHIN SELECTABLE LIMITS
1213                /
1214                / 0 <= OD <= 114
1215                /
1216  0352  1027          TAD OD
1217  0353  7700          SMA CLA
1218  0354  5257          JMP .+3
1219  0355  1367          TAD (52)
1220  0356  3027          DCA OD
1221  0357  1366          TAD (-114)
1222  0360  1027          TAD OD
1223  0361  7740          SMA SZA CLA
1224  0362  5255          JMP .-5
1225  0363  4473          PRINT
1226  0364  6674          MOD
1227  0365  4505          TY4OCT
1228  0366  0027          OD
1229                / 0 <= ID <= OD
1230                /
1231  0367  1030          TAD ID
1232  0370  7700          SMA CLA
1233  0371  5274          JMP .+3
1234  0372  1365          TAD (53)
1235  0373  3030          DCA ID
1236  0374  1030          TAD ID
1237  0375  7041          CIA
1238  0376  1027          TAD OD
1239  0377  7740          SMA SZA CLA
1240  0400  5272          JMP .-6
1241  0401  4473          PRINT
1242  0402  6700          MID
1243  0403  4505          TY4OCT
1244  0404  0030          ID
1245                / 0 < (FIRST) <= 32
1246                /

1247  0405  1031          TAD FIRST
1248  0406  7740          SMA SZA CLA
1249  0407  5312          JMP .+3
1250  0410  7301          CLL CLA IAC
1251  0411  3031          DCA FIRST
1252  0412  1031          TAD FIRST
1253  0413  1364          TAD (-32)
1254  0414  7740          SMA SZA CLA
```



```
1255  0415  5310          JMP .-5
1256  0416  4473          PRINT
1257  0417  6704          MFIRST
1258  0420  4505          TY4OCT
1259  0421  0031          FIRST
1260  0422  5763'         JMP TADLAST
1261                /IF THE TELEPRINTER IS BUSY (TTYBUSY = X), AND
1262                /
1263                /IF A KEYBOARD FLAG HAS OCCURED,
1264                /
1265                /THEN STOP TELEPRINTER OUTPUTS (IF A KRB = <CTRL>S ), OR
1266                /
1267                /THEN RESUME TELEPRINTER OUTPUTS (IF A KRB = <CTRL>Q
1268                /AND A PREVIOUS <CTRL> Q HAD OCCURED)
1269                /
1270  0423  6036    XKCC,   KRB                             /READ THE KEYBOARD BUFFER STATIC
1271  0424  0362          AND     (177
1272  0425  1361          TAD     (200                    /MAKE IT 8 BIT CODE
1273  0426  6211          CDF 10
1274  0427  3750          DCA I   XC8CHAR                 /STORE IN FIELD ONE CHAR
1275  0430  6201          CDF 0
1276  0431  1162          TAD TTYBUSY             /#1 IF BUSY
1277  0432  7012          RTR
1278  0433  7710          SPA CLA                 /WAS TELEPRINTER BUSY?
1279  0434  7040          CMA                     /YES
1280  0435  3351          DCA INMODE              /0=NOT BUSY  7777=BUSY
1281  0436  3162          DCA TTYBUSY             /CLEAR FLAG
1282                      /********
1283                      /CONSOLE
1284                      /1*******
1285
1286  0437  4424    C8TEST, CHECKC8                 /CONSOLE ACTIVE,
1287  0440  4425          XC8ENTR                 /CHECK CONSOLE CONTROL CHARACTERS
1288  0441  7000          NOP
1289  0442  7200          CLA
1290  0443  1351          TAD     INMODE
1291  0444  7650          SNA CLA                 /SKIP TO RESUME TYPEOUT
1292  0445  5760'         JMP     PIEXIT          /EXIT
1293  0446  3351          DCA     INMODE          /CLEAR ACTIVE MESSAGE FLAG
1294  0447  5787'         JMP     XTCF            /RESUME TYPEOUT
1295  0450  0031    XC8CHAR,        C8CHAR          /LOC IN FIELD 1
1296  0451  0000    INMODE, 0               /MESSAGE ACTIVE FLAG
1297
1298                      /********
1299                      /CONSOLE
1300                      /********
1301  0452  5344
1302  0453  5510
1303  0454  0200
1304  0455  0177
1305  0456  3273
1306  0457  7746
1307  0460  0053
1308  0461  7664
1309  0462  0052
```

```
1310    0370  6127
1311    0371  4235
1312    0372  6000
1313    0373  7000
1314    0374  5067
1315    0375  1531
1316    0376  7740
1317    0377  0661
              0400                PAGE
1318                      /PRETEST - INITIALIZE [KEY] PART 1 / FLAG DETECTION PART 1
1319                      /
1320                      / (A)   IF AN RX01 MICROCONTROLLER IS [NOT] CABLED TO THE RX8 INTERFACE,
1321                      /       THEN ALL FLAGS (DONE, TRANSFER REQUEST, AND ERROR) , AND THE RX8
1322                      /       INTERFACE TRANSFER TEGISTER SHOULD HAVE BEEN CLEARED BY "KEY"
1323                      /       INITIALIZE (IF THEY WERE EVER SET).
1324                      /
1325                      / (B)   IF AN RX01 MICROCONTROLLER [IS] CABLED TO THE RX8 INTERFACE,
1326                      /       THEN "KEY" INITIALIZE SHOULD HAVE [SET] THE DONE FLAG BECAUSE
1327                      /       ANY [INIT] OF THE RX01 MICROCONTROLLER IS AN IMPLIED [READ SECTOR]
1328                      /       OF TRACK 0 SECTOR 1 (FOR SYSTEMS PROGRAMMING BOOTSTRAP APPLICATIONS).
1329                      /
1330                      /       THEREFORE, ANY ERROR (EXCEPT PARITY) THAT MAY OCCUR FROM A NORMAL
1331                      /       "READ SECTOR" COMMAND MAY OCCUR HERE CAUSEING THE ERROR FLAG TO SET, AND
1332                      /       DISPLAYING THE ERROR STATUS WITHIN THE TRANSFER REGISTER AT "DONE".
1333                      /
1334                      /       THE TRANSFER REQUEST FLAG SHOULD BE CLEARED.
1335                      /
1336                      /NOTE:
1337                      /
1338                      /SCOPE LOOPING IS NOT OFFERED BECAUSE THE "INIT" FUNCTION
1339                      /
1340    0400  7240       PRETEST, STA
1341    0401  3115              DCA FIRSTERROR          /FOR FIRST ERROR EVER THIS PASS
1342    0402  3777*             DCA ERRORS                      /CLEAR "ERRORS" FOR FIRST "SCOPE" EVER
1343    0403  4502              SCOPE                           /THIS "SCOPE" TO REFRESH "FAT" IF ERROR
1344    0404  1776*             TAD PESCOPE
1345    0405  3171              DCA TEST                /TO REFRESH "FAT" FOR "ERROR"
1346    0406  6007              CAF             /VT78/
1347    0407  4451              CKUNIT                  /VT78/SETUP FOR UNIT A OR B
1348    0410  4443              STR
1349    0411  4465              OK
1350    0412  4452    E0PRE,    ERROR                           /UNEXPECTED TRANSFER REQUEST FLAG
1351    0413  4444              SER
1352    0414  4465              OK
1353    0415  4452    E2PRE,    ERROR                           /UNEXPECTED ERROR FLAG
1354                      /
1355                      /*****************************************************************************
1356                      /*****************************************************************************
1357                      /
1358                      /IF AN RX01 MICROCONTROLLER [IS] CABLED TO THE RX8 INTERFACE
1359                      /THEN THE DONE FLAG SHOULD BE SET
1360                      /
1361    0416  1165              TAD RXHERE
1362    0417  7640              SZA CLA
1363    0420  5231              JMP NORX01                      /
```



```
1364    0421  4471              WAIT
1365    0422  4445              SDN
1366    0423  5221              JMP     .-2                     /WAIT FOR DONE FLAG
1367    0424  7410              SKP
1368    0425  4452    E3PRE,    ERROR                           /MISSING DONE FLAG
1369                      /
1370                      /*****************************************************************************
1371                      /*****************************************************************************
1372                      /THE ENTIRE STATUS WORD IS DISPLAYED IN THE TRANSFER REGISTER AT ERROR/DONE TIME,
1373                      /
1374                      /IF AN RX01 CONTRULLER IS CABLED TO THE RX8 INTERFACE
1375                      / (AND DRIVE 0 IS READY THEN THE STATUS SHOULD INDICATE " SEL DRV RDY" ), ALSO
1376                      /DELETED DATA [MAY] = 1 IF TRACK 0/SECTOR 1 WAS WRITTEN WITH DELETED DATA
1377                      /AND "INIT DONE" SHOULD BE SET,
1378                      /
1379    0426  5775*             JMP     TSTUNI                          /OFF PAGE BECAUSE OF ROOM,
1380                      /
1381                      /
1382    0427  1374              TAD [40                 /PROGRAM EXPECTS DRIVE 0 TO BE READY
1383                      /
1384                      /
1385                      ////////////////////////////////////////////////////////////////////////////
1386                      /
1387                      /       4       5       -       -       8       9       10      11              /
1388                      /
1389                      /       SEL                             WRITE   INIT    PAR                     /
1390                      /       DRIVE   DD                      PROTECT (DONE)          CRC             /
1391                      /       RDY                                             (N/A)                   /
1392                      /
1393                      ////////////////////////////////////////////////////////////////////////////
1394                      /
1395                      /
1396    0430  7107              CLL IAC RTL                     / 4  [INIT] DONE OR 204
1397    0431  3166    NORX01, DCA GOOD
1398    0432  4441              XDRIN
1399    0433  3170              DCA BLANK                       /ACTUAL STATUS FROM [INIT]
1400    0434  1170              TAD BLANK
1401    0435  0773*             AND     COMP
1402    0436  3167              DCA EAC                         /STATUS MINUS DELETED DATA (BIT 5)
1403    0437  1167              TAD EAC
1404    0440  7041              CIA
1405    0441  1166              TAD GOOD                        /EXPECTED
1406    0442  7650              SNA CLA
1407    0443  5246              JMP .+3                         /OK
1408    0444  1167              TAD EAC
1409    0445  4452    E1PRE,    ERROR                           / [INIT] STATUS NOT = EXPECTED
1410                      /
1411                      /IF AN RX01 MICROCONTROLLER [IS] CABLED TO THE RX8 INTERFACE
1412                      /THEN THE PREVIOUS "SDN" SHOULD HAVE CLEARED THE DONE FLAG, BUT
1413                      /
1414                      /IF AN RX01 MICROCONTROLLER IS [NOT] CABLED TO THE RX8 INTERFACE
1415                      /THEN "KEY" INITIALIZE SHOULD HAVE CLEARED THE DONE FLAG
1416                      /
1417                      /TECHNICAL NOTE:
1418                      /
```

```
                    /IF THE DONE FLAG IS SET, AND IF THE INTERRUPT ENABLE FLIP-FLOP IS SET ILLEGALLY,
                    /THEN AN "UNEXPECTED RX01 INTERRUPT" WILL OCCUR IN TO (IF AN RX01 CONTROLLER
                    / (IS) CABLED TO THE RX8 INTERFACE) OR IN T1 WHEN THE MAINTENANCE FLIP-
                    /FLOP "SETS ALL FLAGS"
                    /
0446  4445              SDN
0447  4465              CK
0450  4452    E4PRE,    ERROR                       /UNEXPECTED DONE FLAG
                    /
                    /END OF PRE-TEST                /END OF PRETEST
                    /
0451  5313              JMP REBEGIN
                    /
0452  4464    MORETESTS, LOCKUP
0453  3777'   FIRSTTEST, DCA ERRORS
0454  1413              TAD I A13
0455  3171              DCA TEST              / PAT (FIRST ADDRESS OF TEST)
0456  1171              TAD TEST
0457  3776'             DCA PCSCOPE            / EQUIVALENT TO " SCOPE "
0460  3772'             DCA WUNITS                    /FOR FIRST ENTRY INTO XGETUNIT THIS TEST
0461  5571              JMP I TEST
                    /
                    /THERE ARE NO MORE TESTS
                    /
                    /PRINT AN END OF PASS INDICATOR
                    /
                    /               A = INTERFACE TEST OK (ONLY RX8 TO TEST)
                    /               C = RX8 AND RX01 TEST OK
                    /               D = RX8 AND RX01 AND DRIVE TESTING OK
                    /
                    /               * = AN ERROR OCCURED (DURING A, B, OR D)
                    /
0400                XD=0400
0462  2771'             ISZ CHECKU              /YT?8/ARE WE DONE ALL SELECTED UNITS?
0463  5323              JMP NXTUNT              /YT?8/NO =  DO NEXT UNIT(RX8)
0464  1370              TAD (XD)
0465  3322    NOMORETESTS, DCA MX                     / (X1), (XC), (XD), OR 0
0466  4767'               JMS SELUNT                /RESET UNIT COUNTER(CHECKU)
                    /
                    /NOTE:IF THE CONTENTS OF PROGRAM LOCATION FIRSTERROR = 0
                    /THEN AN ERROR HAS OCCURED FOR THIS PASS
                    /
0467  1115              TAD FIRSTERROR
0470  7640              SZA CLA
0471  5274              JMP .+3
0472  1366              TAD (5500)
0473  3322              DCA MX          /  =

                        /**************
                        /CONSOLE
                        /********
0474  4424              CHECKC8
0475  4426              C8PASS
0476  5326              JMP C8RET2      /
                        /*************
0477  4473              PRINT
```



```
0500  0522              MX
0501  2163              ISZ PASS
0502  5305              JMP .+3
0503  2164              ISZ PASS+1
0504  7000              NOP
0505  4572              LAS
0506  0371              AND (SW3)
0507  7640              SZA CLA
0510  4461              HLT
0511  1114    REBEGIN, TAD DTESTP
0512  0365              AND (37)
0513  1364              TAD (TESTS-1)
0514  3413              DCA A13
0515  7240              STA
0516  3115              DCA FIRSTERROR          /FIRST ERROR SWITCH FOR EACH PASS
0517  7340              CLL CLA CMA
0520  3763'             DCA   CLKCNT                  /FOR APT TIMING
0521  5253              JMP FIRSTTEST
                    /
0522  1100    MX,       TEXT "I"                      / I, C, OR D

0523  7201    NXTUNT,   CLA IAC
0524  3135              DCA UNITCK              /SET UP TO TEST UNIT 8
0525  5200              JMP PRETEST             /START OVER

                        /*****************************************
                        /ROUTINE FOR CONSOLE PASS

0526  6001    C8RET2,   ION     /CONSOLE PASS
0527  2163              ISZ PASS
0530  5333              JMP .+3
0531  2164              ISZ PASS+1

0532  7000              NOP
0533  5311              JMP REBEGIN             /CONTINUE WITH PROGRAM RETURN
                        /*****************************************
0463  4151
0464  4727
0465  0037
0466  5500
0467  6127
0470  0400
0471  6151
0472  4236
0473  2746
0474  0040
0475  2732
0476  1366
0477  1365
            0600        PAGE
                    /TEST 0 = FLAG DETECTION PART II / " C " LINES VERIFICATION PART I
                    /
                    /*************************************************************************
                    /*************************************************************************
                    /
```

```
                        /IF AN RX01 MICROCONTROLLER IS CABLED TO THE RX8 INTERFACE
                        /THEN DON'T EXECUTE THIS TEST
                        /BECAUSE ISSUING THE IOT LCD WITH THE AC = 177
                        /RESEMBLED A COMMAND TO THE RX01
                        /
0600  1165    TO,       TAD RXHERE
0601  7650              SNA CLA
0602  5453              NOTEST
0603  3166              DCA GOOD
                        /*****************************************************************************
                        /*****************************************************************************
                        /
                        /THE PURPOSE OF THIS TEST IS TO VERIFY THAT THE LCD (LOAD COMMAND REGISTER)
                        /IOT 67X1 DOES (NOT) SET THE MAINTENANCE FLIP-FLOP WHEN THE CONTENTS
                        /OF THE AC = 177 AT THE TIME THE LCD IOT IS ISSUED.
                        /
                        /
                        /TECHNICAL NOTE:
                        /
                        /IF AN ERROR OCCURS, THEN IT IS ASSUMED (KEY) INIT FAILED TO CLEAR THE
                        /MAINTENANCE FLIP-FLOP, OR, THAT THE ISSUING OF THE LCD IOT REALLY
                        / (SET) THE MAINTENANCE FLIP-FLOP INSTEAD OF (CLEARING) .
                        /
                        / " C " LINES VERIFICATION PART I
                        /
0604  1377              TAD (177)
0605  4436              LCD                     /MAINTENANCE MODE <OFF>
                        /THE (AC) SHOULD = 0 BECAUSE IOT LCD 67X1 SHOULD CLEAR THE AC
                        /
0606  7440              SZA
0607  4452    E0,       ERROR                   / IOT 67X1 DID NOT CLEAR THE AC
0610  4503              SUBSCOPE
                        /
                        /FLAG DETECTION PART II
                        /
                        /THE PURPOSE OF THIS TEST IS TO VERIFY THAT ISSUING IOT LCD 67X1 WITH
                        /THE AC = 177 DOES NOT SET THE MAINTENANCE FLIP-FLOP
                        /WHICH IN TURN WOULD SET ALL FLAGS
                        /
                        /THEREFORE ALL FLAGS SHOULD BE CLEARED
                        /
0611  4443              STR
0612  4465              OK
0613  4452    E1,       ERROR                   /UNEXPECTED TRANSFER REQUEST FLAG
0614  4503              SUBSCOPE
0615  4444              SER
0616  4465              OK

0617  4452    E2,       ERROR                   /UNEXPECTED ERROR FLAG
0620  4503              SUBSCOPE
0621  4445              SDN
0622  4465              OK
0623  4452    E3,       ERROR                   /UNEXPECTED DONE FLAG
0624  4502              SCOPE
0625  5453              EXIT                    / END OF TEST 0
                        /
```



```
                        /TEST 1 = DIRECTION OF IOT XDR (67X2) PART I / IOT DECODING PART I
                        /
                        /       = " C " LINES VERIFICATON PART II
                        /
                        /THE PURPOSE OF THIS TEST IS TO VERIFY THAT
                        /ISSUING THE IOT XDR (TRANSFER DATA REGISTER) 67X2 DOES (NOT) CLEAR
                        /THE MAINTENANCE FLIP-FLOP
                        /
                        /TECHNICAL NOTE:
                        /
                        /THE IOT'S SDN (67X5), AND SER (67X4) ARE NOT TESTED HERE
                        /BECAUSE IF AN RX01 MICROCONTROLLER IS CABLED TO THE RX8 INTERFACE
                        /AND IF THE IOT LCD IS ISSUED WITH THE AC = 200
                        /REALLY CLEARS THE MAINTENANCE FLIP-FLOP
                        /THEN THE DONE FLAG, AND THE ERROR FLAG SHOULD BE CLEARED, AND
                        /TRANSFER REQUEST MAY BE SET
                        /BECAUSE THE CLEARING OF THE MAINTENANCE FLIP-FLOP WOULD HAVE
                        /RESEMBLED A COMMAND TO THE RX01 MICROCONTROLLER
                        /
                        /TECHNICAL NOTE:
                        /
                        /IF THE CONTENTS OF THE TRANSFER REGISTER IS NOT = 200, THEN IT MUST
                        /BE ASSUMED THAT THE SECOND LCD IOT CLEARED THE MAINTENANCE FLIP-FLOP
                        /OR THAT IOT XDR CLEARED THE MAINTENANCE FLIP-FLOP
                        /
0626  3166    T1,       DCA GOOD
0627  1376              TAD (200)
0630  4436              LCD     / MAINTENANCE MODE <ON>
                        /THE (AC) SHOULD = 0 AFTER ISSUING IOT LCD 67X1
                        /
0631  7440              SZA
0632  4452    E11,      ERROR                   / IOT LCD 67X1 FAILED TO CLEAR AC
0633  4503              SUBSCOPE
                        /
0634  1376              TAD (200)
0635  4436              LCD                     / MAINTENANCE MODE <ON>, AGAIN
0636  4441              XDRIN                   /CONTENTS OF TRANSFER REGISTER
0637  3167              DCA EAC                 /SAVE
0640  1167              TAD EAC
0641  1375              TAD (-200)              /COMPARE WITH "EXPECTED"
0642  7650              SNA CLA
0643  5250              JMP .+5                 / OK
0644  1376              TAD (200)
0645  3166              DCA GOOD                / "EXPECTED" RESULT
0646  1167              TAD EAC                 / "ACTUAL" RESULT
0647  4452    E10,      ERROR                   /TRANSFER REGISTER NOT =200
0650  4502              SCOPE
0651  5453              EXIT                    / END OF TEST 1
                        /TEST 2 = FLAG DETECTION PART III / " C " LINES VERIFICATION PART III
                        /
                        / (A)   THE SETTING OF THE MAINTENANCE FLIP-FLOP SHOULD "DIRECT SET" ALL
                        /       FLAGS (DONE, TRANSFER REQUEST, AND ERROR).
                        /
                        / (B)   IF AN RX01 MICROCONTROLLER (IS) CABLED TO THE RX8 INTERFACE,
                        /       THEN THE SETTING OF THE MAINTENANCE FLIP-FLOP WILL ASSERT THE "RUN"
```

```
                        /       LINE (RESEMBLING A FILL BUFFER COMMAND) THUS CAUSING THE RX01
                        /       CONTROLLER TO SETUP FOR A "FILL BUFFER", BUT, HOWEVER, BECAUSE THE
                        /       MAINTENANCE FLIP-FLOP [IS] SET, THE RX8 INTERFACE RECIEVERS
                        /       SHOULD BE DISABLED AND NOT REACTIVE TO THE RX01 MICROCONTROLLER.
                        /
                        /WITH ALL FLAGS SET, THE RX8 INTERFACE IOT'S:
                        /
                        / SDN = "SKIP ON DONE" (67X5), AND
                        / SER = "SKIP ON ERROR" (67X4), AND
                        / STR = "SKIP ON TRANSFER REQUEST" (67X3) SHOULD SKIP
                        /
                        /TECHNICAL NOTE:
                        /
                        /IF FLAGS ARE "MISSING", IS THE MAINTENANCE MODE FLIP-FLOP REALLY SET ?
                        /
0652  1376    T2,       TAD (200)
0653  4436              LCD                     / MAINTENANCE <ON>
0654  4445              SDN
0655  4452    E20,      ERROR                           /MISSING DONE FLAG
0656  4503              SUBSCOPE
0657  4443              STR
0660  4452    E21,      ERROR                           /MISSING TRANSFER REQUEST FLAG
0661  4503              SUBSCOPE
0662  4444              SER
0663  4452    E22,      ERROR                           /MISSING ERROR FLAG
0664  4503              SUBSCOPE
                        /
                        /ALL FLAGS SHOULD REMAIN " DIRECT SET "
                        /BECAUSE THE MAINTENANCE FLIP-FLOP SHOULD STILL BE SET.
                        /
                        /TECHNICAL NOTE:
                        /
                        /IF THE FLAGS ARE "MISSING" THEN IT IS ASSUMED THAT THE PREVIOUS
                        /FLAG TESTING ACTUALLY [CLEARED] THE FLAGS.
                        /
0665  4445              SDN
0666  4457    E23,      ERROR                           /MISSING DONE FLAG
0667  4503              SUBSCOPE
0670  4443              STR
0671  4452    E24,      ERROR                           /MISSING TRANSFER REQUEST FLAG
0672  4503              SUBSCOPE
0673  4444              SER
0674  4452    E25,      ERROR                           /MISSING ERROR FLAG
0675  4503              SUBSCOPE
                        / " C " LINES VERIFICATION PART III
                        /
                        /THE FOLLOWING RX8 INTERFACE IOT'S SHOULD NOT CLEAR THE AC:
                        /
                        /IOT'S: SDN(67X5), SER(67X4), OR STR(67X3)
                        /
0676  7240              STA
0677  3166              DCA GOOD
0700  1166              TAD GOOD
0701  6755    K67X58,   6755
0702  7000              NOP
```



```
0703  7650              SNA CLA
0704  4452    E26,      ERROR                           / IOT SDN (67X5) CLEARED THE AC
0705  4503              SUBSCOPE
0706  1166              TAD GOOD
0707  6753    K67X38,   6753
0710  7000              NOP
0711  7650              SNA CLA
0712  4452    E27,      ERROR                           / IOT STR (67X3) CLEARED THE AC
0713  4503              SUBSCOPE
0714  1166              TAD GOOD
0715  6754    K67X48,   6754
0716  7000              NOP
0717  7650              SNA CLA
0720  4452    E28,      ERROR                           / IOT SER (67X4) CLEARED THE AC
0721  4502              SCOPE
0722  5453              EXIT                            / END OF TEST 2
                        /TEST 3
                        /
                        /RX8 IOT DEVICE CODE VERIFICATION
                        /
                        /THE PURPOSE OF THIS TEST IS TO VERIFY THAT ONLY THE DEVICE CODE SELECTED
                        /BY THE OPERATOR (AC SWITCHES 3-4-5 AT THE START OF THIS PROGRAM) IS ACTIVE.
                        /
                        /FIRST SET THE MAINTENANCE FLIP-FLOP, WHICH HAS PREVIOUSLY BEEN VERIFIED TO
                        /DIRECT SET ALL FLAGS, THEN SEQUENCE THROUGH ALL DEVICE CODES (EXPECT THE
                        /DEVICE CODE SELECTED AT THE START OF THIS PROGRAM) BY ISSUING IOT SDN 67X5
                        / [SKIP ON DONE FLAG], WHICH HAS ALSO PREVIUOSLY BEEN VERIFIED TO "SKIP AND
                        /CLEAR " SUCCESSFULLY.
                        /
                        /NOTE:
                        /
                        /THE PROGRAM DOES NOT ISSUE THE DEVICE CODE 67X5 WHERE X = POSITION OF AC
                        /SWITCHES 3-4-5 AT THE START 200 OF THIS PROGRAM.
                        /*************************************************************
                        /*********************************************************************
                        /THIS TEST HAS BEEN REMOVED
                        /THIS TEST IS NOT NEEDED IN A SYSTEM ENVIRERNMENT.
                        /TO REPLACE TEST T3 CHANGE LOCATIONS:
                        /       LOCATION  FROM    TO
                        /       --------  ----    --
                        /       734       5464    1367
                        /
                        /       767       XXXX    0200
                        /REMOVED MAY 16,1975
                        ///
                        /
0723  5453    T3,       EXIT
0724  4436              LCD                     / MAINTENANCE <ON>
0725  1774'             TAD K67X5A
0726  3166              DCA GOOD
0727  1373              TAD (-7)
0730  3010              DCA A10
0731  1372              TAD (6705)
0732  3341    DCACTIVE, DCA ACTIVE
0733  4502              SCOPE                           /REFRESH PROGRAM LOCATION PCSCOPE
```

```
 1748  0734  1166          TAD GOOD
 1749  0735  7041          CIA
 1750  0736  1341          TAD ACTIVE
 1751  0737  7650          SNA CLA
 1752  0740  5346          JMP NEXTACTIVE
 1753  0741  6775    ACTIVE, 6775
 1754  0742  5346          JMP NEXTACTIVE
 1755  0743  1341          TAD ACTIVE
 1756  0744  4452    E30,  ERROR
 1757  0745  4502          SCOPE                   / (AC) = ILLEGAL DEVICE CODE
 1758  0746  1371    NEXTACTIVE, TAD (10)
 1759  0747  1341          TAD ACTIVE
 1760  0750  2010          ISZ A10
 1761  0751  5332          JMP DCACTIVE
 1762  0752  5453          EXIT                    / END OF TEST 3
 1763  0771  0010
 1764  0772  6705
 1765  0773  7771
 1766  0774  6422
 1767  0775  7600
 1768  0776  0200
 1769  0777  0177
       1000          PAGE
 1770              /TEST 4 = TRANSFER REGISTER DIRECTION TESTING (PART II)
 1771              /
 1772              /       = " C " LINES VERIFICATION PART IV
 1773              /
 1774              /WITH THE MAINTENANCE FLIP-FLOP SET THE PROGRAM WILL VERIFY THE DIRECTION
 1775              /AND TRANSFER MODE (8-BIT MODE INCLUSIVE "OR", AND 12-BIT MODE "JAM")
 1776              /TRANSFERS INTO THE ACCUMULATOR FROM THE RX8 TRANSFER REGISTER BY ISSUING
 1777              /IOT "XDR" (TRANSFER DATA REGISTER) 67X2 AFTER PREVIOUSLY (LOADING) THE
 1778              /THE TRANSFER REGISTER WITH THE CONTENTS OF THE ACCUMULATOR REPRESENT-
 1779              /ATIVE OF THE FOLLOWING PATTERNS WHEN THE "LCD" IOT 67X1 IS ISSUED.
 1780              /
 1781              /               (1)     200     - MAINTENANCE MODE <ON>
 1782              /               (2)     376     -
 1783              /               (3)     375     -
 1784              /               (4)     373     - (BYTES 2 THRU 7)
 1785              /               (5)     367     - (INCLUSIVE "OR" )
 1786              /               (6)     357     -
 1787              /               (7)     337     -
 1788              /               (8)    7677     - (WORD 8 = "JAM " )
 1789              /
 1790              /THE LCD IOT WILL BE ISSUED A TOTAL OF 8 TIMES.
 1791              /
 1792              /THE 1ST LCD IOT WILL BE ISSUED WITH THE AC = 200 WHICH INITIALLY SETS THE
 1793              /MAINTENANCE FLIP-FLOP THEREBY GUARANTEEING THE CONTENTS OF THE TRANSFER
 1794              /REGISTER (BUFER) EACH SUCCEEDING LCD IOT.
 1795              /
 1796              /LCD IOT'S 2 THUR 8 ARE ISSUED WITH THE ACCUMULATOR CONTAINING THE PATTERNS
 1797              /DESCRIBED ABOVE.
 1798              /
 1799              /ALL PATTERNS EXCEPT WORD 8 (7677) TEST THE INCLUSIVE "OR" TRANSFER OF
 1800              /THE RX8 INTERFACE TRANSFER REGISTER.  WORD 8 TESTS THE 12-BIT "JAM" TRANSFER.
 1801              /
```



```
 1802  1000  1377    T4,   TAD (200)
 1803  1001  4436          LCD                     /MAINTENANCE MODE <ON>
 1804  1002  7350          CLL STA RAR             / 3777
 1805  1003  3170          DCA BLANK
 1806  1004  1170    T48,  TAD BLANK
 1807  1005  7120          STL
 1808  1006  7500          SMA
 1809  1007  7100          CLL
 1810  1010  7004          RAL
 1811  1011  3170          DCA BLANK
 1812  1012  4502          SCOPE                   / REFRESH PROGRAM LOCATION PCSCOPE
 1813  1013  1170          TAD BLANK               / (BLANK) = (AC) BEFORE LCD IOT 67X1
 1814  1014  4436          LCD                     /  TO
 1815              /
 1816              / " C " LINES VERIFICATION PART IV
 1817              /
 1818              /THE PURPOSE OF THIS TEST IS TO VERIFY THAT SUCCEEDING LCD IOT'S(67X1)
 1819              /TRANSFER THE (AC) INTO THE DATA REGISTER CLEARING THE ACCUMULATOR
 1820              /
 1821  1015  3167          DCA EAC                 / (AC) AFTER ISSUING IOT LCD (67X1)
 1822  1016  3166          DCA GOOD                / PROGRAM EXPECTS AC = 0
 1823  1017  1167          TAD EAC
 1824  1020  7440          SZA
 1825  1021  4452    E42,  ERROR                   / IOT LCD (67X1) DIDN'T CLEAR THE AC
 1826  1022  4503          SUBSCOPE
 1827              /
 1828              /TRANSFER DIRECTION PART II
 1829              /
 1830  1023  4441          XDRIN                   /  FROM
 1831  1024  3167          DCA EAC
 1832  1025  1376          TAD (100)
 1833  1026  0170          AND BLANK
 1834  1027  7106          CLL RTL
 1835  1030  7006          RTL                     / LINK = 1 FOR 8-BIT MODE
 1836  1031  7006          RTL
 1837  1032  1170          TAD BLANK
 1838  1033  7430          SZL
 1839  1034  0375          AND (377)               / 8-BIT BYTE "GOOD" MASK
 1840  1035  3166          DCA GOOD
 1841  1036  1166          TAD GOOD                /EXPECTED RESULT
 1842  1037  7041          CIA
 1843  1040  1167          TAD EAC                 /ACTUAL RESULT
 1844  1041  7650          SNA CLA
 1845  1042  5245          JMP .+3                 /COMPARED OK
 1846  1043  1167          TAD EAC
 1847  1044  4452    E40,  ERROR                   / TRANSFER REGISTER NOT = "GOOD"
 1848              /CHECK TO SEE IF RUNNING ON A VT78 SYSTEM
 1849  1045  4365          JMS VT78CK              /VT78/ RETURN +1 IF NOT VT78
 1850  1046  5251          JMP E41+1               /VT78 - SKIP FOLLOWING SUBTEST
 1851
 1852  1047  4503          SUBSCOPE
 1853              /
 1854              /THE TRANSFER REGISTER SHOULD REMAIN UNCHANGED
 1855              /FROM THE PREVIOUS XDR IOT (NOT SO ON VT78)
 1856              /
```

```
1857  1050  4441          XDRIN                           /  FROM
1858  1051  3167          DCA EAC
1859  1052  1167          TAD EAC                         /ACTUAL
1860  1053  7041          CIA
1861  1054  1166          TAD GOOD                        /EXPECTED
1862  1055  7650          SNA CLA
1863  1056  5261          JMP .+3                         /COMPARED OK
1864  1057  1167          TAD EAC
1865  1060  4452  E41,    ERROR                           / TRANSFER REGISTER NOT = "GOOD"
1866  1061  4507          SCOPE
1867  1062  1170          TAD BLANK
1868  1063  0376          AND (100)
1869  1064  7640          SZA CLA
1870  1065  5204          JMP T4B                         /UNTIL (BLANK) = 7677
1871  1066  5453          EXIT                            / END OF TEST 4
1872                /TEST 5
1873                /
1874                /RX8 IOT DECODING VERIFICATION PART II
1875                /
1876                /*****************************************************************************
1877                /*****************************************************************************
1878                /
1879                /IF AN RX01 CONTROL IS CABLED TO THE RX8 INTERFACE
1880                /THEN DON'T EXECUTE THIS TEST
1881                /BECAUSE THE CLEARING OF THE MAINTENANCE F/F
1882                /RESEMBLES A FILL BUFFER COMMAND (NOT SO ON VT78)
1883                /
1884                /CHECK TO SEE IF RUNNING ON A VT78 SYSTEM
1885  1067  4365          JMS VT78CK                      /VT78/ RETURN +1 IF NOT VT78
1886  1070  5274          JMP .+4                         /VT78 =ALWAYS EXECUTE TEST
1887
1888  1071  1165  T5,     TAD RXHERE
1889  1072  7650          SNA CLA
1890  1073  5453          NOTEST
1891  1074  3166          DCA GOOD
1892                /*****************************************************************************
1893                /*****************************************************************************
1894                /
1895                /THE MAINTENANCE FLIP-FLOP HAS PREVIOUSLY BEEN VERIFIED TO SET AND CLEAR,
1896                /THE IOT UNDER TEST SHOULD "SKIP AND CLEAR" (ONLY) ITS RESPECTIVE FLAG,
1897                /ALL OTHER FLAGS SHOULD REMAIN UNCHANGED
1898                /
1899                / (I.E. THE SDN IOT 67X5 SHOULD SKIP AND CLEAR ONLY THE DONE FLAG, ALL
1900                /OTHER FLAGS SHOULD REMAIN SET)
1901                /
1902  1075  1377          TAD (200)
1903  1076  4436          LCD

1904  1077  4436          LCD             / MAINTENANCE <ON> / <OFF>
1905  1100  4441          XDRIN
1906  1101  7440          SZA
1907  1102  4452  E56,    ERROR                           /TRANSFER REGISTER NOT = 0
1908  1103  4503          SUBSCOPE
1909  1104  4445          SDN
1910  1105  4452  E50,    ERROR                           /DONE FLAG WASN'T SET, OR
1911  1106  4503          SUBSCOPE                        /IOT LCD OR XDR CLEARED THE DONE FLAG
```



```
1912  1107  4445          SDN
1913  1110  4465          OK
1914  1111  4452  E53,    ERROR
1915  1112  4503          SUBSCOPE                        /IOT SDN DIDN'T "SKIP AND CLEAR"
1916  1113  4443          STR
1917  1114  4452  E51,    ERROR                           /TRANSFER REQUEST FLAG WASN'T EVER SET, OR
1918  1115  4503          SUBSCOPE                        /IOT LCD, OR SDN OR XDR CLEARED THE TR FLAG
1919  1116  4443          STR
1920  1117  4465          OK
1921  1120  4452  E54,    ERROR
1922  1121  4503          SUBSCOPE                        /IOT STR DIDN'T "SKIP AND CLEAR"
1923  1122  4444          SER
1924  1123  4452  E52,    ERROR                           /ERROR FLAG WASN'T EVER SET, OR
1925  1124  4504          SUBSCOPE                        /IOTS LCD OR SDN OR XDR OR STR CLEARED THE ERROR FLAG
1926  1125  4444          SER
1927  1126  4465          OK
1928  1127  4452  E55,    ERROR
1929  1130  4502          SCOPE                           /IOT SER DIDN'T "SKIP AND CLEAR"
1930  1131  5453          EXIT                            / END OF TEST 5
1931                /TEST 6 = INTERRUPT TEST PART I / IOT DECODING VERIFICATION PART III
1932                /
1933                /INTERRUPT TEST PART 1
1934                /
1935                /THE MAINTENANCE FLIP-FLOP HAS PREVIOUSLY BEEN VERIFIED TO DIRECT
1936                / (SET) ALL FLAGS AND THE INTERFACE IOT =SKIP ON DONE= "SDN" 67X5 WAS
1937                /FOUND TO "SKIP AND CLEAR" SUCCESSFULLY,
1938                /
1939                /FIRST SET THE MAINTENANCE FLIP-FLOP WHICH IN TURN SETS ALL FLAGS.
1940                /
1941                /THEN ISSUE IOT INTR 67X6 WITH THE AC = 0 (CLEARING) THE RX8 INTERRUPT ENABLE
1942                /NO INTERRUPTS SHOULD OCCUR
1943                /
1944  1132  4507  T6,     WAITIY
1945  1133  1374          TAD (E60)
1946  1134  3002          DCA IPI
1947  1135  1377          TAD (200)
1948  1136  4436          LCD
1949  1137  4446          INTR                            /INTERRUPT ENABLE FLIP-FLOP <OFF>
1950  1140  7000          NOP                             /...WAIT
1951                /       NOP                             /...PLENTY
1952  1141  7410          SKP                             /...OF TIME
1953  1142  4452  E60,    ERROR                           /UNEXPECTED INTERRUPT
1954  1143  4503          SUBSCOPE
1955                /
1956                /*****************************************************************************
1957                /*****************************************************************************
1958                /
1959                /IF AN RX01 MICRO-CONTROLLER IS CABLED TO THE RX8 INTERFACE
1960                /THEN DON'T EXECUTE THE REMAINING PORTION OF THIS TEST
1961                /BECAUSE THE CLEARING OF THE MAINTENANCE FLIP-FLOP RESEMBLES A FILL BUFFER COMMAND
1962                /TO THE RX01 MICROCONTROLLER (NOT SO ON VT78)
1963                /
1964                /CHECK TO SEE IF RUNNING ON A VT78 SYSTEM
1965  1144  4365          JMS VT78CK                      /VT78/ RETURN +1 IF NOT VT78
1966  1145  5351          JMP .+4                         /VT78 -ALWAYS EXECUTE TEST
```

```
1967
1968    1146  1165            TAD RXHERE
1969    1147  7650            SNA CLA
1970    1150  5453            NOTEST
1971                    /
1972                    /*****************************************************************************
1973                    /*****************************************************************************
1974                    /
1975                    /IOT DECODING PART III- IOT INTR 67X6 DECODING VERIFICATION
1976                    /
1977                    /TECHNICAL NOTE:
1978                    /
1979                    /ALL FLAGS SHOULD REMAIN SET
1980                    /IF ANY FLAG IS MISSING,
1981                    /THEN IT IS ASSUMED THAT IOT "INTR" 67X6 CLEARED THE FLAG(S)
1982                    /
1983    1151  4436            LCD                             /MAINTENANCE MODE <OFF>
1984    1152  4446            INTR                            /DISABLE THE INTERRUPT ENABLE F/F
1985    1153  4445            SDN
1986    1154  4452    E61,    ERROR                           /MISSING DONE FLAG
1987    1155  4503            SUBSCOPE
1988    1156  4443            STR
1989    1157  4452    E62,    ERROR                           /MISSING TRANSFER REQUEST FLAG
1990    1160  4503            SUBSCOPE
1991    1161  4444            SER
1992    1162  4452    E63,    ERROR                           /MISSING ERROR FLAG
1993    1163  4502            SCOPE
1994    1164  5453            EXIT                            / END OF TEST 6
1995                    /ROUTINE TO CHECK IF RUNNING ON A VT78 SYSTEM
1996                    /
1997    1165  0000    VT78CK, 0
1998    1166  1022            TAD 22          /GET LOC 22 (HCW2)
1999    1167  0173            AND (1000       /TEST BIT 2
2000    1170  7650            SNA CLA         /IS THIS A VT78 SYSTEM?
2001    1171  2365            ISZ VT78CK      /NO = BUMP RETURN
2002    1172  5765            JMP I VT78CK    /RETURN
2003
2004    1173  1000
2005    1174  1142
2006    1175  0377
2007    1176  0100
2008    1177  0200
              1200            PAGE
2009                    /
2010                    /TEST 7 - INTERRUPT TEST PART II
2011                    /
2012                    /INTERRUPT TEST PART II

2013                    /
2014                    /THE MAINTENANCE FLIP-FLOP HAS PREVIOUSLY BEEN VERIFIED TO DIRECT
2015                    / (SET) ALL FLAGS AND THE INTERFACE IOT -SKIP ON DONE- "SDN" 67X5 WAS
2016                    /FOUND TO "SKIP AND CLEAR" SUCCESSFULLY,
2017                    /
2018                    /FIRST SET THE MAINTENANCE FLIP-FLOP
2019                    /WHICH SHOULD DIRECT SET THE DONE FLAG,
2020                    /THEN BY SETTING THE RX01 INTERRUPT ENABLE
```



```
2021                    /BY ISSUING THE IOT "INTR" 67X6 WITH THE AC = 1,
2022                    /
2023                    /AN INTERRUPT REQUEST SHOULD BE ASSERTED,
2024                    /
2025                    /THE PROGRAM IS EXPECTING AN INTERRUPT,
2026                    /
2027                    /TECHNICAL NOTE:
2028                    /
2029                    /IF AN INTERRUPT DOES NOT OCCUR, THEN IT IS ASSUMED THAT ISSUING THE IOT
2030                    / "INTR" 67X6 DID NOT SET THE RX8 INTERRUPT ENABLE, OR INTERRUPT REQUEST
2031                    /
2032    1200  4507    T7,     WAITTY
2033    1201  1377            TAD (200)
2034    1202  4436            LCD                     /MAINTENANCE <ON>
2035    1203  1376            TAD (T70K)
2036    1204  3002            DCA IPI
2037    1205  6001            ION     /*SEE FOOTNOTE NEXT PAGE
2038    1206  7201            CLA IAC
2039    1207  4446            INTR                    /RX01 INTERRUPT ENABLE <ON>
2040    1210  7000            NOP
2041                    /       NOP
2042                    /PROGRAM NOTE:
2043                    /
2044                    /CLEAR PROGRAM LOCATION "GOBIT" BECAUSE THE TIME FOR THE INTERRUPT
2045                    /TO OCCUR HAS EXPIRED (IF IT WAS EVER GOING TO OCCUR THAT IS)
2046                    /
2047    1211  3154            DCA GOBIT
2048    1212  4452    E70,    ERROR                           /MISSING INTERRUPT
2049    1213  4502    T70K,   SCOPE
2050    1214  5453            EXIT                            / END OF TEST 7
2051                    /TEST 10
2052                    /
2053                    /INTERRUPT TEST (PART III)
2054                    /
2055                    /IOT INTR 67X6 SHOULD CLEAR THE INTERRUPT ENABLE FLIP-FLOP, THEN
2056                    /
2057                    /WITH ALL FLAGS SET, NO INTERRUPTS SHOULD OCCUR
2058                    /
2059                    /TECHNICAL NOTE:
2060                    /
2061                    /IF AN UNEXPECTED PROGRAM INTERRUPT OCCURS FROM APPROXIMATELY THIS PC
2062                    /THEN THE RX PROGRAM INTERRUPT REQUEST TOOK TO LONG TO SET
2063                    /FROM THE PREVIOUS TEST,
2064                    /
2065                    / * FOOTNOTE:
2066                    /
2067                    /THIS IOT "ION" IS ISSUED HERE BECAUSE - IF AN UNEXPECTED PROGRAM
2068                    /INTERRUPT HAD OCCURED IN THE PREVIOUS TEST AND AC SW3 = 1 DIRECTING
2069                    /THE PROGRAM NOT TO PRINT AN ERROR - THEN THE PDP'S INTERRUPT FACILITY
2070                    /WOULD BE <OFF> - THEREFORE NEVER EXECUTING THIS TEST PROPERLY
2071                    /
2072    1215  4507    T10,    WAITTY
2073    1216  4446            INTR                            /DISABLE RX8 INTERRUPT ENABLE
2074    1217  1375            TAD (E100)
2075    1220  3002            DCA IPI
```

```
2076  1221  6001          ION     / *SEE FOOTNOTE ABOVE
2077  1222  1377          TAD (200)
2078  1223  4436          LCD
2079  1224  7000          NOP
2080  1225  7410          SKP
2081  1226  4452  E100,   ERROR                           /UNEXPECTED INTERRUPT
2082  1227  4502          SCOPE
2083  1230  5453          EXIT                            / END OF TEST 10
2084                /TEST 11
2085                /
2086                /INTERRUPT TEST (PART IV)
2087                /
2088                /*************************************************************************
2089                /*************************************************************************
2090                /
2091                /IF AN RX01 CONTROL IS CABLED TO THE RX8 INTERFACE
2092                /THEN DON'T EXECUTE THIS TEST
2093                /BECAUSE THE CLEARING OF THE MAINTENANCE F/F
2094                /RESEMBLES A FILL BUFFER COMMAND
2095                /
2096                /CHECK TO SEE IF RUNNING ON A VT78 SYSTEM
2097  1231  4774*         JMS VT78CK                      /VT78/ RETURN +1 IF NOT VT78
2098  1232  5236          JMP .+4                         /VT78 =ALWAYS EXECUTE TEST
2099
2100  1233  1165  T11,    TAD RXHERE
2101  1234  7650          SNA CLA
2102  1235  5453          NOTEST
2103                /*************************************************************************
2104                /*************************************************************************
2105                /
2106                /TOGGLING THE MAINTENANCE MODE <ON> / <OFF> SETS ALL FLAGS AND
2107                /
2108                /PERMITS IOT SDN TO CLEAR THE DONE FLAG
2109                /
2110                /THEREFORE NO INTERRUPTS SHOULD OCCUR (ONLY DONE FLAG RAISES AN INTERRUPT REQUEST)
2111                /
2112                / (EVEN THOUGH THE RX01 INTERRUPT ENABLE IS 1 )
2113                /
2114  1236  4507          #AITTY
2115                /
2116  1237  1377          TAD (200)
2117  1240  4436          LCD
2118  1241  4436          LCD             /MAINTENANCE <ON> / <OFF>
2119  1242  4445          SDN
2120  1243  7000          NOP
2121                /       NOP                         /CLEAR THE DONE FLAG
2122  1244  1373          TAD (E110)

2123  1245  3002          DCA IPI
2124  1246  7201          CLA IAC
2125  1247  4446          INTR                          /RX01 INTERRUPT ENABLE <ON>
2126  1250  7000          NOP
2127                /       NOP
2128  1251  7330          STL CLA RAR
2129  1252  4446  E110,   INTR                          /RX01 INTERRUPT ENABLE <OFF>
2130  1253  1154          TAD GOBIT
```



```
2131  1254  7700          SMA CLA
2132  1255  4452          ERROR                         /UNEXPECTED INTERRUPT
2133  1256  4502          SCOPE
2134  1257  5453          EXIT                          / END OF TEST 11
2135                /TEST 12 = INITIALIZE TEST PART II (PROGRAMMED) / INTERRUPT TEST PART V
2136                /
2137                /*************************************************************************
2138                /*************************************************************************
2139                /
2140                /IF AN RX01 IS CABLED TO THE RX8 THEN DON'T EXECUTE T12
2141                /
2142                /BUT EXECUTE ALT12 (THE ALTERNATIVE TEST)
2143                /
2144  1260  1165  T12,    TAD RXHERE
2145  1261  7650          SNA CLA
2146  1262  5772*         JMP ALT12
2147                /*************************************************************************
2148                /*************************************************************************
2149                /
2150                /INTERRUPT TEST PART V / INITIALIZE TEST PART II (PROGRAMMED)
2151                /
2152                /THE PURPOSE OF THIS TEST IS TO VERIFY THAT IOT INIT CLEARS THE INTERRUPT
2153                /ENABLE FLIP-FLOP WHEN SET
2154                /
2155  1263  1371          TAD (E124)
2156  1264  3002          DCA IPI
2157  1265  7201          CLA IAC
2158  1266  4446          INTR                          / SET THE RX8 INTERRUPT ENABLE F/F
2159  1267  4450          INITB
2160  1270  4451          CKUNIT                        /VT78/SETUP FOR UNIT A OR B
2161  1271  3154          DCA GOBIT                     / ISSUE INIT IOT 67X7
2162                /...BUT AN INTERRUPT SHOULD NOT OCCUR
2163                /
2164                /IF AN INTERRUPT OCCURS THEN IOT INIT FAILED TO CLEAR
2165                /
2166                /THE RX8 INTERRUPT ENABLE FLIP-FLOP
2167                /
2168  1272  1377          TAD (200)
2169  1273  4436          LCD
2170  1274  4436          LCD             / MAINTENANCE MODE <ON> / <OFF>
2171                /
2172                /THE DONE FLAG SHOULD BE SET, BUT NO INTERUPTS SHOULD OCCUR
2173                /
2174  1275  7330          STL CLA RAR
2175                /
2176                /RETURN TO HERE IF AN INTERRUPT OCCURED
2177                /
2178  1276  4446  E124,   INTR                          / RX8 INTERRUPT ENABLE <OFF>
2179  1277  1154          TAD GOBIT
2180  1300  7700          SMA CLA
2181  1301  4452          ERROR                         / IOT INIT 67X7 DID NOT CLEAR THE IE F/F
2182  1302  4503          SUBSCOPE
2183                /
2184                /IOT "INIT" 67X7 SHOULD CLEAR THE RX8 INTERFACE TRANSFER REGISTER, THE
2185                /MAINTENANCE FLIP-FLOP, AND ALL FLAGS (DONE, TRANSFER REQUEST, AND ERROR).
```

```
                        /
                        STA
                        LCD                     /ALL 1'S TO TRANSFER REGISTER
                        INITB                     / IOT 67X7
                        CKUNIT                  /VT78/SETUP FOR UNIT A OR B
                        SDN
                        OK
E120,                   ERROR                           /UNEXPECTED DONE FLAG
                        SUBSCOPE
                        STR
                        OK
E121,                   ERROR                           /UNEXPECTED TRANSFER REQUEST FLAG
                        SUBSCOPE
                        SER
                        OK
E122,                   ERROR                           /UNEXPECTED ERROR FLAG
                        SUBSCOPE
                        DCA GOOD                        / PROGRAM EXPECTS TRANSFER REGISTER = 0
                        XDMIN
                        SZA
E123,                   ERROR                           /TRANSFER REGISTER NOT = 0
                        SCOPE
                        /
                        /*****************************************************************************
                        /*****************************************************************************
                        /
                        /NO MORE RX8 INTERFACE TESTS EXIST
                        /
                        /IF AN RX01 CONTROL IS CABLED TO THE RX8 INTERFACE
                        /
                        /THEN CONTINUE WITH THE NORMAL FLOW OF TESTING
                        /
        1100            XI=1100
                        /
                        / END OF PASS " I "
                        /
1330  4464                      LOCKUP
1331  1378                      TAD (XI)
1332  5767*                     JMP NOMORETESTS
                        /*****************************************************************************
                        /*****************************************************************************
1333  1333              XSCOPE, .
1334  7300                      CLA CLL
1335  1365                      TAD ERRORS
1336  7640                      SZA CLA
1337  5357                      JMP SCOPING
                        /NO ERROR HAS BEEN DETECTED HERE
                        /
                        /JUST SET (PCSCOPE)=THE FIRST ADDRESS OF THE SCOPE LOOP
                        /
                        / (IN CASE ANY ERRORS ARE EVER DETECTED LATER)
                        /
1340  3365              NOSCOPE, DCA ERRORS
1341  1333                      TAD XSCOPE
1342  3366                      DCA PCSCOPE
```



```
1343  5733                      JMP I XSCOPE
                        /  " SUBSCOPE "
                        /
1344  1344              XSSCOPE, .
1345  1349                      TAD XSSCOPE
1346  3333                      DCA XSCOPE
1347  1365                      TAD ERRORS
1350  7650                      SNA CLA
1351  5733                      JMP I XSCOPE
                        /ERRORS DO EXIST
                        /
                        /IF THIS ERROR IS THE SAME AS THE ADDRESS WITHIN THE PROGRAM LOCATION
                        /PCSSCOPE, THEN THIS IS A SCOPE LOOP
                        /
                        /IF NOT, THEN EXIT
                        /
1352  1333                      TAD XSCOPE
1353  7041                      CIA
1354  1364                      TAD EPCSCOPE
1355  7640                      SZA CLA
1356  5733                      JMP I XSCOPE
                        /THIS IS A SCOPEING LOOP
                        /
1357  4572              SCOPING, LAS              /TEST BIT 1
1360  7004                      RAL
1361  7700                      SMA CLA CLL
1362  5340                      JMP NOSCOPE
1363  5766                      JMP I PCSCOPE
1364  0000              EPCSCOPE,       0               /ADDRESS +1 OF  "SCOPE" OR "SUBSCOPE"
1365  0000              ERRORS,         0               / > 0 IF AN ERROR HAS BEEN DETECTED (FOR THIS TEST)
1366  0000              PCSCOPE,        0               / FIRST ADDRESS OF SCOPE LOOP
1367  0465
1370  1100
1371  1276
1372  1400
1373  1252
1374  1165
1375  1226
1376  1213
1377  0200
      1400                      PAGE
                        /ALTERNATE TEST 12 - VERIFICATION OF [INIT]
                        /
                        /INITIALIZE TEST PART II
                        /
                        /THIS TEST IS EXECUTED IN PLACE OF T12
                        /
                        /BECAUSE AN RX01 CONTROLLER IS CABLED TO THE RX8 INTERFACE
                        /
                        /IOT "INIT" 67X7 WILL PERFORM AN IMPLIED READ OF TRACK 0 SECTOR 1
                        /
                        / (IF DRIVE 0 IS READY)
                        /
                        /THEREFORE THE DONE FLAG SHOULD SET AT THE END OF THAT IMPLIED READ.
                        /
```

```
                        /TECHNICAL NOTE:
                        /
                        /IF AN ERROR FLAG IS SET (AND DRIVE 0 IS READY) THEN THE ERROR MAY HAVE
                        /BEEN THE RESULT FROM THE [IMPLIED READ SECTOR 0]
                        /
2300    1400  4502      ALT12,  SCOPE
2301    1401  4450              INITB
2302    1402  4451              CKUNIT                  /VT78/SETUP FOR UNIT A OR B
2303    1403  4443      ALT12LOOP, STR
2304    1404  7410              SKP
2305    1405  5212              JMP EA120               /UNEXPECTED TRANSFER REQUEST FLAG
2306    1406  4445              SDN
2307    1407  5203              JMP ALT12LOOP           /WAIT FOR THE DONE FLAG
2308    1410  4443              STR
2309    1411  4465              OK
2310    1412  4452      EA120,  ERROR                           /UNEXPECTED TRANSFER REQUEST
2311    1413  4503              SUBSCOPE
2312    1414  4444              SER
2313    1415  4465              OK
2314    1416  4452      EA121,  ERROR                           /UNEXPECTED ERROR FLAG
2315    1417  4503              SUBSCOPE
2316    1420  1777*             IAD UNITS                       /UNITS SELECTED BY OPERATOR
2317    1421  7710              SPA CLA
2318    1422  1376              TAD (40                 /PROGRAM EXPECTS DRIVE 0 TO BE READY
                        /
                        /
                        ////////////////////////////////////////////////////////////////////////////////
                        /
                        /       4       5       -       -       8       9       10      11              /
                        /
                        /       SEL                             WRITE   INIT    PAR                     /
                        /       DRIVE   D0                      PROTECT [DONE]          CRC             /
                        /       RDY                                             (N/A)                   /
                        /
                        ////////////////////////////////////////////////////////////////////////////////
                        /
                        /
2332    1423  7107              CLL IAC RTL                     /  4 [INIT] DONE, OR 204
2333    1424  3166              DCA GOOD
2334    1425  4441              XDRIN                           / "ACTUAL" STATUS AT DONE
2335    1426  3170              DCA BLANK
2336    1427  1170              TAD BLANK
2337    1430  0136              AND MASK                /7677 FOR STANDARD 8 = 277 FOR VT78
2338    1431  3167              DCA EAC                         / "ACTUAL" MINUS DELETED DATA (IF ANY)
2339    1432  1167              TAD EAC
2340    1433  7041              CIA
2341    1434  1166              TAD GOOD                        /EXPECTED STATUS

2342    1435  7650              SNA CLA
2343    1436  5241              JMP .+3                         /COMPARED OK
2344    1437  1167              TAD EAC
2345    1440  4452      EA122,  ERROR                           /TRANSFER REGISTER NOT = "GOOD"
2346    1441  4503              SUBSCOPE        /NOTE:DRIVES NOT UNDER TEST MUST HAVE DOORS OPEN
                        /
                        /READ THE B-CODE STATUS AND EXPECT = 0
                        /
```



```
                        /PROGRAMMING NOTE:
                        /
                        /THE PROGRAM SAVES THE CONTENTS OF "GOOD" FOR REFERENCES WITHIN SUBROUTINE "XRST"
                        /
                        /BECAUSE "GOOD" IS REFRESHED WITHIN PROGRAM SUBROUTINE "XRSTB"
                        /
2356    1442  1166              TAD GOOD
2357    1443  3170              DCA BLANK
2358    1444  4477              RSTB
2359    1445  7650              SNA CLA
2360    1446  5252              JMP .+4
2361    1447  3166              DCA GOOD                        /PROGRAM EXPECTS 0
2362    1450  1167              TAD EAC
2363    1451  4452      EA123,  ERROR                           /B-CODE NOT = 0
2364    1452  4503              SUBSCOPE
                        /
                        /READ THE CONTENTS OF THE RX01 STATUS REGISTER USING THE COMMAND # 5
                        /
                        /THIS STATUS SHOULD = THE STATUS IN THE TRANSFER REGISTER AT ERROR/DONE
                        /
2370    1453  4476              RST                             / "READ STATUS" (COMMAND # 5)
                        /
2372    1454  5453              EXIT                            / END OF TEST ALT12 (TEST 12)
                        /THE PURPOSE OF THESE TESTS IS TO VERIFY THE TRANSFER LENGTH OF THE FUNCTION
                        / "FILL BUFFER" AND "EMPTY BUFFER" OF THE RX01 MICROCONTROLLER
                        /
                        /64 TRANSFERS SHOULD OCCUR FOR 12-BIT MODE, AND
                        /128 TRANSFERS SHOULD OCCUR FOR 8-BIT MODE
                        /
                        /THE SECTOR BUFFER IS FILLED WITH A COUNT PATTERN
                        /
                        /               WORD/BYTE 0 = 0
                        /
                        /               WORD 2 = 0202
                        /               BYTE 2 = 2
                        /
                        /               WORD 77 = 7777
                        /               BYTE 177 = 177
                        /
                        /FILL BUFFER 8-BIT MODE
                        /
2391    1455  1375      T16,    TAD (100)
                        /
                        /FILL BUFFER 12-BIT MODE
                        /
2395    1456  4436      T13,    LCD                                     /ISSUE THE COMMAND
2396    1457  1375              TAD (100)
2397    1460  0112              AND COMMAND
2398    1461  7640              SZA CLA
2399    1462  7307              CLL CLA IAC RTL         /  4
2400    1463  1374              TAD (6000)
2401    1464  3132              DCA TESTP
2402    1465  4455              GETAPATTERN
2403    1466  1373              TAD (WBUFFER-1)
2404    1467  3010              DCA A10         /PROGRAMS "WRITE" BUFFER
```

```
2405    1470  1372            TAD (-NBUFFER+1)
2406    1471  3133            DCA XA10                / -STARTING ADDRESS OF WRITE BUFFER
2407    1472  4277    FB,     JMS FBEB
2408    1473  5453            EXIT                            / ** END OF TESTS 13, OR 16
2409    1474  1410            TAD I A10
2410    1475  4442            XDROUT
2411    1476  5272            JMP FB          / AND "FILL THE BUFFER"
2412                  / FILL / EMPTY BUFFER SUBROUTINE FOR TESTS:     ***     13, 16 / 14, 17 ***
2413                  /
2414    1477  1477    FBEB,   .
2415    1500  4443            STR
2416    1501  5304            JMP .+3                         /WAIT FOR TRANSFER REQUEST FLAG
2417    1502  2277            ISZ FBEB
2418    1503  5677            JMP I FBEB
2419    1504  4445            SDN
2420    1505  5300            JMP FBEB+1                              /WAIT FOR THE DONE FLAG
2421    1506  3006            DCA     6                               /FIRST TIME  FOR WAIT,
2422    1507  1112            TAD COMMAND
2423    1510  3170            DCA BLANK
2424    1511  4444            SER
2425    1512  4465            OK
2426    1513  4452    E130,   ERROR                           /UNEXPECTED ERROR FLAG
2427    1514  4503            SUBSCOPE
2428                  /
2429                  / 64 OR 128 BYTES SHOULD HAVE BEEN TRANSFERRED IN OR OUT
2430                  /
2431    1515  1375            TAD (100)
2432    1516  0112            AND COMMAND                     / 200 FOR 8-BIT MODE
2433    1517  1375            TAD (100)
2434    1520  3166            DCA GOOD
2435    1521  1166            TAD GOOD
2436    1522  7041            CIA                             / 100 FOR 12-BIT MODE
2437    1523  1010            TAD A10
2438    1524  1133            TAD XA10
2439    1525  7440            SZA                             /SKIP IF TRANSFERS OK
2440    1526  4452    E131,   ERROR                           / (AC) = - # MEANS NOT ENOUGH TRANSFERS
2441    1527  4502            SCOPE                           / (AC) > 0 MEANS TO MANY TRANSFERS
2442    1530  5677            JMP I   FBEB                    /RETURN IS TO EXIT
2443
2444
2445                          /******************
2446                          /CONSOLE PACKAGE
2447                          /******************
2448                          /*************
2449                          /CONSOL
2450                          /*************
2451

2452    1531  0000    PNTID, 0                                /PRINT BEGIN MESSAGES
2453    1532  6007            CAF                             /TO REPLACE A CLEAR SWITCH
2454    1533  4476            APTH                            /TEST FOR APT SYSTEM,
2455    1534  4473            PRINT
2456    1535  6472            %IDENTIFICATION         /ID MESSAGE
2457    1536  4473            PRINT
2458    1537  6453            %REMOVE                 /REMOVE DIAGNOSTIC DISKETTE
2459    1540  4473            PPINT
```



```
2460    1541  6505            MSELECT                 /SELECT PARAMETERS
2461    1542  7200            CLA
2462    1543  3135            DCA UNITCK              /CLEAR IT
2463    1544  5731            JMP I   PNTID                   /EXIT PNTID
2464                          /************************************
2465                  /
2466                  /
2467                  /
2468                  /
2469                  /
2470                  /ROUTINE TO DETERMINE IF ON APT-8. IF APT-8 IS SELECTED
2471                  /THEN CONSOLE AND TEST PARAMETER SELECTION FUNCTIONS ARE NOP,
2472                  /IF NOT ROUTINE IS NOP.
2473                  /
2474    1545  0000    XAPT8,  0
2475    1546  7300            CLA CLL
2476    1547  4472            CHEK22
2477    1550  7410            SKP                             /ON APT-8
2478    1551  5745            JMP I   XAPT8
2479    1552  1022            TAD     22
2480    1553  0361            AND     K7377                   /NOP CONSOLE PACKAGE
2481    1554  3022            DCA     22                      /RESTORE 22
2482    1555  1173            TAD     K7000
2483    1556  3762            DCA I   HLTNOP
2484    1557  1020            TAD     20                      /GET TEST PARAMETERS,
2485    1560  5771'           JMP     AROUND-2                /MAIN FLOWOF PROGRAM,
2486    1561  7377    K7377,  7377
2487    1562  3316    HLTNOP, CBRET4-1
2488    1571  0231
2489    1572  0665
2490    1573  7113
2491    1574  6000
2492    1575  0100
2493    1576  0940
2494    1577  4235
              1600              PAGE
2495                  /SECTOR BUFFER ADDRESSING VERIFICATION TESTS
2496                  /
2497                  /OPERATIONAL NOTES:
2498                  /
2499                  / (1).  FOR TEST 14 TO EMPTY THE BUFFER IN 12-BIT MODE SUCCESSFULLY, TEST 13
2500                  /       MUST HAVE FILLED THE BUFFER IN 12-BIT MODE SUCCESSFULLY,
2501                  /
2502                  / (2).  FOR TEST 17 TO EMPTY THE BUFFER IN 8-BIT MODE SUCCESSFULLY, TEST 16
2503                  /       MUST HAVE FILLED THE BUFFER IN 8-BIT MODE SUCCESSFULLY
2504                  /
2505                  /THE PURPOSE OF THESE TESTS IS TO VERIFY THAT THE CONTENTS OF THE SECTOR
2506                  /BUFFER REMAIN UNCHANGED AFTER THE PREVIOUS EMPTY BUFFER 8-BIT MODE TEST, AND
2507                  /AFTER THE PREVIOUS EMPTY BUFFER 12-BIT MODE TEST
2508                  /
2509    1600  7410    T20,    SKP                             /VERIFY EMPTY BUFFER 8-BIT MODE
2510                  /
2511    1601  7410    T15,    SKP                             /VERIFY EMPTY BUFFER 12-BIT MODE
2512                  /
2513                  /THE PURPOSE OF THESE TESTS IS TO VERIFY THE CONTENTS OF THE SECTOR BUFFER AFTER
```

```
                        /THE PREVIOUS FILL BUFFER 8-BIT MODE TEST, AND THE PREVIOUS FILL BUFFER
                        /12-BIT MODE TEST.
                        /
                        /EMPTY BUFFER 8-BIT MODE
                        /
1602  1377      T17,    TAD (40
                        /
                        /EMPTY BUFFER 12-BIT MODE
                        /
1603  7105      T14,    CLL IAC RAL
1604  4436              GCD                     /ISSUE THE COMMAND 2 OR 102
1605  1376              TAD (100)
1606  0112              AND COMMAND
1607  7640              SZA CLA
1610  7307              CLL CLA IAC RTL
1611  1375              TAD (6000)
1612  3132              DCA TESTP
1613  4455              GETAPATTERN     / COUNT PATTERN ( PATTERN #6)
1614  1374              TAD (RBUFFER-1)
1615  3010              DCA A10         /PROGRAMS "READ" BUFFER
1616  1373              TAD (-RBUFFER+1)
1617  3133              DCA XA10                / -STARTING ADDRESS OF READ BUFFER
1620  1010              TAD A10
1621  3011              DCA A11                 /
1622  4772*     EB,     JMS FREB
1623  5230              JMP EBCOMPARE
1624  3410              DCA I A10
1625  4441              XORIN
1626  3411              DCA I A11               / AND "EMPTY THE BUFFER"
1627  5222              JMP EB                  /
                        /COMPARE THE CONTENTS OF THE SECTOR BUFFER
                        /
                        /WITH THE GOOD DATA IN "WBUFFER"
                        /
1630  1371      EBCOMPARE, TAD (WBUFFER-1)
1631  3133              DCA XA10                /EXPECTED
1632  1374              TAD (RBUFFER-1)
1633  3134              DCA XA11                /ACTUAL
1634  3113              DCA COMPERROR                   / = 1 IF COMPARE ERROR
                        /
1635  2133      EBLOOP, ISZ XA10
1636  2134              ISZ XA11
1637  7100              CLL
1640  1376              TAD (100)
1641  0112              AND COMMAND
1642  7640              SZA CLA
1643  7120              STL                             /SET LINK IF 8-BIT MODE

1644  1533              TAD I XA10
1645  7430              SZL
1646  0370              AND (377)
1647  3166              DCA GOOD
1650  1166              TAD GOOD
1651  7041              CIA
1652  1534              TAD I XA11
1653  7650              SNA CLA
```



```
1654  5263              JMP EBOK
                        /A COMPARE ERROR HAS OCCURED
                        /
                        /INCORRECT DATA WAS TRANSFERRED FROM THE RX01 CONTROL SECTOR BUFFER
                        /TO THE RX8 INTERFACE AND SAVED WITHIN PROGRAM LOCATIONS BEGINNING WITH "RBUFFER"
                        /
                        /THAT DATA, HOWEVER, MAY HAVE BEEN TRANSFERRED INCORRECTLY  *TO*
                        /THE RX01 CONTROL FROM THE RX8 INTERFACE PREVIOUSLY WITHIN T12, OR T15
                        /
1655  1367              TAD (-WBUFFER)
1656  1133              TAD XA10
1657  3170              DCA BLANK
1660  1534              TAD I XA11                      /ACTUAL WORD/BYTE FROM SECTOR BUFFER
1661  4452      E140,   ERROR                           /IS NOT = EXPECTED
1662  4502              SCOPE
1663  1376      EBOK,   TAD (100)
1664  0112              AND COMMAND
1665  1376              TAD (100)
1666  7041              CIA
1667  1133              TAD XA10
1670  1366              TAD (-WBUFFER+1)
1671  7640              SZA CLA
1672  5235              JMP EBLOOP
                        /END OF TESTS 14, 15, 17, OR 20
                        /
                        /...ALSO
                        /
                        /END OF TESTS 31, 32, OR 33
                        /
1673  5453              EXIT
                        /
                        /SECTOR BUFFER DATA TESTING
                        /
                        /THE PURPOSE OF THESE TESTS IS TO VERIFY THAT ALL 1'S AND ALL 0'S CAN BE
                        /SET INTO THE SECTOR BUFFER
                        /
                        /SECTOR BUFFER DATA TESTING
                        /
                        /FILL THE SECTOR BUFFER WITH ALL 1'S
                        /
1674  1370      T22,    TAD (377)                       / " GOOD " = ALL 1'S
                        /
                        /FILL THE SECTOR BUFFER WITH ALL 0'S
                        /
                        /FILL THE SECTOR BUFFER WITH 128 BYTES OF "GOOD"
                        /
1675  4765*     T21,    JMS FB128BYTES
1676  4764*             JMS TX                  / "GOOD " = ALL 0'S
                        /*****************************************************************************
                        /*****************************************************************************
                        /
                        /IF THIS IS TEST #22
                        /
                        /THEN TEST FOR A DRIVE SELECTION
                        /
```

```
                        /IF NO DRIVES ARE ENABLED WITHIN PROGRAM LOCATION " DTESIP "
                        /
                        /THEN THERE ARE NO MORE RX01 CONTROL TESTS TO EXECUTE
                        /
2628    1677  1171              TAD TEST
2629    1700  1363              TAD (-T22)
2630    1701  7640              SZA CLA
2631    1702  5453              EXIT    / END OF TEST 21
2632    1703  1762'             TAD UNITS
2633    1704  7640              SZA CLA
2634    1705  5453              EXIT            / END OF TEST 22
2635          0300      XC=0300
2636                    /
2637                    / END OF PASS " C "
2638                    /
2639    1706  7340              CLL CLA CMA
2640    1707  3761'             DCA     COUNT                   /INIT TIMING FOR APT IF ONLY
2641                                                            /INTERFACE IS TO BE TESTED.
2642    1710  4760'             JMS     XTICK
2643    1711  4464              LOCKUP
2644    1712  1357              TAD (XC)
2645    1713  5773'             JMP NOMORETESTS
2646                    /*************************************************************************
2647                    /*************************************************************************
2648    1714  7327      T24,    CLA STL IAC RTL
2649    1715  5756'             JMP IRDWR       /  6  (READ)
2650    1716  7307      T25,    CLL CLA IAC RTL
2651    1717  5756'             JMP IRDWR       /  4  (WRITE)
2652    1720  1355      T26,    TAD (14)
2653    1721  5756'             JMP IRDWR               / 14  (WRITE DELETED DATA)
2654                    /
2655                    /THE PURPOSE OF THESE TESTS IS TO VERIFY
2656                    /THE RX01 CONTROL CLOCK SET OF THE ERROR FLAG
2657                    /
2658                    /BY FORCING A SEEK ERROR TO OCCUR
2659                    / (ATTEMPTING TO PERFORM A FUNCTION ON A NON-EXISTANT SECTOR #0 )
2660                    /
2661                    /NOTE:THE CONTENTS OF THE SECTOR BUFFER SHOULD REMAIN UNCHANGED AND CONTAIN
2662                    /     THE PATTERN OF ALL 1'S AS FILLED WITHIN TEST 22 BECAUSE THE READ SHOULD
2663                    /     HAVE NEVER OCCURED.
2664                    /
2665                    /  1.  THE STATUS WITHIN THE TRANSFER REGISTER AT ERROR SHOULD = 0
2666                    /  2.  THE B-CODE STATUS SHOULD = 70 (UNABLE TO FIND SECTOR)
2667                    /  3.  THE STATUS FROM THE RST COMMAND (12) SHOULD = DRIVE READY (200)
2668                    /
2669                    /THE LENGTH ( # OF TRANSFERS TO THE RX01 CONTROL) SHOULD BE TWO
2670                    / (ONE EACH FOR THE SECTOR AND FOR THE TRACK)
2671                    /
2672                    /GET ONE UNIT ONLY (UNIT 1 IF UNIT 0 IS NOT READY)
2673                    /
2674                    /ROUTINE TO WAIT FOR SKIP ON AN IOT, IF SKIP DOES NOT OCCUR
2675                    /THE ROUTINE WILL PRINT PC POINT IN ERROR AND GO BACK ABOUT ITS
2676                    /BUSINESS.
2677                    /
2678    1722  0000      XWAIT,  0
```



```
2679    1723  1006              TAD     6
2680    1724  7650              SNA CLA
2681    1725  5330              JMP     .+3
2682    1726  7240              STA
2683    1727  3006              DCA     6
2684    1730  2153              ISZ     H1
2685    1731  5722              JMP I   XWAIT
2686    1732  2116              ISZ     HANGER
2687    1733  5722              JMP I   XWAIT
2688    1734  1322              TAD     XWAIT                   /GET ERROR PC
2689    1735  1354              TAD     (-E3PRE
2690    1736  7710              SPA CLA                         /DID CALL COME FROM PRETEST,
2691    1737  5753'             JMP     E3PRE                   /YES, REPRORT ERROR,
2692    1740  1322              TAD     XWAIT                   /GET BACK ERROR
2693    1741  5752'             JMP     HUNGUP
2694                    /
2695    1752  3341
2696    1753  0425
2697    1754  7353
2698    1755  0014
2699    1756  2000
2700    1757  0300
2701    1760  4133
2702    1761  4152
2703    1762  4235
2704    1763  6104
2705    1764  2303
2706    1765  4541
2707    1766  0665
2708    1767  0664
2709    1770  0377
2710    1771  7113
2711    1772  1477
2712    1773  0465
2713    1774  7313
2714    1775  6000
2715    1776  0100
2716    1777  0040
                2000            PAGE
2717    2000  3112      IRDWR,  DCA COMMAND
2718    2001  3777'             DCA MUNITS
2719    2002  4460              GETUNII
2720    2003  1112              TAD COMMAND
2721    2004  1776'             TAD UNIT
2722    2005  3170              DCA BLANK
2723    2006  1170              TAD BLANK
2724    2007  4436              UCD                     /  8,  4,  OR  14
2725    2010  3167              DCA EAC
2726    2011  5214              JMP .+3
2727    2012  2167              ISZ EAC
2728    2013  4442              XDROUT
2729    2014  4443              STR
2730    2015  7410              SKP
2731    2016  5212              JMP .-4                         /SECTOR 0 - TRACK 0
2732    2017  4445              SDN
```

```
2733  2020  5214          JMP .-4                         /WAIT FOR DONE FLAG
2734  2021  7344          CLL STA RAL
2735  2022  1167          TAD EAC
2736  2023  7650          SNA CLA
2737  2024  5231          JMP .+5
2738  2025  7305          CLL CLA IAC RAL
2739  2026  3166          DCA GOOD                        / 2 TRANSFERS WERE EXPECTED
2740  2027  1167          TAD EAC
2741  2030  4452  E240,   ERROR                           / # OF TRANSFER REQUEST FLAGS NOT OK
2742  2031  4503          SUBSCOPE                        / (AC) = # OF TRANSFERS OCCURED
2743                      /
2744                      /THE ERROR FLAG SHOULD = 1
2745                      /
2746  2032  4444          SER
2747  2033  4452  E245,   ERROR                           / MISSING ERROR FLAG
2748  2034  4503          SUBSCOPE
2749                      /IF THIS IS T24, THEN DELETED DATA (MAY) BE SET (BUT THAT'S OK FOR NOW),
2750                      /THE STATUS AT ERROR SHOULD = X (100 MAYBE DELETED DATA)+200 DRIVE READY
2751                      /
2752                      /IF THIS IS T25, THEN DELETED DATA (SHOULD NOT) BE SET, THEREFORE
2753                      /THE CONTENTS OF THE TRANSFER REGISTER (THE STATUS AT THE ERROR) SHOULD = 200
2754                      /
2755                      /IF THIS IS T26, THEN DELETED DATA (MUST) BE SET, THEREFORE
2756                      /THE STATUS SHOULD = 300 (200 DRIVE READY)+(100 (DELETED DATA)
2757                      /
2758  2035  1171          TAD TEST                        /FOR T #
2759  2036  1375          TAD (-T25)
2760  2037  7650          SNA CLA
2761  2040  5245          JMP .+5                         / T25 THEN " JMP .+5 "
2762  2041  1171          TAD TEST
2763  2042  1374          TAD (-T26)
2764  2043  7650          SNA CLA
2765  2044  1373          TAD (100)                       / T26 MEANS EXPECT DELETED DATA
2766  2045  3166          DCA GOOD                        / T24
2767  2046  4441          XORIO                           /ACTUAL STATUS
2768  2047  3170          DCA BLANK
2769  2050  1170          TAD BLANK
2770  2051  0372          AND (377              /VT78/
2771  2052  3167          DCA EAC
2772                      /
2773                      /IF THIS IS T24, THEN DELETED DATA (MAY) BE SET, (BUT THAT'S OK FOR NOW)
2774                      /
2775  2053  1171          TAD TEST                        / FOR T #
2776  2054  1371          TAD (-T24)
2777  2055  7640          SZA CLA                         / T24 ?
2778  2056  5262          JMP .+4
2779  2057  1136          TAD MASK                        / YES

2780  2060  0170          AND BLANK                       /ACTUAL STATUS MINUS DELETED DATA
2781  2061  3167          DCA EAC
2782  2062  1167          TAD EAC
2783  2063  7041          CIA
2784  2064  1166          TAD GOOD                        /EXPECTED
2785  2065  7650          SNA CLA
2786  2066  5271          JMP .+3
2787  2067  1167          TAD EAC
```



```
2788  2070  4452  E241,   ERROR                           /STATUS NOT = "GOOD"
2789  2071  4503          SUBSCOPE
2790                      /
2791                      /THE B-CODE SHOULD = 70 (UNABLE TO FIND SECTOR)
2792                      /
2793  2072  4477          RSTB                            /RETURN WITH AC = CODE
2794  2073  1370          TAD (-70)
2795  2074  7650          SNA CLA
2796  2075  5302          JMP .+5
2797  2076  1367          TAD (70)
2798  2077  3166          DCA GOOD
2799  2100  1167          TAD EAC
2800  2101  4452  E242,   ERROR                           /B-CODE STATUS NOT = CODE # 70
2801  2102  4502          SCOPE
2802                      /THE CONTENTS TO THE SECTOR BUFFER SHOULD REMAIN UNCHANGED
2803                      /
2804                      /THE CONTENTS OF THE SECTOR BUFFER SHOULD = ALL BYTES OF 1'S
2805                      /
2806  2103  1372          TAD (377)
2807  2104  3166          DCA GOOD                /EXPECT ALL 1'S
2808  2105  4766*         JMS TX                          /VERIFY SECTOR BUFFER SUBROUTINE
2809  2106  5453          EXIT                            / END OF TEST 24, 25, 26
2810                      /
2811                      / TEST 27 = SEEK AND CRC VERIFICATION (FIRST PROGRAMMED HEAD MOVEMENT)
2812                      /
2813                      /THE PURPOSE OF THIS TEST IS TO VERIFY THAT SUPPLYING THE RX01 WITH A TRACK
2814                      /WHOSE VALUE IS GREATER THAN 114 (OCTAL) EXPECTS A B-CODE ERROR OF 40
2815                      /
2816  2107  1365  T27,    TAD (115)
2817  2110  3170          DCA BLANK
2818  2111  7327          STL CLA IAC RTL
2819  2112  4436          LCD             / ISSUE READ COMMAND
2820  2113  3167          DCA EAC
2821  2114  7410          SKP
2822  2115  2167          ISZ EAC                         / # TO TRANSFER COUNT
2823  2116  1170          TAD BLANK                       / SECTOR TRACK
2824  2117  4442          XDROUT                          /TO RX01 CONTROL
2825  2120  4443          STR                             / WAIT FOR TRANSFER REQUEST FLAG
2826  2121  7410          SKP
2827  2122  5315          JMP .-5
2828  2123  4445          SDN                             / WAIT FOR DONE FLAG
2829  2124  5320          JMP .-4
2830  2125  3006          DCA     6                       /WAIT POINTER
2831  2126  7364          CLL STA RAL                     / ONLY 2 TRANSFER REQUESTS WERE EXPECTED
2832  2127  1167          TAD EAC                         / ACTUAL # OF TRANSFER REQUEST OCCURED
2833  2130  7650          SNA CLA
2834  2131  5336          JMP .+5
2835  2132  7305          CLL CLA IAC RAL
2836  2133  3166          DCA GOOD
2837  2134  1167          TAD EAC
2838  2135  4452  E270,   ERROR                           / # OF TRANSFER REQUEST FLAGS NOT OK
2839  2136  4503          SUBSCOPE                        / (AC) CONTAINS THE # OF REQUEST OCCURED
2840                      /
2841                      /THE ERROR FLAG SHOULD = 1
2842                      /
```

```
2843    2137  4444            SER
2844    2140  4452    E271,   ERROR                           / MISSING ERROR FLAG
2845    2141  4503            $UBSCOPE
2846                    /THE B-CODE SHOULD = 40
2847                    /
2848    2142  4477            RSTB
2849    2143  1364            TAD (-40)
2850    2144  7650            SNA CLA
2851    2145  5352            JMP .+5
2852    2146  1363            TAD (40
2853    2147  3166            DCA GOOD
2854    2150  1167            TAD EAC
2855    2151  4452    E272,   ERROR                           / B-CODE NOT = 40
2856    2152  4502            SCOPE
2857                    /
2858                    /THE CONTENTS OF THE SECTOR BUFFER SHOULD REMAIN UNCHANGED
2859                    /
2860    2153  1372            TAD (377)
2861    2154  3166            DCA GOOD                / EXPECT ALL 1'S
2862    2155  4766'           JMS TX
2863                    /
2864    2156  5453            EXIT                            / END OF TEST 27
2865    2163  0040
2866    2164  7740
2867    2165  0115
2868    2166  2303
2869    2167  0070
2870    2170  7710
2871    2171  6064
2872    2172  0377
2873    2173  0100
2874    2174  6060
2875    2175  6062
2876    2176  4242
2877    2177  4236
              2200              PAGE
2878                    /TEST 30 - SEEK AND CRC VERIFICATION
2879                    /
2880                    /READ ALL SECTORS OF ALL TRACKS
2881                    /
2882                    /IF THE DATA IS OF KNOWN QUALITY THEN MONITOR FOR CRC ERRORS
2883                    /
2884    2200  3132    T30,    DCA TESTP
2885    2201  5777'           JMP TEST4
2886                    /TEST 31 - FIRST WRITE EVER
2887                    /
2888                    /WRITING TO THE DISK SHOULD NOT DESTROY THE CONTENTS OF THE SECTOR BUFFER

2889                    /
2890                    /TECHNICAL NOTE:
2891                    /
2892                    /THIS TEST WRITES ON ONE UNIT ONLY - UNIT 0, BUT IF UNIT 0 WAS
2893                    /NOT SELECTED BY THE OPERATOR AT THE START OF THIS PROGRAM
2894                    /THEN THIS TEST WRITES ON UNIT 1
2895                    /
2896                    /PROGRAMMING NOTE:
```



```
2897                    /
2898                    /THIS "DCA WUNITS" IS NECESSARY IF THIS TEST IS LOCKED WITH SW5
2899                    /
2900    2202  3776'   T31,    DCA WUNITS
2901                    /
2902    2203  7307            CLL CLA IAC RTL                 / 4 (WRITE 8-BIT MODE)
2903    2204  1375            TAD (6000)
2904    2205  3132            DCA TESTP               /COUNT PATTERN 6 .
2905    2206  7240            STA
2906    2207  3120            DCA RDC
2907                    / "GETATRACK"
2908                    /
2909    2210  1027            TAD OD
2910    2211  3131            DCA TARGET              / TRACK = (OD)
2911                    / "GETASECTOR"
2912                    /
2913    2212  1031            TAD FIRST
2914    2213  3124            DCA STARGET             / SECTOR = (FIRST)
2915                    /GET UNIT 0 (OR UNIT 1 IF UNIT 0 NOT SELECTED)
2916                    /
2917    2214  4460            GETUNIT
2918                    /
2919                    / "INITSECTOR"
2920                    /
2921    2215  7240            STA
2922    2216  3122            DCA SECTORS             / ; SECTOR (FIRST) TO WRITE
2923    2217  1374            TAD (.+3)
2924    2220  3773'           DCA XWRITE              / RETURN ADDRESS FROM WRITE SUBROUTINE
2925    2221  5772'           JMP REWRITE+)                   / JMP TO WRITE SUBROUTINE
2926                    /
2927                    /RETURN HERE FROM SUBROUTINE " XWRITE "
2928                    /
2929                    / JMP  TO T17 TO VERIFY THE CONTENTS OF THE SECTOR BUFFER
2930                    /
2931    2222  5771'           JMP T17
2932                    /TEST 32 - INIT (PROGRAMMED) PART III / IMPLIED READ OF TRACK 1 SECTOR 1
2933                    /
2934                    /*************************************************************************
2935                    /*************************************************************************
2936                    /
2937                    /IF THE CONTENTS OF PROGRAM LOCATIONS:
2938                    /
2939                    /  " OD " = 1, AND
2940                    / " FIRST " = 1,
2941                    /
2942                    /AND IF UNIT 0 WAS SELECTED BY THE OPERATOR AT THE START OF THIS PROGRAM
2943                    /
2944                    /THEN EXECUTE THIS TEST
2945                    /
2946    2223  1031    T32,    TAD FIRST
2947    2224  7110            CLL RAR
2948    2225  7640            SZA CLA
2949    2226  5453            NOTEST
2950    2227  1027            TAD OD
2951    2230  7110            CLL RAR
```

```
2952  2931  7640            SZA CLA
2953  2932  5453            NOTEST
2954  2933  1770'           TAD UNITS
2955  2934  7700            SMA CLA
2956  2935  5453            NOTEST
2957                  /*************************************************************************
2958                  /*************************************************************************
2959                  /
2960                  /
2961                  /THE PURPOSE OF THIS TEST IS TO VERIFY THE "IMPLIED READ" OF TRACK 1 SECTOR 1
2962                  /AS PART OF THE INITIALIZE FUNCTION
2963                  /
2964                  /FIRST FILL THE SECTOR BUFFER WITH ALL 0'S, THEN ISSUE IOT INIT 67X7
2965                  /
2966                  /INIT SHOULD READ THE CONTENTS OF TRACK 1 SECTOR 1 OF UNIT 0
2967                  /
2968                  /INTO THE SECTOR BUFFER
2969                  /
2970  2936  4767'            JMS FB128BYTES                  / FILL THE SECTOR BUFFER
2971  2937  4447            INIT                            /OF UNIT 0
2972                  /
2973                  /JMP TO TEST 17 TO VERIFY THE CONTENTS OF THE SECTOR BUFFER
2974                  /
2975  2940  5771'            JMP T17                         / TO TEST 17
2976                  /TEST 33 - FIRST READ (PROGRAMMED) EVER
2977                  /
2978                  /FIRST FILL THE SECTOR BUFFER WITH ALL 0'S
2979                  /
2980                  /THEN READ FROM THE DISK TRACK # (OD), SECTOR # (FIRST)
2981                  /
2982                  /THE CONTENTS OF THE SECTOR BUFFER SHOULD BE THAT OF THE PREVIOUS TEST
2983                  /
2984                  /PROGRAMMING NOTE:
2985                  /
2986                  /THIS "DCA WUNITS" IMPERATIVE IF T27 WAS EXECUTED PREVIOUSLY THIS PASS
2987                  /
2988  2941  3776'  T33,    DCA WUNITS
2989  2942  4767'            JMS FB128BYTES                  / FILL THE SECTOR BUFFER
2990  2943  7307            CLL CLA IAC RTL
2991  2944  3132            DCA TESTP       / 4 (READ 8-BIT MODE)
2992                  /PROGRAMMING NOTE:
2993                  /
2994                  /THE FOLLOWING CODE TO " JMP T17 " IS IMPERATIVE HOUSEKEEPING PRIMING THE
2995                  / " READ " SUBROUTINE
2996                  /
2997  2945  7240            STA
2998  2946  3120            DCA ROC

2999                  / "GETATRACK"
3000                  /
3001  2947  1027            TAD OD
3002  2950  3131            DCA TARGET
3003                  / "GETASECTOR"
3004                  /
3005  2951  1031            TAD FIRST
3006  2952  3124            DCA STARGET
```



```
3007                  /GET ONE UNIT ONLY (UNIT 1 IF UNIT 0 IS NOT READY)
3008                  /
3009  2953  4460            GETUNIT                         / SELECT A UNIT
3010  2954  7240            STA
3011  2955  3140            DCA RIRETRY             /SO NO "REWRITES" OCCUR
3012                  / "INITSECTOR"
3013                  /
3014  2956  7240            STA
3015  2957  3122            DCA SECTORS             / 1 SECTOR TO READ (#FIRST)
3016  2960  1366            TAD (,+4)
3017  2961  3765'           DCA XREAD               /RETURN ADDRESS FROM " READ " SUBROUTINE
3018  2962  5764'           JMP READRETRY                   / JMP TO READ SUBROUTINE
3019                  /THIS "WRITE" IS IMPERATIVE FOR REFERENCES WITHIN "XREAD"
3020                  /
3021  2963  4510            WRITE                           / "WRITE" FOR PROGRAM REFERENCES ONLY
3022                  /
3023                  /RETURN HERE FROM SUBROUTINE " XREAD "
3024                  /
3025                  /
3026                  /JMP TO TEST 17 TO VERIFY THE CONTENTS OF THE SECTOR BUFFER
3027                  /
3028  2964  5771'            JMP T17                         / TO TEST 17
3029                  /TEST 23 - DRIVE READY SELECTION (ALL UNITS SELECTED BY OPERATOR)
3030                  /
3031                  /THE PURPOSE OF THIS TEST IS TO VERIFY THE "SEL DRV RDY" STATUS BIT 4
3032                  /
3033  2965  1363    T23,    TAD (200)
3034  2966  3170            DCA BLANK
3035  2967  4460            GETUNIT
3036  2970  1762'           TAD UNIT
3037  2971  4476            RST
3038  2972  4454            DONE
3039  2973  5265            JMP T23
3040  2974  5453            EXIT                            / END OF TEST 27
3041                  /
3042                  /THE PURPOSE OF THESE TESTS IS TO WRITE-READ-AND PROGRAM VERIFY THE DATA
3043                  /ON ALL TRACKS FROM (OD) TO (ID), AND ALL SECTORS FROM (FIRST) TO (LAST),
3044                  /EXERCISING 8-BIT MODE, 12-BIT MODE, AND DELETED DATA
3045                  /
3046                  /A PATTERN OF ALL 1'S ARE WRITTEN ON THE DISK
3047                  /
3048                  /               WORD/BYTE 1 IS THE TRACK ID (BITS 5 THRU 11)
3049                  /               WORD/BYTE 2 IS THE SECTOR ID (BITS 7 THRU 11)
3050                  /
3051                  /               WORDS 3 THRU 62 IS THE ALL 1'S DATA
3052                  /
3053                  /               BYTES 3 THRU 126 IS THE ALL 1'S DATA
3054                  /
3055                  /               WORDS 63, AND 64 ARE SPECIAL SUMCHECK WORDS
3056                  /
3057                  /               BYTES 127, AND 128 ARE SPECIAL SUMCHECK WORDS
3058                  /
3059                  /TEST 37 - 8 BIT MODE WITH DELETED DATA
3060                  /
3061  2975  7305    T37,    CLL CLA IAC RAL                 / 6 (DELETED DATA - 8/BIT MODE)
```

```
3062                    /
3063                    /TEST 35 = 8 BIT MODE
3064                    /
3065    2276  1361    T35,    TAD (2)                         / 4 (8/BIT MODE)
3066                    /
3067                    /TEST 36 = 12 BIT MODE WITH DELETED DATA
3068                    /
3069    2277  1361    T36,    TAD (2)                         / 2 (DELETED DATA = 12/BIT MODE)
3070                    /
3071                    /TEST 34 = 12 BIT MODE
3072                    /
3073    2300  1360    T34,    TAD (1000)                      /ALL 1'S PATTERN
3074    2301  3132            DCA TESTP                       /  (12/BIT MODE)
3075    2302  5757*           JMP THETEST
3076                    /THIS SUBROUTINE IS ENTERED FROM TESTS;   ***   T21, T22, (T24, T25, T26), T27
3077                    /
3078                    /EMPTY THE BUFFER TO VERIFY THE CONTENTS = ALL 1'S OR ALL 0'S
3079                    /
3080    2303  2303    TX,     .
3081    2304  3170            DCA BLANK                               / BYTE # 1 TO 128
3082    2305  1356            TAD (102)
3083    2306  4436            LCD                             /EMPTY BUFFER 8-BIT MODE
3084    2307  5322            JMP T20STR-1
3085    2310  4441    T20XDRIN, XDRIN
3086    2311  3167            DCA EAC                 /DATA FROM SECTOR BUFFER
3087    2312  1167            TAD EAC
3088    2313  7041            CIA
3089    2314  1166            TAD GOOD                        /COMPARED WITH EXPECTED DATA
3090    2315  7650            SNA CLA
3091    2316  5321            JMP .+3
3092    2317  1167            TAD EAC
3093    2320  4452    E211,   ERROR                                   /DATA "TO" NOT = DATA "FROM"
3094    2321  4503            SUBSCOPE
3095    2322  2170            ISZ BLANK                               / 1 TO 128
3096    2323  4443    T20STR, STR
3097    2324  7410            SKP
3098    2325  5310            JMP T20XDRIN
3099    2326  4445            SDN
3100    2327  5323            JMP T20STR
3101    2330  4444            SER
3102    2331  4465            OK
3103    2332  4452    E212,   ERROR                                   /UNEXPECTED ERROR FLAG
3104    2333  4502            SCOPE
3105    2334  5703            JMP I TX
3106                    /VT78/ ROUTINE TO RESELECT UNIT UNDER TEST.
3107                    /ON VT78 A CAF OR INIT INSTRUCTION AUTOMATICALLY
3108                    /RESELECTS UNIT A(RXA).

3109                    /THE FLAGS ARE CLEARED AT THIS TIME DUE TO POSSIBLE
3110                    /GLITCHES IN THE RX8 INTERFACE.
3111    2335  0000    XCKUNT, 0
3112    2336  7300            CLA CLL
3113    2337  1135            TAD UNITCK              /0=UNIT A  1=UNIT B
3114    2340  4435            SEL                     /RESETS UNIT SELECT TO UNIT UNDER TEST
3115    2341  4445            SDN             /CLEAR FLAGS
3116    2342  7000            NOP
```



```
3117    2343  4444            SER
3118    2344  7000            NOP
3119    2345  4443            STR
3120    2346  7300            CLA CLL
3121    2347  5735            JMP I XCKUNT
3122    2350  0102
3123    2351  3000
3124    2352  1000
3125    2353  0002
3126    2354  4242
3127    2355  0200
3128    2356  3425
3129    2357  3416
3130    2360  2264
3131    2361  4541
3132    2362  4235
3133    2363  1602
3134    2364  3207
3135    2365  3200
3136    2366  2222
3137    2367  6000
3138    2370  4236
3139    2371  2514
              2400      PAGE
3140                    /READ THE B-CODE STATUS
3141                    /
3142                    /THIS SUBROUTINE IS ENTERED FROM TESTS;  ***  ALT12, (T24, T25, T26), T27
3143                    /
3144    2400  2400    XRSTB,  .
3145    2401  1377            TAD (16)
3146    2402  4436            LCD             /ISSUE COMMAND # 7
3147    2403  4443            STR
3148    2404  4465            OK
3149    2405  4452    E7000,  ERROR                           /UNEXPECTED TRANSFER REQUEST FLAG
3150    2406  4503            SUBSCOPE
3151    2407  4445            SDN
3152    2410  5203            JMP .-5
3153    2411  4441            XDRIN
3154    2412  3167            DCA EAC                         /ACTUAL STATUS
3155    2413  4444            SER
3156    2414  5217            JMP .+3
3157    2415  1167            TAD EAC
3158    2416  4452    E7001,  ERROR                           /UNEXPECTED ERROR FLAG
3159    2417  4776*           JMS VT78CK              /GO CHECK IF ON VT78 SYSTEM
3160    2420  5233            JMP E7002+1             /VT78 = SKIP THIS SUBTEST
3161    2421  4503            SUBSCOPE
3162    2422  1167            TAD EAC
3163    2423  0375            AND (7000)                      /BITS 0,1,2 ARE RESIDUAL FROM COMMAND SHIFT
3164    2424  1374            TAD (1000)
3165    2425  7650            SNA CLA
3166    2426  5233            JMP .+5
3167    2427  1375            TAD (7000)
3168    2430  3166            DCA GOOD
3169    2431  1167            TAD EAC
3170    2432  4452    E7002,  ERROR                           / SHIFT REGISTER NOT SHIFTING OK
```

```
3171  2433  4503          SUBSCOPE
3172  2434  1167          TAD EAC
3173  2435  0373          AND (377)
3174  2436  3167          DCA EAC
3175  2437  1167          TAD EAC
3176  2440  5600          JMP I XRSTB
3177                /
3178                /READ STATUS SUBROUTINE
3179                /
3180                /THE CONTENTS OF THE AC AT ENTRY = BIT 7 (UNIT SELECT)
3181                /
3182                /READ THE STATUS AT DONE BY ISSUING COMMAND # 5
3183                /
3184                /THIS SUBROUTINE IS ENTERED FROM TESTS:  ***  ALT12, AND T27
3185                /
3186  2441  2441   XRST,  .
3187  2442  1372          TAD (12)
3188  2443  4436          LCD             / ISSUE COMMAND # 5 (AC AT ENTRY = UNIT)
3189  2444  4443          STR
3190  2445  4465          OK
3191  2446  4452   E7003, ERROR                          /UNEXPECTED TRANSFER REQUEST FLAG
3192  2447  4503          SUBSCOPE
3193  2450  4445          SDN
3194  2451  5244          JMP .-5                        /WAIT FOR DONE FLAG
3195  2452  4441          ADMIN
3196  2453  3167          DCA EAC                        /ACTUAL STATUS
3197  2454  4444          SER
3198  2455  5260          JMP .+3
3199  2456  1167          TAD EAC
3200  2457  4452   E7004, ERROR                          /UNEXPECTED ERROR FLAG
3201  2460  4776*         JMS VT78CK              /GO CHECK IF ON VT78 SYSTEM
3202  2461  5274          JMP E7006+1             /VT78 = SKIP THIS SUBTEST
3203  2462  4503          SUBSCOPE
3204                /
3205                /THE PURPOSE OF THIS SUBTEST IS TO VERIFY THE SHIFTING OF THE RX8 INTERFACE
3206                /
3207                /TRANSFER REGISTER BY THE RX01 MICROCONTROLLER
3208                /
3209                /BITS 0, 1, AND 2 OF THE RX8 INTERFACE TRANSFER REGISTER SHOULD BE REMNANTS
3210                /
3211                /OF THE PREVIOUS COMMAND (COMMAND # 5), THEREFORE BITS 0, 1, AND 2 SHOULD = 101 (BINARY)
3212                /(NOT TRUE ON VT78)
3213  2463  1167          TAD EAC
3214  2464  0375          AND (7000)
3215  2465  1371          TAD (3000)
3216  2466  7650          SNA CLA
3217  2467  5274          JMP .+5

3218  2470  1370          TAD (5000)
3219  2471  3166          DCA GOOD
3220  2472  1167          TAD EAC
3221  2473  4452   E7006, ERROR
3222  2474  4503          SUBSCOPE
3223                /
3224                /THE CONTENTS OF THE RST STATUS SHOULD = DRIVE READY (200)
3225                /
```



```
3226                / (IF UNITS WERE SELECTED AT L/S 200 OTHERWISE THE STATUS SHOULD = 0 )
3227                /
3228  2475  1170          TAD BLANK                      / (GOOD) SAVED PRIOR TO ENTRY INTO " XRST "
3229  2476  0367          AND (-4-1)                     / MINUS " INIT DONE " BIT
3230  2477  3166          DCA GOOD
3231  2500  1167          TAD EAC                        / ACTUAL STATUS MINUS " DELETED DATA "
3232  2501  0366          AND (277)
3233  2502  3170          DCA BLANK
3234  2503  1166          TAD GOOD                       /EXPECTED
3235  2504  7041          CIA
3236  2505  1170          TAD BLANK                      /ACTUAL (MASSAGED)
3237  2506  7650          SNA CLA
3238  2507  5312          JMP .+3
3239  2510  1167          TAD EAC                        / ACTUAL ACTUAL STATUS
3240  2511  4452   E7005, ERROR                          /EXPECTED STATUS NOT = (GOOD)
3241  2512  4502          SCOPE
3242  2513  5641          JMP I XRST
3243                /SUB-TEST SELECTIONS
3244                /
3245                /
3246                /       TEST   0 = " THE TEST "
3247                /       TEST 001 = WRITE - READ (PARITY CHECK)
3248                /       TEST 010 = WRITE - READ - READ CHECK (PROGRAM VERIFY)
3249                /       TEST 011 = READ - READ CHECK (COMPATABILITY)
3250                /       TEST 100 = READ (PARITY CHECK)
3251                /       TEST   5 = WRITE ONLY
3252                /       TEST 110 = EMPTY BUFFER
3253                /       TEST 111 =
3254                /
3255                /
3256  2514  1365    TEST4,  TAD (READ)
3257  2515  7410          SKP
3258  2516  1364    TEST3,  TAD (READCOMPARE)
3259  2517  3337          DCA DOB
3260  2520  1375          TAD (NOP)
3261  2521  5331          JMP DCADOA
3262  2522  1364    TEST2,  TAD (READCOMPARE)
3263  2523  7410          SKP
3264  2524  1365    TEST1,  TAD (READ)
3265  2525  7410          SKP
3266  2526  1375    TEST5,  TAD (NOP)
3267  2527  3337          DCA DOB
3268  2530  1363          TAD (WRITE)
3269  2531  3336    DCADOA, DCA DOA
3270                /
3271  2532  4455    TESTX,  GETAPATTERN
3272  2533  4463          INITTRACKS
3273  2534  4460          GETUNIT
3274  2535  4457    TESTXL, GETATRACK
3275  2536  4510    DOA,    WRITE
3276  2537  4474    DOB,    READ
3277  2540  2147          ISZ TRACKS
3278  2541  5335          JMP TESTXL
3279  2542  4454          DONE
3280  2543  5332          JMP TESTX
```

```
3281    2644  5453            EXIT
3282                  /AC SW 7 = 1 TO HALT AT END OF TEST
3283                  /
3284    2645  2545    XLOCKUP, .
3285    2646  4572            LAS
3286    2647  0352            AND (SW7)
3287    2650  7640            SZA CLA
3288    2651  4461            HLT
3289                  /AC SW 2 = 1 TO LOCK SCOPE LOOP ON TEST
3290                  /
3291    2652  4572            LAS
3292    2653  0374            AND (SW2)
3293    2654  7640            SZA CLA
3294    2655  5571            JMP I TEST
3295    2656  5745            JMP I XLOCKUP
3296    2562  0020
3297    2563  4510
3298    2564  4475
3299    2565  4474
3300    2566  0277
3301    2567  7773
3302    2570  5000
3303    2571  3000
3304    2572  0012
3305    2573  0377
3306    2574  1000
3307    2575  7000
3308    2576  1165
3309    2577  0016
              2600            PAGE
3310                  /
3311                  /BYTE SWAP SUBROUTINE
3312                  /
3313                  /THE CONTENTS OF THE AC AT ENTRY WILL BE SWAPPED
3314                  /
3315    2600  2600    XRSW,   .
3316    2601  3223            DCA BSWAC
3317    2602  7010            RAR
3318    2603  3224            DCA BSWLINK
3319    2604  1377            TAD (-6)
3320    2605  3222            DCA BSWRAL
3321    2606  1223            TAD BSWAC
3322    2607  7100            CLL
3323    2610  7510            SPA
3324    2611  7120            STL
3325    2612  7004            RAL
3326    2613  2222            ISZ BSWRAL

3327    2614  5207            JMP .-5
3328    2615  3223            DCA BSWAC
3329    2616  1224            TAD BSWLINK
3330    2617  7104            CLL RAL
3331    2620  1223            TAD BSWAC
3332    2621  5600            JMP I XRSW
3333    2622  7772    BSWRAL, -6
3334    2623  0000    BSWAC,  0
```



```
3335    2624  0000    BSWLINK, 0
3336    2625  2625    XERROR, .
3337    2626  3167            DCA EAC
3338    2627  1167            TAD     EAC                     /GET ERROR PC,
3339    2630  4467            AERROR
3340    2631  2111            ISZ BUSY
3341    2632  1725            TAD XERROR
3342    2633  7001            IAC
3343    2634  3776*           DCA EPCSCOPE    / ERROR RETURN ADDRESS + 1
3344    2635  7301            CLL CLA IAC
3345    2636  3775*           DCA ERRORS
3346                  /IF AC SW 4 = 0 THEN PRINT AN ERROR MESSAGE
3347                  /
3348    2637  4572            LAS
3349    2640  0374            AND (SW4)
3350    2641  7640            SZA CLA
3351    2642  5315            JMP XNOPRINT
3352                  /IF THIS IS THE FIRST ERROR FOR THIS PASS THEN PRINT THE HEADER LINE
3353                  /
3354    2643  2115            ISZ FIRSTERROR
3355    2644  5247            JMP .+3
3356    2645  4473            PRINT
3357    2646  6545            MXEHEADER
3358    2647  4473            PPINT
3359    2650  6602            MCRLF
3360                  /               ERR  FAT  FAST      EAC  GOOD PASS
3361                  /
3362                  / ERR   = ERROR ADDRESS ( E # )
3363                  / FAT   = FIRST ADDRESS OF TEST
3364                  / FAST  = FIRST ADDRESS OF SUB-TEST
3365                  /         *SEE MAP
3366                  / EAC   = CONTENTS OF THE ACCUMULATOR AT THE ERROR
3367                  / PASS  = PASS IN WHICH ERROR OCCURED
3368                  /
3369    2651  7240            STA
3370    2652  1225            TAD XERROR
3371    2653  3160            DCA LSB
3372    2654  4505            TY4OCT
3373    2655  0160            LSB
3374    2656  4504            TAB
3375    2657  0005            5
3376    2660  1171            TAD TEST
3377    2661  3160            DCA LSB
3378    2662  4505            TY4OCT
3379    2663  0160            LSB
3380    2664  4504            TAB
3381    2665  0012            12
3382    2666  4505            TY4OCT
3383    2667  1366            PCSCOPE
3384    2670  4504            TAB
3385    2671  0017            17
3386    2672  4505            TY4OCT
3387    2673  0170            BLANK
3388    2674  4504            TAB
3389    2675  0024            24
```

```
3390  2676  4505          TY4OCT
3391  2677  0167          FAC
3392  2700  4504          TAB
3393  2701  0031          31
3394  2702  4505          TY4OCT
3395  2703  0166          GOOD
3396  2704  4504          TAB
3397  2705  0036          36
3398  2706  4434          TY8OCT
3399  2707  0163          PASS
3400  2710  4572          LAS
3401  2711  7700          SMA CLA
3402  2712  5315          JMP .+3
3403  2713  4504          TAB
3404  2714  0043          43
3405        0207    BELL=207
3406                /
3407  2715  4572    XNOPRINT, LAS
3408  2716  0373          AND (SW11)
3409  2717  7640          SZA CLA
3410  2720  5323          JMP .+3
3411  2721  4501          SPECIALTYPEIT
3412  2722  0207          BELL
3413  2723  3115          DCA FIRSTERROR
3414  2724  4572          LAS
3415  2725  7700          SMA CLA
3416  2726  4461          HLT
3417                /
3418  2727  3411          DCA BUSY
3419  2730  6001          ION
3420  2731  5625          JMP I XERROR
3421                /
3422                /
3423                /ROUTINE TO DETERMINE WHETHER TO TEST DRIVE ZERO
3424                /OR IF NO DRIVES ARE TO BE TESTED.
3425                /
3426  2732  4772*   TSTUNT, JMS VT78CK            /GO CHECK IF ON VT78 SYSTEM
3427  2733  4350          JMS CHGMSK            /VT78/ GO CHANGE MASKING CONSTANT
3428  2734  1771*         TAD UNITS                    /UNITS SELECTED BY OPERATOR
3429  2735  0370          AND     (4000                /ISOLATE DRIVE ZERO.
3430  2736  7640          SZA CLA                      /IS DRIVE ZERO THERE.
3431  2737  5343          JMP     DRVZRO               /YES.
3432  2740  1347          TAD     MASK1                /DON'T TEST DRIVE ZERO.
3433  2741  3346          DCA     COMP                 /IT IS NOT ANERROR IF DRIVE
3434                                                   /ZERO IS OPERATIONAL.
3435  2742  5767*         JMP     NORX01+1
3436  2743  1136    DRVZRO, TAD     MASK

3437  2744  3346          DCA     COMP
3438  2745  5766*         JMP     NORX01+2                    /DRIVE ZERO THERE SO INDICATE IT.
3439                /
3440  2746  0000    COMP,   0
3441  2747  7477    MASK1,  7477
3442                /
3443                /ROUTINE TO CHANGE MASKING CONSTANT FOR USE ON VT78
3444                /BITS 0-2 ARE NOT RESIDUAL ON VT78
```



```
3445                /
3446  2750  0000    CHGMSK, 0
3447  2751  1365          TAD     (277
3448  2752  3136          DCA     MASK
3449  2753  1364          TAD     (77
3450  2754  3347          DCA     MASK1
3451  2755  5750          JMP I   CHGMSK
3452                /
3453  2756  0077
3454  2757  0277
3455  2760  0427
3456  2761  0430
3457  2762  4000
3458  2763  4235
3459  2764  1165
3460  2765  0001
3461  2766  0200
3462  2767  1365
3463  2770  1364
3464  2771  7772
            3000    PAGE
3465                /
3466  3000  4455    THETEST, GETAPATTERN
3467  3001  4463          INITTRACKS
3468  3002  4460          GETUNIT
3469                /
3470                /FORCE THE ACTUATOR SEQUENCE = 0 (INCREMENTAL 0-114)
3471                /
3472  3003  1377    THEL,   TAD (XTHEL)
3473  3004  3776*         DCA XGETATRACK
3474  3005  1131          TAD TARGET
3475  3006  3125          DCA START
3476  3007  1150          TAD TTRACKS
3477  3010  1147          TAD TRACKS
3478  3011  7640          SZA CLA
3479  3012  5775*         JMP SEQ000
3480  3013  1027          TAD OD
3481  3014  3131          DCA TARGET
3482  3015  5775*         JMP SEQ000
3483  3016  4510    XTHEL,  WRITE
3484  3017  4475          READCOMPARE
3485  3020  2147          ISZ TRACKS
3486  3021  5203          JMP THEL
3487  3022  4454          DONE
3488  3023  5201          JMP THETEST+1
3489                /ACTUATOR MOVEMENT IS THAT SELECTED OF BITS 6,7,8 OF (TESTP)
3490                /
3491  3024  4463    XXTHEL, INITTRACKS
3492  3025  4460          GETUNIT
3493  3026  4457    XYTHEL, GETATRACK
3494  3027  4475          READCOMPARE
3495  3030  2147          ISZ TRACKS
3496  3031  5226          JMP XYTHEL
3497  3032  4454          DONE
3498  3033  5224          JMP XXTHEL
```

```
3499    3034  5453            EXIT
3500                  /GET A PATTERN
3501                  /
3502    3035  3035    XGETAPATTERN, .
3503                  /
3504                  /ONLY GENERATE A PATTERN, HOWEVER, IF THE CONTENTS OF PROGRAM LOCATIONS
3505                  /
3506                  /ERRORS = 0 (MEANS NO ERRORS),
3507                  /
3508                  /AND AC SW2 = 0 (NOT TO LOCK ON TEST OK)
3509                  /
3510                  /AND TEST = T13, T16, T34, T35, T36, T37
3511                  /
3512    3036  4572            LAS
3513    3037  0374            AND (SW2)
3514    3040  1773'           TAD ERRORS
3515    3041  7640            SZA CLA
3516    3042  5635            JMP I XGETAPATTERN
3517    3043  1372            TAD (GENTESTS-1)
3518    3044  3012            DCA A12
3519    3045  1412            TAD I A12
3520    3046  7450            SNA
3521    3047  5635            JMP I XGETAPATTERN
3522    3050  1171            TAD TEST
3523    3051  7640            SZA CLA
3524    3052  5245            JMP .+5
3525    3053  1371            TAD (WBUFFER+1)
3526    3054  3010            DCA A10
3527    3055  3155            DCA PATSUMCHECK
3528    3056  7307            CLL CLA IAC RTL
3529    3057  0132            AND TESTP       / 0/12 MODE MASK
3530    3060  7640            SZA CLA
3531    3061  1370            TAD (-100)              /124 DATA WORDS
3532    3062  1367            TAD (-74)
3533    3063  3011            DCA A11         / 60 DATA WORDS
                      /WORD X AND WORD Y CONTAIN THE ADDRESSES OF THE LAST 2 SUMCHECK WORDS
3534                  /
3535
3536    3064  1011            TAD A11
3537    3065  7041            CIA
3538    3066  1366            TAD (WBUFFER+2)
3539    3067  3156            DCA WORDX
3540    3070  7301            CLL CLA IAC
3541    3071  1156            TAD WORDX
3542    3072  3157            DCA WORDY
3543    3073  1365            TAD (7000)
3544    3074  0132            AND TESTP
3545    3075  7106            CLL RTL

3546    3076  7006            RTL
3547    3077  1364            TAD (TAD PATTERNS)
3548    3100  3301            DCA .+1
3549    3101  1315            TAD PATTERNS
3550    3102  3303            DCA XPATTERNS
3551    3103  4763' XPATTERNS, JMS RANGEN
3552    3104  3137              DCA XXX
3553                  /DEVELOP A 12 BIT SUMCHECK FOR THE 60/124 DATA WORDS
```



```
3554                  /
3555                  /NOTE:
3556                  /
3557                  /THE SUMCHECK WRITTEN IS THIS DEVELOPED SUMCHECK WITH THE FIRST 2 ID WORDS, AND
3558                  /THE LAST 2 OVERALL SUMCHECK WORDS APPENDED WITHIN SUBROUTINE XGETASECTOR
3559                  /
3560    3105  1155            TAD PATSUMCHECK
3561    3106  1137            TAD XXX
3562    3107  3155            DCA PATSUMCHECK
3563    3110  1137            TAD XXX
3564    3111  3410            DCA I A10
3565    3112  2011            ISZ A11
3566    3113  5303            JMP XPATTERNS
3567    3114  5635            JMP I XGETAPATTERN
3568                  /THE FOLLOWING ARE THE ALLOCATED PATTERN POINTERS
3569                  /
3570    3115  4763' PATTERNS,       JMS RANGEN
3571    3116  7240                  STA                     / 1
3572    3117  1325                  TAD PAT2
3573    3120  1326                  TAD PAT3
3574    3121  1327                  TAD PAT4
3575    3122  1330                  TAD PAT5
3576    3123  5340                  JMP PAT6
3577    3124  7200                  CLA
3578                  /
3579                  /       12 BIT MODE     8 BIT MODE
3580                  /
3581    3125  1463    PAT2,   1463            / 63            / 0011  00110011
3582    3126  6314    PAT3,   6314            / 314           / 1100  11001100
3583    3127  5252    PAT4,   5252            / 252           / 1010  10101010
3584    3130  2525    PAT5,   2525            / 125           / 0101  01010101
3585                  /
3586    3131  6322    GENTESTS, -T13
3587    3132  6323            -T16
3588    3133  5500            -T34
3589    3134  5502            -T35
3590    3135  5501            -T36
3591    3136  5503            -T37; 0
        3137  0000
3592                  /PROGRAMMING NOTE:
3593                  /
3594                  /PATTERN 6 IS A COUNT PATTERN FROM 0 TO 7777, OR FROM 0 TO 177
3595                  /
3596                  /THIS COUNT PATTERN IS A " PURE " PATTERN
3597                  /
3598                  /A CHECKSUM IS NOT GENERATED FOR THIS PATTERN AS FOR ALL OTHER PATTERNS
3599                  /
3600                  /               WORD/BYTE 0 = 1
3601                  /               WORD/BYTE 1 = 1
3602                  /
3603                  /               WORD 2 = 0202
3604                  /               BYTE 2 = 2
3605                  /
3606                  /               WORD 77 = 7777
3607                  /               BYTE 177 = 177
```

```
                        /
3140  7307    PAT6,   CLL CLA IAC RTL                 / 4
3141  0132            AND TESTP
3142  7440            SZA
3143  7120            STL                             / LINK = 1 FOR 8-BIT MODE (128 BYTES)
3144  5351            JMP .+5
3145  7001    XPAT6,  IAC
3146  7420            SNL
3147  1362            TAD (100)
3150  1137            TAD XXX
3151  3137            DCA XXX
3152  1137            TAD XXX
3153  3410            DCA I A10
3154  2011            ISZ A11
3155  5345            JMP XPAT6
3156  5635            JMP I XGETAPATTERN
3157  0100
3160  4712
3161  1315
3162  7000
3163  7116
3164  7704
3165  7700
3166  7115
3167  3130
3170  1365
3171  1000
3172  4306
3173  4261
3174  3016
      3200            PAGE
                /WRITE ONLY
                /
                /WRITE ALL SELECTED SECTORS OF THAT TRACK
                /
3200  3200    XWRITE, .
3201  7330            STL CLA BAR
3202  3120            DCA RDC         / THIS IS A WRITE (RDC = 4000)
                /
3203  4462            INITSECTORS
3204  4456    WRITEL, GETASECTOR
3205  7410            SKP
3206  1377    REWRITE, TAD (JMP WHICHREAD)
3207  3263            DCA JMPWHICHREAD
                /THE PROGRAM WILL ISSUE AN INIT FOR ALL SEEK ERRORS
                /
                /NOTE:
                /
                /THE FUNCTION OF THE INIT IS TO SEEK TRACK 0/SECTOR 1, AND
                /TRANSFER INTO THE SECTOR BUFFER THE CONTENTS OF SECTOR 1, THEREFORE
                /TO RECOVER FROM A SEEK ERROR, THE PROGRAM MUST RE-FILL THE SECTOR BUFFER
                /THEN RE-SEEK
                /
3210  1121            TAD KRETRY
3211  3145            DCA SRETRY
```



```
3212  1121    WRESEEK, TAD KRETRY
3213  3146            DCA PRETRY              /PARITY RETRY COUNTER
                /FILL RX01 SECTOR BUFFER
                /
3214  1376    REFILL, TAD (WBUFFER-1)
3215  3010            DCA A10
3216  4437            LCDA
3217  5237            JMP FILLOK
3220  5226            JMP FILLERROR
                /RETURN TO HERE IS FROM SUBROUTINE XLCDA
                /
3221  4443    FILL,   STR
3222  5221            JMP FILL
3223  1410            TAD I A10
3224  4442            XORDOI
3225  5221            JMP FILL
                /AC SW (4) = 0 ; INHIBIT INTERFACE PARITY RECOVERY
                /
3226  2146    FILLERROR, ISZ PRETRY
3227  7410            SKP
3230  5600            JMP I XWRITE
3231  4572            LAS
3232  0375            AND (SW1)
3233  7640            SZA CLA
3234  5214            JMP REFILL
3235  3146            DCA PRETRY
3236  5600            JMP I XWRITE
                /THE SECTOR BUFFER HAS SUCCESSFULLY BEEN FILLED AND CONTAINS THE
                /PATTERN SELECTED - ALL SOFT PARITY ERRORS HAVE BEEN LOGGED
                /
3237  1121    FILLOK, TAD KRETRY
3240  3146            DCA PRETRY
3241  7305            CLL CLA IAC RAL         /  2
3242  0132            AND TESTP               /TESTP FOR DELETED DATA SELECTION
3243  7007            IAC RTL                 / 4 IF WRITE OR 14 IF WRITE DELETED DATA
3244  4440            LCDR
3245  5257            JMP WRITEOK
                /RETURN TO HERE IS FROM A PI (IF AN RX01 ERROR FLAG)
                /
                /AC SW (1) = 0 ; INHIBIT WRITE RETRY
                /
3246  2145    WRITERROR, ISZ SRETRY
3247  7410            SKP
3250  5264            JMP WNOTOK
3251  4572            LAS
3252  0375            AND (SW1)
3253  7640            SZA CLA
3254  5212            JMP WRESEEK
3255  3145            DCA SRETRY
3256  5264            JMP WNOTOK
                /NOTE: THE ONLY ERROR EXPECTED HERE EVER IS A "SEEK" ERROR
                /
                /RETURN TO HERE IS FROM A PI (IF ONLY AN RX01 DONE FLAG)
                /
3257  1131    WRITEOK, TAD TARGET
```

```
3717  3260  3125          DCA START
3718  3261  1124          TAD STARGET
3719  3262  3123          DCA SSTART
3720  3263  5267    JMPWHICHREAD, JMP WHICHREAD     /CONTAINS 0 OR MODIFIED TO JMP WHICHREAD
3721                      /
3722  3264  2122    WNOTOK, ISZ SECTORS
3723  3265  5204          JMP WRITEU
3724  3266  5600          JMP I XWRITE
3725                      /IF THIS IS A WRITE AFTER READ, "JMP READRETRY", BUT
3726                      /
3727                      /IF A HARD SEEK ERROR, "JMP NUREAD"
3728                      /
3729  3267  1145    WHICHREAD, TAD SRETRY
3730  3270  7650          SNA CLA
3731  3271  5774'         JMP NUREAD              /HARD SEEK ERROR
3732  3272  5773'         JMP READRETRY           /SOFT
3733                      /
3734                      / 0 < (LAST) => (FIRST)
3735                      /
3736  3273  1032    TADLAST, TAD LAST
3737  3274  7740          SMA SZA CLA
3738  3275  5300          JMP .+3
3739  3276  1372          TAD (32)
3740  3277  3032          DCA LAST
3741  3300  1032          TAD LAST
3742  3301  7041          CIA
3743  3302  1031          TAD FIRST
3744  3303  7740          SMA SZA CLA
3745  3304  5276          JMP .-6
3746  3305  4473          PRINT
3747  3306  6711          MLAST
3748  3307  4505          TY4OCT
3749  3310  0032          LAST
3750  3311  4504          TAB
3751  3312  0005          5                       /TAB TO MOVE TELEPRINTER HEAD
3752                      /**********
3753                      /CONSOLE
3754                      /***********
3755
3756
3757  3313  4424          CHECKCB                 /IS CONSOLE ACTIVE
3758  3314  4425          XCBENTR                 /YES PRINT SWITCH REGISTER QUESTION
3759                                              /FOR RUNNING SWITCHES
3760  3315  5317          JMP     CBRET4
3761  3316  4461          HLT
3762  3317  5771'         CBRET4,JMP PRETEST
3763                      /ENTRY TO HERE IS FROM RX01 PI ERROR SERVICE ROUTINE

3764                      /
3765                      /CONTROLLER FAILURES
3766                      /
3767  3320  1370    SDNUNEXPECTED, TAD (MSDNUNEXPECTED)
3768  3321  7410          SKP
3769  3322  1367    NUSER,  TAD (MNOSER)
3770  3323  3334          DCA XMESSAGE
3771  3324  4572          LAS
```



```
3772  3325  0366          AND (SW4)
3773  3326  7640          SZA CLA
3774  3327  5335          JMP QUIET
3775  3330  4576          FORCE
3776  3331  1334          TAD     XMESSAGE        /POINTS TO ERROR MESSAGE THAT WOULD HAVE BEEN PRINTED,
3777  3332  4467          AERROR                  /REPORT ERROR TO APT IF REQUIRED,
3778  3333  4473          PRINT
3779  3334  0000          XMESSAGE, 0
3780  3335  4572    QUIET,  LAS
3781  3336  7710          SPA CLA
3782  3337  4461          HLT
3783  3340  5765'         JMP ERETURN
3784                      /
3785                      /ENTRY TO HERE FROM SUBROUTINES XSER, OR XSDN
3786                      /
3787  3341  2111    HUNGUP, ISZ BUSY
3788  3342  3353          DCA HUNGPC
3789  3343  4576          FORCE
3790                      /
3791                      /THE LABLE "XHUNG" MUST RESIDE HERE BECAUSE OF REFERENCES MADE WITHIN "FORCE"
3792                      /
3793  3344  4473    XHUNG,  PRINT
3794  3345  6612          MHUNGPC
3795  3346  4505          TY4OCT
3796  3347  3353          HUNGPC
3797  3350  1364          TAD (-4D)
3798  3351  3116          DCA HANGER
3799  3352  5453          NOTEST
3800  3353  0000    HUNGPC, 0
3801                      /
3802  3354  7740
3803  3355  5520
3804  3356  0200
3805  3357  7056
3806  3360  7043
3807  3361  0400
3808  3362  0032
3809  3363  3425
3810  3364  3521
3811  3365  2000
3812  3366  7113
3813  3367  5267
      3400    PAGE
3814                      /
3815                      /ROUTINE IS USED INPLACE OF THE LAS INSTRUCTION WILL READ CORRECT SWITCHES
3816                      /
3817                      /
3818  3400  0000    XCKSWIT,        0
3819  3401  7200          CLA
3820  3402  1022          TAD     22              /CHECK BIT 0 FOR APT
3821  3403  7710          SPA CLA                 /ON APT?
3822  3404  5600          JMP  I  XCKSWIT         /YES RETURN WITH CLEARED AC
3823  3405  1021          TAD     21              /CHECK STATUS WORD
3824  3406  7710          SPA CLA                 /0=ACTIVE CONSOLE
3825  3407  7614          7614                                    /LAS AND SKIP
```

```
3826  3410  1020          TAD     20                      /GET PSEUDO SW REG
3827  3411  5600          JMP I   XCKSWIT                 /EXIT XCKSWIT
3828                /READ VERIFY
3829                /
3830  3412  3412    XREADCOMPARE, .
3831  3413  1212          TAD XREADCOMPARE
3832  3414  3216          DCA XREAD
3833  3415  5220          JMP XRDC
3834                /READ AND READ AFTER WRITE SUBROUTINE
3835                /
3836                /*************************************************************************
3837                /
3838                /IF THIS IS A READ AFTER WRITE, THEN 1 PROGRAM LOCATION PRECEEDING
3839                /THE PROGRAM LOCATION CONTAINING THE "READ" WILL CONTAIN "WRITE"
3840                /
3841                /*************************************************************************
3842                /
3843                /IF THIS IS A READ ONLY, THEN THE CONTENTS OF " RDC " WILL = 1
3844                /
3845                /IF THIS IS A READ VERIFY, THEN THE CONTENTS OF " RDC " WILL = 0
3846                /
3847                /READ ALL SELECTED SECTORS OF THAT TRACK
3848                /
3849  3416  3416    XREAD,  .
3850  3417  7301          CLL CLA IAC
3851  3420  3120    XRDC,   DCA RDC
3852  3421  4462          INITSECTORS
3853  3422  1121    READL,  TAD KRETRY
3854  3423  3146          DCA R1RETRY
3855  3424  4456          GE1ASECTOR
3856  3425  1121    READRETRY, TAD KRETRY
3857  3426  3141          DCA R2RETRY
3858                /REFRESH PROGRAM LOCATION SNDLOG BECAUSE THE CONTENTS MIGHT BE RESIDUAL
3859                /IF A PREVIOUS SND (STATUS NO DATA) ERROR EVER OCCURED
3860                /
3861  3427  3144          DCA SNDLOG
3862  3430  3142          DCA DWSLOG
3863  3431  3143          DCA DNSLOG
3864
3865                /
3866  3432  1121    REREAD, TAD KRETRY
3867  3433  3145          DCA SRETRY
3868  3434  1121    RESEEK, TAD KRETRY
3869  3435  3146          DCA PRETRY
3870  3436  7327          CLA STL IAC RTL
3871  3437  4440          LCDB
3872  3440  5331          JMP READOK

3873                /RETURN TO HERE IS FROM A PI (IF AN RX01 ERROR FLAG)
3874                /
3875                /AN ERROR HAS BEEN DETECTED
3876                /
3877                /IF NOT A CRC ERROR THEN ASSUME A SEEK ERROR
3878                /
3879  3441  7301    READERROR, CLL CLA IAC
3880  3442  0126          AND ASTATUS             /CRC MASK
```



```
3881  3443  7640          SZA CLA
3882  3444  5256          JMP CRCERROR
3883  3445  2145          ISZ SRETRY
3884  3446  7410          SKP
3885  3447  5347          JMP RLOGGED
3886  3450  4572          LAS
3887  3451  0377          AND (SW1)
3888  3452  7640          SZA CLA
3889  3453  5234          JMP RESEEK
3890  3454  3145          DCA SRETRY
3891  3455  5347          JMP RLOGGED
3892                /
3893                /PROGRAMMING NOTE:
3894                /
3895                /ANY RECOVERABLE SEEK ERRORS ARE NOTED AT PROGRAM LOCATION " DNS "
3896                /
3897                /AN ERROR HAS OCCURED
3898                /
3899          3510  SND=DNS
3900          3510  DWS=SND
3901                /
3902                /THE SECTOR BUFFER CONTAINS THE DATA READ
3903                /
3904                /ANY PARITY ERRORS WOULD HAVE PREVIOUSLY BEEN DETECTED AND LOGGED
3905                /
3906                /THIS ERROR IS NOT A SEEK ERROR, THEREFORE IT IS ASSUMED TO BE A
3907                /
3908                /                       CRC ERROR
3909                /
3910                /COMPARE THE DATA WITHIN THE SECTOR BUFFER TO DETECT CRC STATUS
3911                /WITHOUT DATA ERRORS (SND)
3912                /
3913                /IF AT THE END OF THE COMPARE, STATUS NO DATA ERRORS HAVE BEEN DETECTED
3914                /THEN PRINT AN APPROPRIATE MESSAGE
3915                /
3916  3456  1120    CRCERROR, TAD RDC
3917  3457  7640          SZA CLA
3918  3460  5305          JMP XCRCERROR
3919  3461  4776*         JMS COMPARE
3920  3462  1113          TAD COMPRERROR
3921  3463  7450          SNA
3922  3464  1775*         TAD INSUMCHECK
3923  3465  7640          SZA CLA
3924  3466  5310          JMP DWS
3925  3467  2144          ISZ SNDLOG
3926                /
3927                /IF AC Sw (4) = 1 THEN DO NOT PRINT THE ERROR INFORMATION
3928                /
3929  3470  4572          LAS
3930  3471  0374          AND (SW4)
3931  3472  7640          SZA CLA
3932  3473  5305          JMP XCRCERROR
3933  3474  4352          JMS RDDRWR
3934  3475  5301          JMP .+4
3935  3476  4473          PRINT
```

```
3936    3477  6716            MWRITE
3937    3500  5303            JMP .+3
3938    3501  4473            PRINT
3939    3502  6722            MREAD
3940    3503  4473            PRINT
3941    3504  6740            MSNDERROR
3942    3505  4572    XCRCERROR, LAS
3943    3506  7700            SMA CLA
3944    3507  4461    HLT7,   HLT
3945                    /
3946    3510  1121    DNS,    TAD KRETRY
3947    3511  3145            DCA SRETRY
3948    3512  2141            ISZ R2RETRY
3949    3513  7410            SKP
3950    3514  5324            JMP UREAD
3951                    /AC SW (1) = 0 ; INHIBIT READ RETRY
3952                    /
3953    3515  4572            LAS
3954    3516  0377            AND (SW1)
3955    3517  7640            SZA CLA
3956    3520  5232            JMP REREAD
3957                    /A HARD FILL BUFFER PARITY ERROR OR A HARD PARITY ERROR ON THE COMMAND/
3958                    /SECTOR/TRACK WORDS, OR
3959                    /A HARD SEEK ERROR WHICH HAS BEEN LOGGED WITHIN THE WRITE SUBROUTINE, OR
3960                    /A HARD CRC ERROR WHICH OCCURED WHILE WITHIN THE READ SUBROUTINE
3961                    /
3962    3521  3140    NOREAD, DCA R1RETRY
3963    3522  3141            DCA R2RETRY
3964    3523  5347            JMP RLOGGED
3965                    /IF THIS IS A READ AFTER WRITE THEN RE-WRITE THE SECTOR IN ERROR
3966                    /
3967                    /BECAUSE THIS IS A HARD PROGRAM COMPARE DATA ERROR
3968                    /
3969    3524  4352    UREAD,  JMS RDORWR
3970    3525  5321            JMP NOREAD
3971    3526  2140            ISZ R1RETRY
3972    3527  5773'           JMP REWRITE
3973    3530  5347            JMP RLOGGED
3974                    /IF THIS IS A READ COMPARE TEST
3975                    /
3976                    /THEN " JMS COMPARE ", BUT ...
3977                    /
3978                    /IF A STATUS ERROR WITH NO DATA ERROR HAS PREVIOUSLY BEEN DETECTED
3979                    /
3980                    /THEN DO NOT RE= " JMS COMPARE ", AND
3981                    /
3982                    /DO NOT RESET PROGRAM LOCATION " START " WITH " TARGET "
3983                    /
3984                    /PROGRAMMING NOTE:
3985                    /
3986                    /ANY RECOVERABLE SEEK ERRORS WHICH OCCURED PRIOR TO CRC OR DATA ERRORS
3987                    /
3988                    /ARE LOGGED AT PROGRAM LOCATION " DNS "
3989                    /
3990    3531  1144    READOK, TAD SNDLOG
```



```
3991    3532  1120            TAD ROC
3992    3533  7640            SZA CLA
3993    3534  5343            JMP ROK
3994    3535  4776'           JMS COMPARE
3995    3536  1113            TAD COMPRERROR
3996    3537  7450            SNA
3997    3540  1775'           TAD INSUMCHECK
3998    3541  7640            SZA CLA
3999    3542  5310            JMP DNS
4000    3543  1131    ROK,    TAD TARGET
4001    3544  3125            DCA START
4002    3545  1124            TAD STARGET
4003    3546  3123            DCA SSTART
4004    3547  2122    RLOGGED, ISZ SECTORS
4005    3550  5222            JMP READL
4006    3551  5616            JMP I XREAD
4007                    /IF THE PROGRAMMED INSTRUCTION IMMEDIATELY BEFORE " READ "
4008                    /IS A " WRITE " , THEN THIS IS A WRITE DATA ERROR, IF NOT,
4009                    /THEN THIS IS A READ DATA ERROR
4010                    /
4011                    /FORM: JMS RDORWR; (READ RETURN); (WRITE RETURN)
4012                    /
4013    3552  3552    RDORWR, .
4014    3553  7344            CLL STA RAL
4015    3554  1716            TAD XREAD
4016    3555  3137            DCA XXX
4017    3556  1537            TAD I XXX
4018    3557  1372            TAD (=WRITE)
4019    3560  7650            SNA CLA
4020    3561  2352            ISZ RDORWR
4021    3562  5752            JMP I RDORWR
4022    3572  3270
4023    3573  3206
4024    3574  0200
4025    3575  3762
4026    3576  3601
4027    3577  2000
              3600            PAGE
4028    3600  3601    JMPICOMPARE, JMP I COMPARE
4029                    /
4030                    /THE FOLLOWING INFORMATION IS ALWAYS PRINTED IF A PROGRAM COMPARE DATA ERROR
4031                    /
4032                    /                       DATA ERROR
4033                    /                       WORD GOOD BAD
4034                    /
4035                    /WHERE " WORD " IS THE WORD NUMBER (0-127),
4036                    /AND " GOOD " IS THE DATA WORD WRITTEN,
4037                    /AND " BAD " IS THE DATA WORD READ (IN ERROR)
4038                    /
4039                    /WORDS 0 AND 1 ARE HEADER WORDS (8 BIT BYTES)
4040                    /
4041                    / WORD 0 = TRACK # (BITS 5-11)
4042                    / WORD 1 = SECTOR (BITS 7-11)
4043                    /
4044                    /
```

```
                        /AC SW (4) = 1 ; INHIBIT READ DATA ERROR TYPEOUT
                        /
                        /
3601  3601    COMPARE, .
                        /
                        /EMPTY BUFFER
                        /
                        /SAVE THE PREVIOUS READ'S A-STATUS REGISTER
                        /
3602  7301              CLL CLA IAC
3603  0126              AND ASTATUS
3604  3361              DCA XASTATUS
3605  1121              TAD KRETRY
3606  3146              DCA PRETRY
3607  3362              DCA INSUMCHECK
3610  4777'             JMS EMPTYL
3611  1132              TAD TESTP
3612  0376              AND (4
3613  7640              SZA CLA           /IS IT 12 BIT MODE?
3614  1375              TAD (7400               /NO (=377)
3615  7040              CMA                     /YES
3616  3363              DCA BITMODE             /SAVE MASK
                        /
                        /AC SW (4) = 1 ; INHIBIT FURTHER READ DATA ERROR TYPEOUTS
                        /
                        /...BUT STAY IN THIS LOOP UNTIL THE RX01 SECTOR BUFFER IS EMPTIED
                        /
3617  4443    EMPTY,    STR
3620  5217              JMP EMPTY
                        /
                        /DISABLE THE RX01 INTERRUPT
                        /
3621  7300              CLA CLL
3622  6756    K67X6B, 6756
                        /
                        /TRANSFER DATA FROM THE SECTOR BUFFER INTO THE ACCUMULATOR
                        /
3623  6752    K67X2C, 6752                    / "ACTUAL"  (BAD)  DATA
3624  3133              DCA XA10
                        /
                        /ASSUME A 12 BIT SUMCHECK EVEN IF 8 BIT MODE FOR NOW
                        /
                        /NOTE: THE CONTENTS OF PROGRAM LOCATION " INSUMCHECK " SHOULD = 0
                        / (AFTER ALL WORDS HAVE COME IN)
                        /
3625  1133              TAD XA10
3626  1362              TAD INSUMCHECK

3627  3362              DCA INSUMCHECK
3630  1534              TAD I XA11
3631  0363              AND BITMODE             /377 FOR 8 BIT   7777 FOR 12 BIT
3632  7041              CIA
3633  1133              TAD XA10
3634  7640              SZA CLA
3635  5243              JMP DATAERR
3636  7301    ENDCOMPARE,     CLA CLL IAC
```



```
3637  6756    K67X6C, 6756
3640  2134              ISZ XA11
3641  6001              ION
3642  5717              JMP EMPTY
                        /
                        /A PROGRAM COMPARE DATA ERROR HAS BEEN DETECTED
                        /
                        /NOTATION:
                        /
                        /THE CONTENTS OF PROGRAM LOCATION XASTATUS REFLECTS THE STATUS OF THE
                        /RX01 AT THE COMPLETION OF THE PREVIOUS " READ SECTOR "
                        /
                        /IF A CRC ERROR EXISTS THEN THIS IS A DATA ERROR WITH STATUS ERROR
                        /
                        /IF A CRC ERROR DOESN'T EXIST THEN THIS IS A DATA ERROR WITH NO ERROR STATUS
                        /
3643  1361    DATAERR,        TAD XASTATUS            / A-STATUS OF PREVIOUS READ
3644  7450              SNA
3645  2143              ISZ DNSLOG              /NO CRC STATUS
3646  7640              SZA CLA
3647  2142              ISZ DWSLOG              /CRC STATUS
                        /
                        /AC SW (4) TO INHIBIT ERROR PRINTOUT
                        /
                        /IF THIS IS A READ ONLY TEST (NOT READ COMPARE) OR IF AC SW 4 = 1
                        /THEN DO NOT PRINT ERROR INFORMATION
                        /
                        /BUT,
                        /
                        /IF THIS IS A READ COMPARE TEST AND AC SW 4 = 0
                        /THEN PRINT ERROR INFORMATION
                        /
3650  4572              LAS
3651  0374              AND (SW4)
3652  1120              TAD ROC
3653  7640              SZA CLA
3654  5357              JMP ISZCOMPRERROR
                        /IF THIS IS THE FIRST COMPARE ERROR THEN PRINT HEADER INFORMATION
                        /
3655  1113              TAD COMPRERROR
3656  7640              SZA CLA
3657  5320              JMP CNOTFIRST
                        /
                        /IF A DATA NO CRC STATUS ERROR (DNS) THEN PRINT ENTIRE ERROR INFORMATION
                        /
3660  1143              TAD DNSLOG
3661  7640              SZA CLA
3662  4576              FORCE
                        /IF THE PROGRAMMED INSTRUCTION IMMEDIATELY BEFORE " READ "
                        /IS A " WRITE " , THEN THIS IS A WRITE DATA ERROR, IF NOT,
                        /THEN THIS IS A READ DATA ERROR
                        /
3663  4773'   XCOMPARE, JMS RDORWR
3664  5270              JMP .+4
3665  4473              PRINT
```

```
4155    3666  6716            MWRITE
4156    3667  5272            JMP .+3
4157    3670  4473            PRINT
4158    3671  6722            MREAD
4159                  /NOTATION:
4160                  /
4161                  /THE CONTENTS OF PROGRAM LOCATION XASTATUS REFLECTS THE STATUS OF THE
4162                  /RX01 AT THE COMPLETION OF THE PREVIOUS " READ SECTOR "
4163                  /
4164                  /IF A CRC ERROR EXISTS THEN THIS IS A DATA ERROR WITH STATUS ERROR
4165                  /
4166                  /IF A CRC ERROR DOESN'T EXIST THEN THIS IS A DATA ERROR WITH NO ERROR STATUS
4167                  /
4168    3672  1361            TAD XASTATUS
4169    3673  7640            SZA CLA
4170    3674  5300            JMP DWESERROR
4171    3675  4473            PRINT
4172    3676  6726            MDNSERROR
4173    3677  5302            JMP .+3
4174    3700  4473      DWESERROR, PRINT
4175    3701  6734            MDWESERROR
4176    3702  4473            PRINT
4177    3703  6753            MDATAERROR
4178                  /PRINT " WORD " IF 12-BIT MODE, OR PRINT " BYTE " IF 8-BIT MODE
4179                  /
4180    3704  1372            TAD (MWORD)
4181    3705  3315            DCA XFLENGTH
4182    3706  7307            CLL CLA IAC RTL
4183    3707  0132            AND TESTP
4184    3710  7650            SNA CLA
4185    3711  5314            JMP .+3
4186    3712  1371            TAD (MBYTE)
4187    3713  3315            DCA XFLENGTH
4188    3714  4473            PRINT
4189    3715  6762      XFLENGTH, MWORD
4190    3716  4473            PRINT
4191    3717  6770            MGB
4192                  / AC 5 = 0 - PRINT ONLY FIRST 3 COMPARE ERRORS
4193                  / AC 5 = 1 - PRINT ALL COMPARE ERRORS
4194                  /
4195    3720  4572      CNOTFIRST, LAS
4196    3721  0370            AND (SW5)
4197    3722  7640            SZA CLA
4198    3723  5330            JMP .+5
4199    3724  7346            CLL STA RTL
4200    3725  1113            TAD COMPRERROR
4201    3726  7700            SMA CLA

4202    3727  5357            JMP ISZCOMPRERROR
4203    3730  4473            PRINT
4204    3731  6602            MCRLF
4205    3732  1367            TAD (.+BUFFER)
4206    3733  1134            TAD XA11
4207    3734  3160            DCA LSB
4208    3735  4505            TY4OCT
4209    3736  0160            LSB
```



```
4210    3737  4504            TAB
4211    3740  0005            5
4212                  /IF 8-BIT MODE THEN MASK THE 12-BIT "GOOD" WORDS (377)
4213                  /
4214    3741  7307            CLL CLA IAC RTL
4215    3742  0132            AND TESTP
4216    3743  7112            CLL RIR
4217    3744  7010            RAR
4218    3745  1534            TAD I XA11
4219    3746  7430            SZL
4220    3747  0366            AND (377)
4221    3750  3160            DCA LSB
4222    3751  4505            TY4OCT
4223    3752  0160            LSB
4224    3753  4504            TAB
4225    3754  0012            12
4226    3755  4505            TY4OCT
4227    3756  0133            XA10
4228    3757  2113      ISZCOMPRERROR, ISZ COMPRERROR
4229    3760  5236            JMP ENDCOMPARE
4230                  /THE CONTENTS OF THE XASTATUS PROGRAM LOCATION REFLECTS THE STATUS AT THE
4231                  /COMPLETION OF THE PREVIOUS READ FUNCTION
4232                  /
4233                  /THE PREVIOUS STATUS IS SAVED BECAUSE A SUCCEEDING ERROR
4234                  / (PARITY ERROR ON THE COMMAND WORD) MAY OCCUR
4235                  /
4236    3761  0000      XASTATUS, 0
4237                  /
4238                  /THE CONTENTS OF " INSUMCHECK " IS THE SUMCHECK DERIVED FROM THE SUM OF ALL
4239                  /DATA WORDS COMING IN (THE SUM OF ALL " BAD " ), AND
4240                  /SHOULD BE EQUIVALENT TO 0 AT THE END OF THE EMPTY BUFFER
4241                  /
4242    3762  0000      INSUMCHECK, 0
4243    3763  0000      BITMODE, 0
4244    3766  0377
4245    3767  0664
4246    3770  0100
4247    3771  6765
4248    3772  6762
4249    3773  3552
4250    3774  0200
4251    3775  7400
4252    3776  0004
4253    3777  4000
              4000            PAGE
4254                  /
4255    4000  0000      EMPTYL, 0
4256    4001  1377            TAD (WBUFFER)
4257    4002  3134            DCA XA11
4258    4003  7305            CLL CLA IAC RAL
4259    4004  4637            LCDA
4260    4005  5222            JMP EMPTYOK
4261    4006  5211            JMP EMPTYERROR
4262                  /RETURN TO HERE FROM SUBROUTINE XLCDA
4263                  /
```

```
4264  4007  3113          DCA COMPRERROR
4265  4010  5600          JMP I EMPTYL            /RETURN
4266                      /
4267                      /THIS INTERFACE PARITY ERROR MUST BE ON THE COMMAND WORD TO "EMPTY BUFFER"
4268                      /
4269                      /NOTE: IT CAN'T BE ANY OTHER ERROR
4270                      /
4271  4011  2146    EMPTYERROR, ISZ PRETRY
4272  4012  7410          SKP
4273  4013  5272          JMP XEMPTYDXNOTOK
4274  4014  4572          LAS
4275  4015  0376          AND (8+1)
4276  4016  7640          SZA CLA
4277  4017  5200          JMP EMPTYL
4278  4020  3146          DCA PRETRY
4279  4021  5272          JMP XEMPTYDXNOTOK
4280                      /IF AC SW (4) = 0
4281                      /
4282                      /PRINT A VALUE SYMBOLIC OF THE TOTAL # OF COMPARE ERRORS DETECTED
4283                      /
4284                      /IF 8-BIT MODE THEN THE "SUMCHECK" WILL OVERFLOW INTO BITS 0 TO 3
4285                      /
4286                      /THEREFORE MASK THE CONTENTS OF " INSUMCHECK "
4287                      /
4288                      /THE RESULT OF THE SUBTRACTION SHOULD = 0
4289                      /
4290                      /NO MASK IS NEEDED FOR 12-BIT MODE
4291                      /
4292  4022  7307    EMPTYOK, CLL CLA IAC RTL
4293  4023  0132          AND TESTP
4294  4024  7112          CLL RTR
4295  4025  7010          RAR
4296  4026  1775'         TAD INSUMCHECK
4297  4027  7430          SZL
4298  4030  0374          AND (377)
4299  4031  3775'         DCA INSUMCHECK
4300  4032  4572          LAS
4301  4033  0373          AND (5+4)
4302  4034  7640          SZA CLA
4303  4035  5272          JMP XEMPTYOK
4304                      /IF A SUMCHECK ERROR EXISTS WITHOUT A "COMPRERROR" THEN "FORCE" A TYPEOUT
4305                      /
4306  4036  1113          TAD COMPRERROR
4307  4037  7640          SZA CLA
4308  4040  5245          JMP .+5
4309  4041  1775'         TAD INSUMCHECK
4310  4042  7650          SNA CLA

4311  4043  5272          JMP XEMPTYOK
4312  4044  4576          FORCE
4313  4045  4473          PRINT
4314  4046  6775          MSUMCHECK
4315  4047  1775'         TAD INSUMCHECK
4316  4050  7640          SZA CLA
4317  4051  5255          JMP .+4
4318  4052  4473          PRINT
```



```
4319  4053  7005          MQA
4320  4054  5260          JMP .+4
4321  4055  4505          TY4OCT
4322  4056  3762          INSUMCHECK
4323  4057  5263          JMP .+4
4324  4060  1113          TAD COMPRERROR
4325  4061  7650          SNA CLA
4326  4062  5272          JMP XEMPTYOK
4327  4063  4473          PRINT
4328  4064  7007          MDESUMMARY
4329  4065  4505          TY4OCT
4330  4066  0113          COMPRERROR
4331  4067  4504          TAB
4332  4070  0005          5
4333  4071  5272          JMP XEMPTYOK
4334                      /
4335                      /AC SW 0 = 1 ; HALT ON ERROR
4336                      /
4337  4072  1113    XEMPTYOK, TAD COMPRERROR
4338  4073  7450          SNA
4339  4074  1775'         TAD INSUMCHECK
4340  4075  7650          SNA CLA
4341  4076  5772'         JMP JMPICOMPARE
4342  4077  4572          LAS
4343  4100  7710          SPA CLA
4344  4101  4461          HLT6, HLT
4345  4102  5772'         JMP JMPICOMPARE
4346  4103  4103    XSETUP, .
4347  4104  4507          WAITTY
4348  4105  1371          TAD (ANDRETURN)
4349  4106  3770'         DCA XPRINT
4350  4107  1703          TAD I XSETUP
4351  4110  3320          DCA XANDRETURN
4352  4111  2303          ISZ XSETUP
4353  4112  5703          JMP I XSETUP
4354                      /
4355                      /AND RETURN TO HERE WAITING FOR ENTIRE NUMERICAL OUTPUT
4356                      /
4357  4113  4507    ANDRETURN, WAITTY
4358                      /
4359                      /THEN EXIT FROM HERE FOR MAIN LINE CODE
4360                      /
4361  4114  1720    THENEXIT, TAD I XANDRETURN
4362  4115  3320          DCA XANDRETURN
4363  4116  3162          DCA TTYBUSY
4364  4117  5720          JMP I XANDRETURN
4365  4120  4120    XANDRETURN, .
4366                      /
4367  4121  4121    XHALT, .
4368  4122  4507          WAITTY
4369                      /**********
4370                      /CONSOLE
4371                      /**********
4372  4123  4424          CHECKC8
4373  4124  4425          XC8ENTR
```

```
4374    4125  5331            JMP C8RET3      /
4375                          /************
4376    4126  7240            STA
4377    4127  1321            TAD XHALT
4378    4130  7402            7402
4379    4131  7200            C8RET3,CLA
4380    4132  5721            JMP I XHALT
4381                  /
4382                  /ROUTINE TO NOTIFY OF OF RUNNING IF NEED BE DONE
4383                  /
4384    4133  0000    XTICK,  0
4385    4134  4472            CHEK22
4386    4135  7410            SKP                             /ON APT,
4387    4136  5733            JMP I   XTICK
4388    4137  2351            ISZ     CLKCNT
4389    4140  5733            JMP I   XTICK
4390    4141  1352            TAD     COUNT
4391    4142  3351            DCA     CLKCNT                  /INIT CLOCK COUNTER
4392    4143  6002            IOF
4393    4144  6201            CDF     00
4394    4145  6272            CIF     70
4395    4146  4750            JMS I   K6500                   /NOTIFY API-8
4396    4147  5733            JMP I   XTICK                   /EXIT,
4397                  /
4398    4150  6500    K6500,  6500
4399    4151  7777    CLKCNT, -1
4400    4152  7763    COUNT,  -15
4401    4170  5244
4402    4171  4113
4403    4172  3600
4404    4173  0200
4405    4174  0377
4406    4175  3762
4407    4176  2000
4408    4177  7114
              4200            PAGE
4409                  /SEQUENCE TO THE NEXT AVAILABLE DISKETTE
4410                  /
4411    4200  4200    XGETUNIT,       .
4412    4201  3240            DCA UNITZ       /CLEAR FOR A NEW DISKETTE
4413    4202  1236            TAD WUNITS      /WORKING UNIT COUNTER
4414    4203  7450            SNA
4415    4204  1235            TAD UNITS       /EXAUSTED ALL DISKETTES ; RESET
4416    4205  3236            DCA WUNITS
4417    4206  3237            DCA POLL        /CLEAR POLLER
4418    4207  7120            STL             /START
4419    4210  1237    NEXT,   TAD POLL

4420    4211  7010            RAR             /NEXT
4421    4212  3237            DCA POLL
4422    4213  1237            TAD POLL
4423    4214  7430            SZL             /DISKETTE
4424    4215  4461            HLT             /NO UNITS AVAILABLE ; CATASTROPHIC
4425    4216  0236            AND WUNITS
4426    4217  7450            SNA
4427    4220  2240            ISZ UNITZ       /ACTIVE DISKETTE
```



```
4428    4221  7450            SNA
4429    4222  5210            JMP NEXT        /TRY AGAIN
4430                  /A DISKETTE IS AVAILABLE AND SELECTED FOR OPERATIONS
4431    4223  3241            DCA UNITX       /A CODED VERSION OF UNIT
4432    4224  1241            TAD UNITX
4433    4225  7040            CMA             /...DELETE FROM
4434    4226  0236            AND WUNITS      /...AVAILABLE UNIT LIST (WUNITS)
4435    4227  3236            DCA WUNITS      /...AND CREATE NEW LIST
4436    4230  1240            TAD UNITZ
4437    4231  7106            CLL RTL
4438    4232  7006            RTL     /BIT 7 OF COMMAND REGISTER
4439    4233  3242            DCA UNIT        /FOR COMMAND REGISTER LOAD LATER
4440    4234  5600            JMP I XGETUNIT
4441    4235  6000    UNITS,  6000            /AVAILABLE UNIT LIST (MAX SYS CONFIGURATION)
4442    4236  0000    WUNITS, 0               /CODED WORKING UNIT LIST (UNITS YET TO BE EXERCISED)
4443    4237  0000    POLL,   0               /DISKETTE POLL
4444                  /
4445                  /UNITZ ; UNIT 1 LOOKS LIKE 0001
4446                  /UNITX ; UNIT 1 LOOKS LIKE 2000
4447                  /UNIT  ; UNIT 1 LOOKS LIKE 0020 (RX01 COMMAND WORD BIT 7)
4448                  /
4449    4240  0000    UNITZ,  0               /ACTIVE DISKETTE
4450    4241  0000    UNITX,  0               /ACTIVE DISKETTE IN CODED FORM
4451    4242  0000    UNIT,   0               /A CODED VERSION OF UNIT Z (FOR COMMAND REGISTER LOAD)
4452                  /
4453                  /IF (WUNITS) = 0 ; ALL SELECTED DISKETTE DRIVES HAVE BEQUENCED
4454                  /
4455    4243  4243    XDONE,  .
4456    4244  1236            TAD WUNITS
4457    4245  7650            SNA CLA
4458    4246  2243            ISZ XDONE       / DONE ; (WUNITS) = 0
4459    4247  5643            JMP I XDONE
4460                  /INITIALIZE THE NUMBER OF TRACKS ACCESSED VIA THE DIFFERENCE BETWEEN
4461                  /THE CONTENTS OF PROGRAM LOCATIONS " OD " AND " ID ",
4462                  /
4463    4250  4250    XINITTRACKS, .
4464    4251  1030            TAD ID
4465    4252  7040            CMA
4466    4253  1027            TAD OD
4467    4254  3147            DCA TRACKS
4468    4255  1147            TAD TRACKS
4469    4256  7041            CIA
4470    4257  3150            DCA ITRACKS
4471    4260  5650            JMP I XINITTRACKS
4472                  / OD (OUTSIDE DIAMETER) ACTUATOR POSITION INITIALIZED TO (0)
4473                  /
4474                  / ID (INSIDE DIAMETER) ACTUATOR POSITION INITIALIZED TO 114 (76 DECIMAL)
4475                  /
4476                  / " XGETATRACK " WILL GET A TRACK VALUE BETWEEN THE LIMITS OF THE CONTENTS OF
4477                  /PROGRAM LOCATION OD (MIN 0), AND THE CONTENTS OF ID (MAX 114),
4478                  /
4479                  /GET A DISKETTE TRACK TO BE (AC) WITHIN IOT LCD=8
4480                  /
4481                  / IF THIS IS THE " FIRSTMOVE ", (START) IS NOT APPLICABLE HERE, BUT
4482                  / WILL BECOME APPLICABLE WITHIN SUBROUINE " XGETASECTOR ",
```

```
4483                    /
4484    4261  4261      XGETATRACK,     .
4485    4262  1131              TAD TARGET      /PRESENT ACTUATOR POSITION (FROM PREVIOUS LCD=B)
4486    4263  3125              DCA START       /BECOMES  STARTING ACTUATOR POSITION
4487    4264  1377              TAD (70)
4488    4265  0132              AND TESTP
4489    4266  7110              CLL RAR
4490    4267  7012              RTR
4491    4270  1376              TAD (TAD SEQ)
4492    4271  3272              DCA .+1
4493    4272  1276              TAD SEQ
4494    4273  3275              DCA .+2
4495    4274  5675      RESEQUENCE, JMP I .+1
4496    4275  4306              SEQ000
4497                    /TRACK ACCESS SEQUENCE IS SELECTED VIA AC SWITCHES 6,7,8 AT L/S 200
4498                    /
4499                    / 0 = INCREMENTAL (1=114=0)
4500                    / 1 = DECREMENTAL (114=0)
4501                    / 2 = 1=114, 113=0
4502                    / 3 = BOUNCE ID TO OD ONLY
4503                    / 4 = BOUNCE: (114, 0 ; 113, 1 ; 112, 2 ; ...ETC TO 47, 45)
4504                    / 5 =
4505                    / 6 = STROBE: (77, 0 ; 76, 0 ; 75, 0 ; ...ETC TO 1, 0)
4506                    / 7 = RANDOM
4507                    /
4508    4276  4306      SEQ,    SEQ000
4509    4277  4317              SEQ001
4510    4300  4400              SEQ010
4511    4301  4422              SEQ3
4512    4302  4444              SEQ100
4513    4303  5453              NOTEST
4514    4304  4465              SEQ6
4515    4305  4330              SEQ111
4516                    /
4517                    /INCREMENTAL ACTUATOR ACCESS (OD INCREMENTALLY TO ID)
4518                    /
4519    4306  1150      SEQ000, TAD TTRACKS
4520    4307  1147              TAD TRACKS
4521    4310  7640              SZA CLA
4522    4311  5314              JMP .+3
4523    4312  1027              TAD OD
4524    4313  5332              JMP DCATARGET
4525    4314  1131              TAD TARGET
4526    4315  7001              IAC
4527    4316  5332              JMP DCATARGET
4528                    /DECREMENTAL ACTUATOR ACCESS (ID TO OD)
4529                    /

4530    4317  1150      SEQ001, TAD TTRACKS
4531    4320  1147              TAD TRACKS
4532    4321  7640              SZA CLA
4533    4322  5325              JMP .+3
4534    4323  1030              TAD ID
4535    4324  5332              JMP DCATARGET
4536    4325  1131              TAD TARGET
4537    4326  1147              TAD K7777
```



```
4538    4327  5332              JMP DCATARGET
4539                    /RANDOM ACTUATOR ACCESS
4540                    /
4541    4330  4775*     SEQ111, JMS RANGEN
4542    4331  0374              AND (177)
4543    4332  3131      DCATARGET, DCA TARGET
4544                    /PREVIOUSLY AT L/S THE FOLLOWING CONDITION WAS TRUE
4545                    /
4546                    /               0 <= (OD) <= (ID) <= 32
4547                    /
4548                    /THEREFORE TEST FOR THE CONDITION
4549                    /
4550                    /               (TARGET) <= (ID)
4551                    /
4552    4333  1030      XSEQ,   TAD ID
4553    4334  7041              CIA
4554    4335  1131              TAD TARGET
4555    4336  7740              SMA SZA CLA
4556    4337  5274              JMP RESEQUENCE
4557                    /AND TEST FOR THE CONDITION
4558                    /
4559                    /               (OD) <= (TARGET)
4560                    /
4561    4340  1131              TAD TARGET
4562    4341  7041              CIA
4563    4342  1027              TAD OD
4564    4343  7740              SMA SZA CLA
4565    4344  5274              JMP RESEQUENCE
4566    4345  5661              JMP I XGETATRACK
4567                    /
4568                    /ERROR REPORTER FOR APT, INDICATES TEST PC IN ERROR, THE ONLY EXCEPTIONS
4569                    /ARE FOR AN UNEXPECTED RX01 INTERRUPT,
4570                    /AND A MISSING ERROR FLAG,
4571                    /
4572    4346  0000      XAERRO, 0
4573    4347  3137              DCA     XXX                             /STORE ERROR PC,
4574    4350  4472              CHEK22
4575    4351  7410              SKP
4576    4352  5746              JMP I   XAERRO
4577    4353  6002              IOF
4578    4354  1137              TAD     XXX                     /GET BACK ERROR PC,
4579    4355  6201              CDF     00
4580    4356  6272              CIF     70
4581    4357  5761              JMP I   K6520
4582    4360  4461              HLT                             /SOMETHING WENT WRONG ON
4583                                                            /ON REPORTING ERROR TO APT
4584    4361  6520      K6520,  6520
4585    4374  0177
4586    4375  4712
4587    4376  1276
4588    4377  0070
              4400              PAGE
4589                    / OD+1 INCREMENTALLY TO ID; ID-1 DECREMENTALLY TO OD
4590                    /
4591    4400  1150      SEQ010, TAD TTRACKS
```

```
4592  4401  1147          TAD TRACKS
4593  4402  7640          SZA CLA
4594  4403  5213          JMP XSEQ2
4595  4404  1147          TAD TRACKS
4596  4405  7104          CLL RAL
4597  4406  1377          TAD (2)
4598  4407  3147          DCA TRACKS      / (TRACKS X 2)-2 = 152(MAX VAL)
4599  4410  1147          TAD TRACKS
4600  4411  7041          CIA
4601  4412  3150          DCA TTRACKS
4602                /INCREMENT IF (TRACKS) < [ (ID)-(OD) ]
4603                /DECREMENT IF (TRACKS) => [ (ID)-(OD) ]
4604  4413  1027    XSEQ2,  TAD OD
4605  4414  7041          CIA
4606  4415  1030          TAD ID
4607  4416  1147          TAD TRACKS
4608  4417  7700          SMA CLA
4609  4420  5776*         JMP SEQ001      / ID=1 TO OD
4610  4421  5775*         JMP SEQ000      / OD=1 TO ID
4611                /
4612                /BOUNCE; ID,OD ONLY
4613                /
4614  4422  1150    SEQ3,   TAD TTRACKS
4615  4423  1147          TAD TRACKS
4616  4424  7640          SZA CLA
4617  4425  5233          JMP XSEQ3
4618  4426  7344          CLL STA RAL
4619  4427  3147          DCA TRACKS
4620  4430  1147          TAD TRACKS
4621  4431  7041          CIA
4622  4432  3150          DCA TTRACKS
4623  4433  1131    XSEQ3,  TAD TARGET
4624  4434  7041          CIA
4625  4435  1027          TAD OD
4626  4436  7650          SNA CLA
4627  4437  1030          TAD ID
4628  4440  7450          SNA
4629  4441  1027          TAD OD
4630  4442  3131          DCA TARGET
4631  4443  5774*         JMP XSEQ
4632                /BOUNCE ; ID TO OD
4633                /
4634                /THEREFORE 76 (NOT 77) TRACKS ARE TESTED
4635                /
4636  4444  1150    SEQ100, TAD TTRACKS
4637  4445  1147          TAD TRACKS
4638  4446  7640          SZA CLA

4639  4447  5254          JMP Q40D
4640                /FIRST ENTRY INTO SEQUENCE # 4
4641                /
4642                /IF (TRACKS) = [ (ID)-(OD) ] IS A NEGATIVE ODD THEN INCREMENT (TRACKS)
4643                /
4644  4450  7201          CLA IAC
4645  4451  0147          AND TRACKS
4646  4452  7640          SZA CLA
```



```
4647  4453  2147          ISZ TRACKS
4648                /IF (TRACKS) = -ODD ; BOUNCE TO OUTSIDE DIAMETER, BUT
4649                /
4650                /IF (TRACKS) = -EVEN ; BOUNCE TO INSIDE DIAMETER
4651                /
4652  4454  7201    Q40D,   CLA IAC
4653  4455  0147          AND TRACKS
4654  4456  7650          SNA CLA
4655  4457  5305          JMP Q46ID
4656  4460  7240          STA
4657  4461  1150          TAD TTRACKS
4658  4462  1147          TAD TRACKS
4659  4463  7110          CLL RAR
4660  4464  5313          JMP Q46OD
4661                // (TRACKS) = -EVEN ; THEREFORE THE BOUNCE IS TO THE INSIDE DIAMETER
4662                //
4663                /Q4IC,  TAD TTRACKS; TAD TRACKS; CLL RAR; CIA; TAD ID; DCA TARGET; JMP XSEQ
4664                /STROBE ID, OD ; ID-1, OD ; ID-2, OD ; ...ETC...
4665                /
4666  4465  1150    SEQ6,   TAD TTRACKS
4667  4466  1147          TAD TRACKS
4668  4467  7640          SZA CLA
4669  4470  5300          JMP Q6OD
4670                /FIRST ENTRY INTO SEQUENCE # 6
4671                /
4672  4471  1147          TAD TRACKS
4673  4472  7105          CLL IAC RAL
4674  4473  3147          DCA TRACKS
4675  4474  1147          TAD TRACKS
4676  4475  7041          CIA
4677  4476  3150          DCA TTRACKS
4678  4477  5305          JMP Q46ID
4679                /
4680                / IF (TARGET) = (OD), THEN STROBE TO INSIDE DIAMETER
4681                /
4682  4500  1131    Q6OD,   TAD TARGET
4683  4501  7041          CIA
4684  4502  1027          TAD OD
4685  4503  7640          SZA CLA
4686  4504  5313          JMP Q46OD
4687                /
4688                /
4689                /
4690  4505  1150    Q46ID,  TAD TTRACKS
4691  4506  1147          TAD TRACKS
4692  4507  7110          CLL RAR
4693  4510  7041          CIA
4694  4511  1030          TAD ID
4695  4512  7410          SKP
4696  4513  1027    Q46OD,  TAD OD
4697  4514  3131          DCA TARGET
4698  4515  5774*         JMP XSEQ
4699                      /**********
4700                      /CONSOLE
4701                      /***********
```

```
4516  0000    XCHECKC8, 0
4517  7200            CLA                             /CHECK IF CONSOL IS ACTIVE
4520  1022            TAD     22
4521  0373            AND     (400
4522  7650            SNA CLA
4523  5337            JMP     NOTCL8                  /NOT ON ACTIVE CONSOLE
4524  1716            TAD I   XCHECKC8                /GET CONSOLE CALL
4525  3331            DCA     PACKDO  /STORE IT IN THIS LOC
4526  4507            WAITTY                          /WAIT FOR PRINTING TO FONISH
4527  6002            IOF                             /KILL INTERRUPT
4530  6212            CIF 10                          /CHANGE INST FILLD TO FIELD ONE
4531  0000            PACKDO, 0000                    /DO CONSULE CALL
4532  7000            NOP
4533  6001            ION                             /RETURN FROM CALL
4534  2316    EXITCK, ISZ     XCHECKC8                /BUMP RETURN
4535  7200            CLA
4536  5716            JMP I   XCHECKC8                /EXIT XCHECK
4537  2316    NOTCL8, ISZ     XCHECKC8                /BUMP FOR NOT CONSOL CALL +2
4540  5334            JMP     EXITCK                  /LEAVE BY THIS MEANS


                      /************
                      /CONSOLE
                      /************
              /THIS SUBROUTINE IS ENTERED FROM TESTS:  T21, T22, T32, T33
              /
              /THE CONTENTS OF THE AC AT ENTRY IS THE PATTERN TO FILL THE BUFFER WITH
              /
4541  4541    F8128BYTES, .
4542  3166            DCA GOOD                                        /THE CONTENTS OF GOOD IS THE PURE PATTERN
4543  1372            TAD (100)
4544  4436            LCD                                     /FILL BUFFER (8-BIT MODE)
4545  5350            JMP .+3                                         /START BY WAITING FOR TRANSFER REQUEST
4546  1166            TAD GOOD
4547  4442            XDROUT                          /TRANSFER OUT TO SECTOR BUFFER
4550  4443            STR
4551  7410            SKP
4552  5346            JMP .-4                         /WAIT FOR TRANSFER REQUEST FLAG
4553  4445            SDN
4554  5350            JMP .-4                                 /WAIT FOR DONE FLAG
4555  4444            SER
4556  4465            OK
4557  4452    E210,   ERROR                                           /UNEXPECTED ERROR FLAG
4560  4502            SCOPE
4561  5741            JMP I F8128BYTES

4572  0100
4573  0400
4574  4333
4575  4306
4576  4317
4577  0002
      4600            PAGE
              /INITIALIZE THE NUMBER OF SECTORS AVAILABLE TO ACCESS (PER TRACK) VIA THE
```



```
              /DIFFERENCE BETWEEN THE CONTENTS OF PROGRAM LOCATIONS " FIRST " AND " LAST ".
              /
4600  4600    XINITSECTORS, .
4601  1032            TAD LAST
4602  7040            CMA
4603  1031            TAD FIRST
4604  3122            DCA SECTORS
4605  3311            DCA XSTARGET
4606  5600            JMP I XINITSECTORS
              /
              /GET A SECTOR
              /
              /SECTOR ACCESS 1-32 (OCTAL)
              /
4607  4607    XGETASECTOR, .
              /
              /SET (SSTART)
              /
4610  7301    XXGETASECTOR, CLL CLA IAC       / 1
4611  3310            DCA IF
4612  1120            TAD RDC
4613  7450            SNA
4614  2310            ISZ IF                  / + 1 RDC
4615  7710            SPA CLA
4616  5222            JMP .+4                 / + 1 WRITE
4617  7307            CLL CLA IAC RTL
4620  0132            AND TESTP
4621  7640            SZA CLA
4622  2310            ISZ IF                  / + 1 8-BIT MODE
4623  4777*           JMS     VT78CK          /GO CHECK IF ON VT78 SYSTEM
4624  2310            ISZ     IF              /INCREASE (IF) FOR VT78
              /
              / (IF) IS:
              /
              / 1 IF READ
              / 2 IF WRITE
              / 2 IF WRITE 8-BIT MODE
              / 2 IF READ AND PROGRAM VERIFY
              / 3 IF READ AND PROGRAM VERIFY 8-BIT MODE
              / 2 IF READ 8-BIT MODE
              /
4625  1311    NEXTSECTOR, TAD XSTARGET
4626  7440            SZA
4627  1310            TAD IF                  /INTERLEAVE FACTOR 1, 2, 3
4630  7001            IAC                     /NOW INTERLEAVE FACTOR IS 2, 3, 4
4631  3311            DCA XSTARGET
4632  1311            TAD XSTARGET
4633  1376            TAD (-33)
4634  7510            SPA
4635  5243            JMP OKSTARGET           / < 33
4636  7640            SZA CLA                 /SKIP IF = 33
4637  7240            STA
4640  1375            TAD (-31)
4641  1311            TAD XSTARGET
4642  3311            DCA XSTARGET
```

```
4811    4643  7200    OKSTARGET, CLA
4812    4644  1311            TAD XSTARGET
4813    4645  3124            DCA STARGET
4814                    /
4815                    /PREVIOUSLY AT L/S THE FOLLOWING CONDITION WAS TRUE
4816                    /
4817                    /               0 < (FIRST) <= (LAST)
4818                    /
4819                    /THEREFORE TEST FOR THE CONDITION
4820                    /
4821                    /               (STARGET) <= (LAST)
4822                    /
4823    4646  1032            TAD LAST
4824    4647  7041            CIA
4825    4650  1124            TAD STARGET
4826    4651  7740            SMA SZA CLA
4827    4652  5225            JMP NEXTSECTOR
4828                    /
4829                    /AND FOR THE CONDITION
4830                    /
4831                    /               (FIRST) <= (STARGET)
4832                    /
4833    4653  1124            TAD STARGET
4834    4654  7041            CIA
4835    4655  1031            TAD FIRST
4836    4656  7740            SMA SZA CLA
4837    4657  5225            JMP NEXTSECTOR
4838                    /FORMAT (XTARGET) BITS 0-6 TRACK ; AND BITS 7-11 SECTOR
4839                    /
4840    4660  1131            TAD TARGET
4841    4661  7104            CLL RAL
4842    4662  7006            RTL
4843    4663  7006            RTL
4844    4664  1124            TAD STARGET
4845    4665  3151            DCA XTARGET
4846                    /AND SET THE HEADER WORDS 0, AND 1 OF THE WRITE BUFFER FOR RDC I,D,
4847                    /
4848                    /WORD 0 IS THE TRACK
4849                    /WORD 1 IS THE UNIT (BIT 4) AND THE SECTOR (BITS 7-11)
4850                    /
4851    4666  1131            TAD TARGET
4852    4667  3774*           DCA WBUFFER
4853    4670  1773*           TAD UNITZ
4854    4671  7106            CLL RTL
4855    4672  7006            RTL
4856    4673  7006            RTL
4857    4674  7004            RAL

4858    4675  1124            TAD STARGET
4859    4676  3772*           DCA WBUFFER+1
4860                    /WORDS 63 AND 64 OR 127 AND 128 ARE OUT-SUMCHECK WORDS
4861                    /
4862    4677  1155            TAD PATSUMCHECK
4863    4700  1774*           TAD WBUFFER
4864    4701  1772*           TAD WBUFFER+1
4865    4702  3556            DCA I WORDX
```



```
4866    4703  1556            TAD I WORDX
4867    4704  1556            TAD I WORDX
4868    4705  7041            CIA
4869    4706  3557            DCA I WORDY
4870    4707  5607            JMP I XGETASECTOR
4871                    /
4872    4710  0000    IF,     0
4873    4711  0000    XSTARGET, 0             / 1 TO 32
4874                    /
4875                    /RANDOM NUMBER GENERATOR
4876                    / (EXIT IS WITH THE RANDOM # IN THE ACCUMULATOR)
4877    4712  4712    RANGEN, .
4878    4713  7301            CLL CLA IAC
4879    4714  1326            TAD R1
4880    4715  1327            TAD R2
4881    4716  7106            CLL RTL
4882    4717  3326            DCA R1
4883    4720  1327            TAD R2
4884    4721  7012            RTR
4885    4722  1326            TAD R1
4886    4723  3327            DCA R2
4887    4724  1327            TAD R2
4888    4725  5712            JMP I RANGEN
4889    4726  1234    R1,     1234
4890    4727  0765    R2,     0765
4891                    /
4892                    /TESTS
4893                    /
4894    4730  0600    TESTS,  T0
4895    4731  0626            T1
4896    4732  0652            T2
4897    4733  0723            T3
4898    4734  1000            T4
4899    4735  1071            T5
4900    4736  1132            T6
4901    4737  1200            T7
4902    4740  1215            T10
4903    4741  1233            T11
4904    4742  1260            T12
4905    4743  1456            T13
4906    4744  1603            T14
4907    4745  1601            T15
4908    4746  1455            T16
4909    4747  1602            T17
4910    4750  1600            T20
4911    4751  1675            T21
4912    4752  1674            T22
4913    4753  2265            T23
4914    4754  1714            T24
4915    4755  1716            T25
4916    4756  1720            T26
4917    4757  2107            T27
4918    4760  2200            T30
4919    4761  2202            T31
4920    4762  2223            T32
```

```
 4921   4763  2241          T33
 4922   4764  2300          T34
 4923   4765  2276          T35
 4924   4766  2277          T36
 4925   4767  2275          T37
 4926   4770  0462          NOMORE-3
 4927   4772  7115
 4928   4773  4240
 4929   4774  7114
 4930   4775  7747
 4931   4776  7745
 4932   4777  1165
               5000          PAGE
 4933                 /
 4934                 /TYPE 4 OCTAL
 4935                 /
 4936   5000  5000    XTY4OCT, .
 4937   5001  7410            SKP
 4938   5002  3162            DCA     TTYBUSY                 /INITIALIZE TTYBUSY INDICAOR.
 4939   5003  4500            SETUP
 4940   5004  5000            XTY4OCT
 4941   5005  1400            TAD I XTY4OCT
 4942   5006  2200            ISZ XTY4OCT
 4943   5007  3262            DCA XOCTAL      /FOR " OCTAL " ADDRESS
 4944   5010  1662            TAD I XOCTAL
 4945   5011  3262            DCA XOCTAL      /OCTAL
 4946   5012  7346            CLL STA RTL     / -3
 4947   5013  1117            TAD K7777       / -1
 4948   5014  3263            DCA DIGITS
 4949   5015  7346    SHIFT,  CLL STA RTL     / -3
 4950   5016  3265            DCA SHIFTS
 4951   5017  1262            TAD XOCTAL
 4952   5020  7100    XSHIFT, CLL
 4953   5021  7510            SPA
 4954   5022  7020            CML
 4955   5023  7004            RAL
 4956   5024  2265            ISZ SHIFTS
 4957   5025  5220            JMP XSHIFT
 4958   5026  3262            DCA XOCTAL      /NEW
 4959   5027  1262            TAD XOCTAL
 4960   5030  0174            AND K0007                       /OCTAL MASK
 4961   5031  7450            SNA
 4962   5032  5242    JMPDIG, JMP     ISZDIG                  /DO NOT PRINT LEADING ZEROS.
 4963   5033  3264            DCA     XXDMP                   /STORE NUMBER TO BE PRINTED
 4964   5034  1173            TAD     K7000
 4965   5035  3232            DCA     .-3                     /NOP JMP ISZDIG, LEADING ZEROS WILL NOT BE PRINTED
 4966   5036  1264            TAD     XXDMP                   /RETURN VALUE TO BE PRINTED.

 4967   5037  1377            TAD (260)                       /FOR ASCII COMPONENT
 4968   5040  4506            TYPEIT
 4969   5041  2266            ISZ     CONT                    /INDICATES A CHARACTER HAS BEEN PRINTED
 4970   5042  2263    ISZDIG, ISZ DIGITS                      /INDEX DIGIT COUNT
 4971   5043  5215            JMP SHIFT
 4972   5044  2175            ISZ     XCNT                    /TYBOCT?
 4973   5045  5202            JMP     XTY4OCT+2               /YES
 4974   5046  1266            TAD     CONT
```



```
 4975   5047  7650            SNA CLA                         /PRINT ONLY A ZERO??
 4976   5050  5257            JMP     ZERO                    /YES
 4977   5051  7340            CLE CLA CMA
 4978   5052  3175            DCA     XCNT                    /INIT COUNTER
 4979   5053  3266            DCA     CONT
 4980   5054  1376            TAD     (JMP    ISZDIG)         /ESTABLISH FIRST TIME SWITCH.
 4981   5055  3232            DCA     JMPDIG
 4982   5056  5775'           JMP     THENEXIT
 4983   5057  1377    ZERO,   TAD     (260)
 4984   5060  4506            TYPEIT
 4985   5061  5251            JMP     .-10
 4986   5062  0000    XOCTAL, 0               / " OCTAL " FOR TYPEOUT
 4987   5063  7775    DIGITS, -3
 4988   5064  0000    XXDMP,  0
 4989   5065  7775    SHIFTS, -3
 4990   5066  0000    CONT,   0
 4991                 /THIS ROUTINE WILL DETERMINE DEVICE CODE TO USE IN PLACE
 4992                 /OF THE STANDARD 7S CODE.
 4993                 /
 4994                 /*************************************************
 4995   5067  0000    CHNDEV, 0
 4996   5070  1114            TAD     DTESTP                  /GET TESTING PARAMETERS.
 4997   5071  0374            AND     (700                    /ISOLATE DEVICE CODE TO USE.
 4998   5072  7450            SNA                             /USE 7S??
 4999   5073  5667            JMP I   CHNDEV                  /YES.
 5000   5074  7112            CLL RTR
 5001   5075  7010            RAR                             /MOVE TO BIT POSITION 5-8.
 5002   5076  1373            TAD (6700)
 5003                 /PROPER DEVICE CODE SHOULD  NOW BE ESTABLISHED.
 5004                 /IF THE OPERATOR HAS MADE AN ERROR THE PROGRAM HAS NO WAY
 5005                 /OF KNOWING IT.
 5006                 /
 5007   5077  3010            DCA A10                         /SET DEVICE CODE = 67X-
 5008   5100  1372            TAD (XDEVIC-1)
 5009   5101  3011            DCA A11         /INTO APPLICABLE PROGRAM
 5010   5102  1411            TAD I A11
 5011   5103  7450            SNA
 5012   5104  5312            JMP .+6         /DEVICE CODE LOCATIONS
 5013   5105  3166            DCA GOOD
 5014   5106  1010            TAD A10
 5015   5107  3568            DCA I GOOD      /SPECIFIED AT
 5016   5110  2010            ISZ A10
 5017   5111  5302            JMP .-7         /PROGRAM LOCATION "DEVICE"
 5018   5112  1735            TAD I XK67X2A
 5019   5113  3771'           DCA K67X2B      /DUPLICATE IOT CODE 67X2
 5020   5114  1735            TAD I XK67X2A
 5021   5115  3770'           DCA K67X2C      /DUPLICATE IOT CODE 67X2
 5022   5116  1736            TAD I XK67X3A
 5023   5117  3767'           DCA K67X3B      /DUPLICATE IOT CODE 67X3
 5024   5120  1737            TAD I XK67X4A
 5025   5121  3766'           DCA K67X4B      /DUPLICATE IOT CODE 67X4
 5026   5122  1740            TAD I XK67X5A
 5027   5123  3765'           DCA K67X5B      /DUPLICATE IOT CODE 67X5
 5028   5124  1741            TAD I XK67X6A
 5029   5125  3764'           DCA K67X6B      /DUPLICATE IOT CODE 67X6
```

```
5030    5126  1741          TAD I XK67X6A
5031    5127  3763'         DCA K67X6C      /DUPLICATE IOT CODE 67X6
5032    5130  1742          TAD I XK67X7A
5033    5131  3762'         DCA K67X7B      /DUPLICATE IOT CODE 67X7
5034    5132  5667          JMP I   CHNDEV                  /EXIT AND RUN PROGRAM,
5035                  /PROGRAM DEVICE CODE TABLE
5036                  /
5037    5133  6201    XDEVICE,        K67X0           /VT78/SEL = SELECT UNIT A OR UNIT B
5038    5134  6206            K67X1
5039    5135  6401    XK67X2A,        K67X2A                  /XDR TRANSFER DATA REGISTER
5040    5136  6410    XK67X3A, K67X3A                         / STR (SKIP ON TRANSFER REQUEST FLAG)
5041    5137  6415    XK67X4A, K67X4A                         / SER (SKIP ON ERROR FLAG)
5042    5140  6422    XK67X5A, K67X5A                         / SDN (SKIP ON DONE FLAG)
5043    5141  6431    XK67X6A, K67X6                          / CLEAR (AC = 0) / SET (AC = 1) INTERRUPT ENABLE
5044    5142  6435    XK67X7A, K67X7A                         / INIT (INITIALIZE / IMPLIED READ TRACK 0 SECTOR 1)
5045    5143  0000            0                               /
5046                  /
5047                  /
5048                  /
5049                  /
5050                  /
5051                  /
5052                  /ROUTINE TO DETERMINE IF ON APT,
5053                  /
5054    5144  0000    XCHK22, 0
5055    5145  1022            TAD     22
5056    5146  0361            AND     (4000
5057    5147  7640            SZA CLA
5058    5150  5744            JMP I   XCHK22
5059    5151  2344            ISZ     XCHK22
5060    5152  5744            JMP I   XCHK22
5061
5062    5161  4000
5063    5162  6451
5064    5163  3637
5065    5164  3622
5066    5165  0701
5067    5166  0715
5068    5167  0707
5069    5170  3623
5070    5171  6404
5071    5172  5132
5072    5173  6700
5073    5174  0700
5074    5175  4114
5075    5176  5242
5076    5177  0260

        5200            PAGE
5077                  /
5078                  /ROUTINE TO TYPE 8 OCTAL DIGITS,
5079                  /FORMAT TY8OCT; MSB(STARTING ADDRESS OF DOUBLE LOG TO BE PRINTED),
5080                  /
5081    5200  0000    XTY8OCT,        0
5082    5201  1600            TAD I   XTY8OCT                 /GET STARTING ADDRESS
5083    5202  3212            DCA     .+10
```



```
5084    5203  1600            TAD I   XTY8OCT
5085    5204  7001            IAC                             /SECOND ADDRESS
5086    5205  3211            DCA     .+4
5087    5206  7344            CLL CLA CMA RAL                 /=2
5088    5207  3175            DCA     XCNT
5089    5210  4505            TY4OCT
5090    5211  7000            NOP                             /REPLACED WITH POINTER TO BE
5091    5212  7000            NOP                             /PRINTED
5092    5213  2200            ISZ     XTY8OCT                 /UPDATE RETURN
5093    5214  5600            JMP I   XTY8OCT                 /EXIT
5094                  /SUBROUTINE ; TAB
5095                  /ENTRY ; TAB; +N
5096                  /COMMENT ; PRINT " N " SPACES WHERE N IS VIA INDEXED XTAB
5097                  /
5098    5215  5215    XTAB,   .
5099    5216  4500            SETUP
5100    5217  5215            XTAB
5101    5220  3243            DCA XXTAB       /FOR COUNT
5102    5221  7200    XTABL,  CLA
5103    5222  1243            TAD XXTAB
5104    5223  1615            TAD I XTAB      /FOR " N "
5105    5224  3243            DCA XXTAB
5106    5225  1320            TAD CHARLINE    / # OF CHARACTERS ALREADY TYPED ON THIS LINE
5107    5226  1377            TAD (110)       / 72 CHARACTER LINE STANDARD
5108    5227  7041            CIA
5109    5230  1243            TAD XXTAB
5110    5231  7550            SPA SNA
5111    5232  5221            JMP XTABL
5112    5233  7041            CIA
5113    5234  3243            DCA XXTAB
5114    5235  2215            ISZ XTAB
5115    5236  1376            TAD (240)
5116    5237  4506            TYPEIT
5117    5240  2243            ISZ XXTAB
5118    5241  5236            JMP .-3
5119    5242  5775'           JMP THENEXIT
5120    5243  0000    XXTAB,  0
5121                  /
5122                  /SUBROUTINE ; PRINT
5123                  /ENTRY ;
5124                  /COMMENT ; PRINT A " MESSAGE ",  AND A <CR><LF> AT EACH _
5125                  /
5126                  /  CALL SYNTAX FOR PRINT
5127                  /
5128                  /  1,  PRINT; MTEXT
5129                  /
5130    5244  5244    XPRINT, .
5131    5245  4472            CHEK22
5132    5246  5341            JMP     PWTEXT
5133    5247  4507            WAITTY
5134    5250  1644            TAD I XPRINT    / " TEXT"
5135    5251  2244            ISZ     XPRINT
5136    5252  3262            DCA MESSAGE     /ADDRESS
5137    5253  1662    NUWORD, TAD I MESSAGE
5138    5254  4263            OUTPUT          /LEFT BYTE
```

```
5139  5255  1662          TAD I MESSAGE
5140  5256  2262          ISZ MESSAGE
5141  5257  4433          BSW
5142  5260  4263          OUTPUT          /RIGHT BYTE
5143  5261  5253          JMP NUWORD
5144  5262  0000  MESSAGE,0
5145        4263  OUTPUT=JMS .
5146  5263  5263  XOUTPUT,.
5147  5264  0374          AND (=100)      /MASK MS BITS 0-5
5148  5265  7440          SZA
5149  5266  5271          JMP .+3
5150  5267  3162          DCA TTYBUSY
5151  5270  5773'         JMP PIEXIT
5152  5271  1372          TAD (4100)
5153  5272  7450          SNA
5154  5273  5307          JMP NULINE      /
5155  5274  1371          TAD (-4100+2)   /CODE 200
5156  5275  7500          SMA
5157  5276  7001          IAC             /CODE 300
5158  5277  4433          BSW
5159  5300  4506          TYPEIT
5160  5301  5663          JMP I XOUTPUT
5161  5302  1263  NULINE, TAD XOUTPUT
5162  5303  3305          DCA XTYPEIT
5163  5304  5311          JMP XNULINE
5164  5305  5305  XTYPEIT,.
5165  5306  4321          JMS TY1ASC
5166  5307  2320          ISZ CHARLINE
5167  5310  5705          JMP I XTYPEIT
5168  5311  1370  XNULINE,TAD (15)       / <CR>
5169  5312  4321          JMS TY1ASC
5170  5313  1367          TAD (12)        / <LF>
5171  5314  4321          JMS TY1ASC
5172  5315  1366          TAD (-110)
5173  5316  3320          DCA CHARLINE    / 72 CHARACTER LINE (NEGATIVE NOTATION)
5174  5317  5705          JMP I XTYPEIT
5175  5320  7670  CHARLINE,      -110     / # CHARACTERS PER LINE ARE COUNTED HERE
5176                      /
5177        0014  A14=14
5178                      /
5179  5321  5321  TY1ASC, .
5180  5322  6002          IOF
5181  5323  3014          DCA A14
5182  5324  4472          CHEK22
5183  5325  5341          JMP     PNTEXT
5184  5326  4765'         JMS     CKSFLG          /GO CHECK IF ^S IS ACTIVE
5185  5327  1014          TAD A14

5186  5330  6046          TLS
5187  5331  7200          CLA
5188  5332  1162          TAD TTYBUSY
5189  5333  7640          SZA CLA
5190  5334  5773'         JMP PIEXIT
5191  5335  2162          ISZ TTYBUSY
5192  5336  1364          TAD (PI)
5193  5337  3002          DCA IPI
```



```
5194  5340  7410          SKP
5195  5341  2244  PNTEXT, ISZ     XPRINT                  /UPDATE RETURN.
5196  5342  6001          ION
5197  5343  5644          JMP I XPRINT
5198                      /
5199                      /
5200  5344  6042  XICF,   ICF
5201  5345  1014          TAD A14
5202  5346  1363          TAD (-207)
5203  5347  7650          SNA CLA
5204  5350  5705          JMP I XTYPEIT
5205  5351  5721          JMP I TY1ASC
5206                      /
5207                      /
5208                      /
5209  5352  5352  XSPECIALTYPEIT, .
5210  5353  4500          SETUP
5211  5354  5352          XSPECIALTYPEIT
5212  5355  1752          TAD I XSPECIALTYPEIT
5213  5356  2352          ISZ XSPECIALTYPEIT
5214  5357  4506          TYPEIT
5215  5360  5775'         JMP THENEXIT
5216  5361  7571
5217  5362  5417
5218  5363  5400
5219  5364  7670
5220  5365  0012
5221  5366  0015
5222  5367  3702
5223  5370  4100
5224  5371  5510
5225  5372  7700
5226  5373  4114
5227  5374  0240
5228  5375  0110
            5400  PAGE
5229                /ROUTINE TO CHECK IF ^S IS ACTIVE
5230                /
5231  5400  0000  CKSFLG, 0
5232  5401  7001          IAC             /AC=1
5233  5402  6211          CDF 10
5234  5403  1777'         TAD     C8SFLG          /GO GET FLAG (7777 IF SET)
5235  5404  6201          CDF 0
5236  5405  7640          SZA CLA         /IS FLAG SET?
5237  5406  5600          JMP I   CKSFLG          /NO - RETURN
5238  5407  6212          CIF 10                  /CHANGE INSTR FIELD TO CONSOLE PACKAGE
5239  5410  4776'         JMS     C8ENTR          /GO TO CONSOLE PACKAGE
5240  5411  5600          JMP I   CKSFLG          /RETURN
5241                      /
5242                      /
5243                      /
5244                      /
5245  5412  5412  XWAITTY, .
5246  5413  1162          TAD TTYBUSY
5247  5414  7640          SZA CLA
```

```
5248    5415  5213          JMP .+2
5249    5416  5612          JMP I XWAITTY
5250                  /ENTRY TO THIS POINT WAS CAUSED BY A PROGRAM INTERRUPT REQUEST
5251                  /
5252    5417  3315    PI,   DCA XAC
5253    5420  7010          RAR
5254    5421  3316          DCA XLINK       /SAVE (AC) AND (LINK)
5255    5422  6031          KSF
5256    5423  7410          SKP
5257    5424  5775'         JMP XKCC        /IGNORE KEYBOARD IRQ
5258    5425  6041          TSF
5259    5426  5234          JMP PISDN
5260                  /IF THIS TELEPRINTER FLAG IS EXPECTED (TTYBUSY) = 1
5261                  /THEN "JMP XTCF"
5262                  /IF NOT THEN "JMP PIEXIT"
5263                  /
5264    5427  1162          TAD TTYBUSY
5265    5430  7740          SMA SZA CLA
5266    5431  5774'         JMP XTCF
5267    5432  6042          TCF
5268    5433  5310          JMP PIEXIT
5269                  /IF (BUSY) = 1, THEN AN RX01 PI IS ALREADY BEING PROCESSED
5270                  /
5271                  /IF (GOBIT) = 0, THEN THIS DISKETTE IRQ IS UNEXPECTED
5272                  /
5273                  /DISABLE RX01 INTERRUPT
5274                  /
5275                  /READ RX01 STATUS REGISTER
5276                  /
5277    5434  1162    PISDN,  TAD TTYBUSY
5278    5435  1111          TAD BUSY
5279    5436  7640          SZA CLA
5280    5437  5310          JMP PIEXIT
5281    5440  2111          ISZ BUSY
5282                  /REFRESH PROGRAM LOCATION " FORCE "
5283                  /
5284    5441  3325          DCA XXFORCE
5285                  /
5286    5442  4445          SDN
5287    5443  5305          JMP UNKNOWN
5288    5444  1154          TAD GOBIT
5289    5445  7750          SPA SNA CLA
5290    5446  5773'         JMP SDNUNEXPECTED
5291    5447  4446          INIP
5292    5450  4441          XDRIN
5293    5451  0372          AND (377)
5294    5452  3326          DCA ASTATUS

5295                  /IF THIS IS TEST # 30 THEN IGNORE DELETED DATA MARKS (IF ANY)
5296                  /
5297    5453  1171          TAD TEST
5298    5454  1373          TAD (-T30)
5299    5455  7650          SNA CLA
5300    5456  5275          JMP DDIGNORE
5301                  /TECHNICAL NOTE:
5302                  /
```



```
5303                  /THE COMMANDS "FILL BUFFER" (0), AND "EMPTY BUFFER" (2)
5304                  /NEVER SHOULD ATTRACT THE "DELETED DATA" STATUS (100)
5305                  /
5306    5457  1370          TAD (16)                /COMMAND MASK
5307    5460  0312          AND COMMAND             /FB (0), OR EB (2)
5308    5461  7440          SZA                     /SKIP IF FILL BUFFER COMMAND (0)
5309    5462  7112          CLL RTR
5310    5463  7640          SZA CLA                 /SKIP IF EMPTY BUFFER COMMAND (2)
5311    5464  7305          CLL CLA IAC RAL         /  2
5312    5465  0132          AND TESTP
5313    5466  7112          CLL RTR                 /PUT TO LINK
5314    5467  1367          TAD (100)               / 100
5315    5470  0126          AND ASTATUS             / A STATUS D.D. MASK
5316                  /
5317                  /IF (L) = 0 AND (AC) = 0, O.K. - NO D.D. MARK
5318                  /
5319                  /IF (L) = 0 AND (AC) > 0  (=100), UNEXPECTED D.D.
5320                  /
5321                  /IF (L) = 1 AND (AC) = 0, D.D. MARK EXPECTED DIDN'T OCCUR
5322                  /
5323                  /IF (L) = 1 AND (AC) > 0  (=100), O.K. - D.D. MARK OCCURED
5324                  /
5325    5471  7430          SZL
5326    5472  7640          SZA CLA                 / (L) = 1
5327    5473  7440          SZA                     / (L) = 0, OR (L) = 1 AND (AC) > 0
5328    5474  5337          JMP DDERROR             / (L) = 0 AND (AC) > 0  (=100)  , OR (L) = 1 AND (AC) = 0
5329    5475  4444    DDIGNORE, SER
5330    5476  5300          JMP VERIFY              /RX01 OK - RETURN TO INLINE CODE
5331    5477  5771'         JMP RXERROR
5332                  /
5333                  /VERIFY THAT THE CONTENTS OF THE A-STATUS REGISTER = 0
5334                  /
5335                  /WHEN NO RX01 ERROR FLAG EXISTS
5336                  /
5337                  /MASK BITS 4 (DRIVE READY)) AND 5 (DELETED DATA)
5338                  /
5339    5500  1126    VERIFY, TAD ASTATUS
5340    5501  0366          AND (73)
5341    5502  7640          SZA CLA
5342    5503  5765'         JMP NOSER
5343    5504  5321          JMP XRETURN
5344                  /
5345                  /AN UNKNOWN PROGRAM INTERRUPT OCCURED
5346                  /
5347    5505  4473    UNKNOWN, PRINT
5348    5506  7070          MUNKNOWN
5349    5507  3111          DCA BUSY
5350                  /
5351    5510  1316    PIEXIT, TAD XLINK
5352    5511  7104          CLL RAL
5353    5512  1315          TAD XAC
5354    5513  6001          ION
5355    5514  5400          JMP I 0
5356    5515  0000    XAC,  0
5357    5516  0000    XLINK,  0
```

```
5358                    /THE CONTENTS OF RETURN ARE SETUP WITHIN THE SUBROUTINES "LCD-A" AND "LCD-B"
5359                    /TO REPRESENT THE RETURN ADDRESS OF THE INLINE TESTING
5360                    /
5361    5517  0000      RETURN, 0
5362                    /
5363    5520  2317      ERETURN, ISZ RETURN                     /INCREMENT FOR ERROR RETURN ADDRESS
5364                    /
5365                    /ENTRY TO HERE FROM PI SERVICE
5366                    /
5367                    /NO RX01 ERROR FLAG EXISTS
5368                    /
5369    5521  3111      XRETURN, DCA BUSY
5370    5522  4466              TICK                            /TIMING FOR APT IF NEEDED.
5371    5523  6001              ION
5372    5524  5717              JMP I RETURN
5373                    /,,,ENTRY TO THIS POINT MAY HAVE BEEN FROM WITHIN THE SUBROUTINE "COMPARE"
5374                    /WHICH DETECTED A DATA NO STATUS ERROR (DNS) , OR
5375                    /,,,ENTRY IO THIS POINT MAY HAVE BEEN FROM ROUTINES "XHUNGUP" OR "HUNGUP"
5376                    /THEREBY FORCING AN ERROR INFORMATION PRINTOUT
5377                    /
5378    5525  0000      XXFORCE,        0
5379    5526  2111              ISZ BUSY
5380    5527  5771'             JMP RXERROR
5381    5530  7240      XFORCE, STA
5382    5531  1111              TAD BUSY
5383    5532  3111              DCA BUSY
5384    5533  6001              ION
5385    5534  5725              JMP I XXFORCE
5386    5535  7020      DTYPE,  MEDDDIDNOT
5387    5536  7031              MDDDDID
5388                    /A DISKETTE DELETED DATA MALFUNCTION HAS BEEN DETECTED
5389                    /
5390                    / IF (AC) = 0 = EXPECTED D,D, DIDN'T OCCUR
5391                    / IF (AC) = 100 = UNEXPECTED D,D, OCCURED
5392                    /
5393    5537  7640      DDERROR,        SZA CLA                 / 0 OR 1
5394    5540  7001              IAC
5395    5541  1364              TAD (DTYPE)
5396    5542  3137              DCA XXX
5397                    /PROGRAMMING NOTE: "SER" TO CLEAR ACCOMPANYING ERROR FLAG (IF ANY)
5398                    /
5399    5543  4444              SER
5400    5544  7000              NOP
5401    5545  1537              TAD I XXX
5402    5546  5771'             JMP RXERROR
5403    5547  5535
5404    5550  3322

5405    5551  0073
5406    5552  0100
5407    5553  0016
5408    5554  5800
5409    5555  0377
5410    5556  3320
5411    5557  5344
5412    5560  0323
```



```
5413    5561  0200
5414    5562  0404
              5600              PAGE
5415                    /A DISKETTE ERROR HAS BEEN DETECTED
5416                    /
5417                    / (DMTYPE) NOT = 0 IF A D,D, ERROR EXISTS
5418                    / (DMTYPE) = 0 IF NO D,D, ERROR EXISTS
5419                    /
5420    5600  3777'     RXERROR, DCA DMTYPE
5421                    /
5422    5601  1112              TAD COMMAND
5423    5602  3152              DCA ECOMMAND
5424    5603  1776'             TAD XXFORCE
5425    5604  1375              TAD (-XHUNG)
5426    5605  7650              SNA CLA
5427    5606  5246              JMP EERROR
5428    5607  1776'             TAD XXFORCE
5429    5610  1374              TAD (-XCOMPARE
5430    5611  7650              SNA CLA
5431    5612  5246              JMP EERROR
5432    5613  1373      SAVEBSTATUS, TAD (16)
5433    5614  4436              LCD
5434    5615  4471              WAIT
5435    5616  4445              SDN
5436    5617  5215              JMP     .-2
5437    5620  3006              DCA     6                       /WAIT POINTER
5438    5621  4444              SER
5439    5622  7000              NOP
5440    5623  4441              XDRIN
5441    5624  0372              AND (377)
5442    5625  3127              DCA BSTATUS
5443    5626  1771'     SAVECSTATUS, TAD UNIT
5444    5627  1370              TAD (12)
5445    5630  4436              LCD
5446    5631  4471              WAIT
5447    5632  4445              SDN
5448    5633  5231              JMP     .-2
5449    5634  3006              DCA     6                       /WAIT POINTER
5450    5635  4444              SER
5451    5636  7000              NOP
5452    5637  4441              XDRIN
5453    5640  0372              AND (377)
5454    5641  3130              DCA CSTATUS
5455                    /PRINT AN ERROR MESSAGE IF AC SW 4 = 0
5456                    /
5457    5642  4572      LASSW4, LAS
5458    5643  0367              AND (SW4)
5459    5644  7640              SZA CLA
5460    5645  5766'             JMP NOPRINT
5461                    /THE FOLLOWING INFORMATION IS PRINTED FOR ALL ERRORS DETECTED
5462                    /
5463                    /THE ERROR HEADER TEXT IS INHIBITED IF THE ERROR IS NOT THE FIRST ERROR EVER
5464                    /
5465                    /
5466                    /
```

```
                        /      FAT   CMND  XDR   CODE  RST   START     TARGET     XXXX   PASS
                        /
                        /
                        /
5471    5646  1171      EERROR, TAD     TEST                          /GET TEST IN ERROR
5472    5647  4467              AERROR                          /REPORT ERROR TO APT.
5473    5650  2115              ISZ FIRSTERROR
5474    5651  5255              JMP NOHEADER
5475    5652  4473              PRINT
5476    5653  6627              MEHEADER
5477    5654  5271              JMP ONECRLF
                        /IF THIS IS =NOT= A FORCED TYPEOUT, AND IF THERE ARE NO DATA COMPARE
                        /ERRORS (COMPRERROR=0), THEN PRINT ONLY 1-CRLF
                        /BECAUSE
                        /
                        /THIS ERROR MUST BE AN ERROR AT THE END OF THE EMPTY BUFFER DONE FLAG
                        /WHICH WOULD BE ASSOCIATED TO ANY PREVIOUS FORCED TYPEOUT OR DATA ERRORS
                        /
5485    5655  1776'    NOHEADER, TAD XXFORCE
5486    5656  7650              SNA CLA
5487    5657  5267              JMP TWOCRLF
5488    5660  1113              TAD COMPRERROR
5489    5661  7640              SZA CLA
5490    5662  5271              JMP ONECRLF
                        /IF THIS IS A FORCED TYPEOUT FROM " XXINIT " THEN PRINT 1 CRLF
                        /
5493    5663  1776'             TAD XXFORCE
5494    5664  1365              TAD (-XXINIT)
5495    5665  7650              SNA CLA
5496    5666  5271              JMP ONECRLF
5497    5667  4473    TWOCRLF,  PRINT
5498    5670  6602              MCRLF
5499    5671  4473    ONECRLF,  PRINT
5500    5672  6602              MCRLF
5501    5673  4505              TY4OCT
5502    5674  0171              TEST
5503    5675  4504              TAB
5504    5676  0005              5
5505    5677  4764'             JMS INITSWITCH
5506    5700  5305              JMP .+5
                        /IF AN ERROR FROM THE RECAL THEN PRINT [INIT] FOR THE COMAND
                        /
5509    5701  1776'             TAD XXFORCE
5510    5702  1365              TAD (-XXINIT)
5511    5703  7640              SZA CLA
5512    5704  5310              JMP .+4
5513    5705  4473              PRINT

5514    5706  6671              MINIT
5515    5707  5312              JMP TAB12
5516    5710  4505              TY4OCT
5517    5711  0152              ECOMMAND
5518    5712  4504    TAB12,    TAB
5519    5713  0012              12
5520                    /
5521                    /IF THE DEVICE TEST IS HUNG, THEN THE A=, B=, AND C= STATUS IS NOT APPLICABLE
```



```
                        /
5523    5714  1776'             TAD XXFORCE
5524    5715  1375              TAD (-XHUNG)
5525    5716  7650              SNA CLA
5526    5717  5325              JMP DASHALL
                        /IF THIS IS A " FORCED " TYPEOUT THEN THE B= AND C=STATUS REGISTERS
                        /ARE NOT APPLICABLE TO THIS TYPEOUT BECAUSE THEY ARE RESIDUAL FROM THE
                        /PREVIOUS COMMAND WHICH WOULD HAVE HAD A PREVIOUS ERROR TYPE OUT
                        /RELATING TO THE B= AND C=STATUS REGISTERS IF AN ERROR HAD OCCURED
                        /
                        /A DATA NO ERROR STATUS HAS BEEN DETECTED PRIOR TO THE COMPLETION OF
                        /THE EMPTY BUFFER FUNCTION
                        /
5535    5720  1776'             TAD XXFORCE
5536    5721  1374              TAD (-XCOMPARE)
5537    5722  7640              SZA CLA
5538    5723  5340              JMP TYASTATUS
5539    5724  5331              JMP DASHBC
5540    5725  4473    DASHALL,  PRINT
5541    5726  7017              MDASH
5542    5727  4504              TAB
5543    5730  0017              17
5544    5731  4473    DASHBC,   PRINT
5545    5732  7017              MDASH
5546    5733  4504              TAB
5547    5734  0024              24
5548    5735  4473              PRINT
5549    5736  7017              MDASH; JMP TAB31
5550    5737  5763'
5551    5740  4505    TYASTATUS, TY4OCT
5552    5741  0126              ASTATUS
5553    5742  4504              TAB
5554    5743  0017              17
5555    5744  4505              TY4OCT
5556    5745  0127              BSTATUS
5557    5746  4504              TAB
5558    5747  0024              24
5559    5750  5762'             JMP TYCSTATUS
5560    5762  6000
5561    5763  6002
5562    5764  6115
5563    5765  1332
5564    5766  6061
5565    5767  0200
5566    5770  0012
5567    5771  4242
5568    5772  0377
5569    5773  0016
5570    5774  4115
5571    5775  4434
5572    5776  5525
5573    5777  6060
              6000              PAGE
5574    6000  4505    TYCSTATUS, TY4OCT
5575    6001  0130              CSTATUS
```

```
5576  6002  4504    TAB31,  TAB
5577  6003  0031            31
5578  6004  4315            JMS INITSWITCH
5579  6005  5211            JMP .+4
5580                  /IF (SSTART) = 0 THEN PRINT "HOME" BECAUSE A RECAL HAS TAKEN PLACE
5581                  /THEREFORE THE ACTUATOR IS AT TRACK 0 (HOME)
5582                  /
5583  6006  1123            TAD SSTART
5584  6007  7640            SZA CLA
5585  6010  5214            JMP .+4
5586  6011  4473            PRINT
5587  6012  6665            MHOME
5588  6013  5222            JMP TAB43
5589  6014  4505            TY40CT
5590  6015  0125            START
5591  6016  4504            TAB
5592  6017  0036            36
5593  6020  4505            TY40CT
5594  6021  0123            SSTART
5595  6022  4501    TAB43,  TAB
5596  6023  0043            43
5597  6024  4315            JMS INITSWITCH
5598  6025  5232            JMP PHOME
5599                  /IF (FORCE) # THE ADDRESS OF "XXINIT" THEN ALSO PRINT [HOME] FOR THE TARGET
5600                  /
5601  6026  1777*           TAD XXFORCE
5602  6027  1376            TAD (-XXINIT)
5603  6030  7640            SZA CLA
5604  6031  5235            JMP .+4
5605  6032  4473    PHOME,  PRINT
5606  6033  6665            MHOME
5607  6034  5243            JMP .+7
5608  6035  4505            TY40CT
5609  6036  0131            TARGET
5610  6037  4504            TAB
5611  6040  0050            50
5612  6041  4505            TY40CT
5613  6042  0124            STARGET
5614  6043  4504            TAB
5615  6044  0055            55
5616  6045  4505            TY40CT
5617  6046  0132            TESTP
5618  6047  4504            TAB
5619  6050  0002            2
5620  6051  4434            TYBOCT
5621  6052  0163            PASS
5622  6053  0164            PASS+1

5623  6054  1260            TAD DMTYPE
5624  6055  7650            SNA CLA
5625  6056  5261            JMP .+3
5626  6057  4473            PRINT
5627  6060  0000            DMTYPE, 0
5628                  /
5629                  /AC SW 11 TO INHIBIT RINGING OF BELL AT ERROR
5630                  /
```



```
5631  6061  3115    NOPRINT, DCA FIRSTERROR
5632  6062  4572            LAS
5633  6063  0375            AND (SW11)
5634  6064  7640            SZA CLA
5635  6065  5270            JMP .+3
5636  6066  4501            SPECIALTYPE11
5637  6067  0207            BELL
5638                  /IF ENTRY WAS FROM A "JMS FORCE" THEN EXIT BY A "JMP I FORCE"
5639                  /
5640  6070  1777*           TAD XXFORCE
5641  6071  7640            SZA CLA
5642  6072  5774*           JMP XFORCE
5643                  /
5644                  /DEFINITIVE ERROR CODES AND MEANINGS
5645                  /
5646                  /       0       /NO ERROR
5647                  /       10      /DRIVE 0 FAILED TO SEE HOME ON INITIALIZE
5648                  /       20      /DRIVE 1 FAILED TO SEE HOME ON INITIALIZE
5649                  /       30      /FOUND HOME WHEN STEPPING OUT 10 TRACKS FOR INIT
5650                  /       40      /TRIED TO ACCESS A TRACK GREATER THAN 77
5651                  /       50      /HOME WAS FOUND BEFORE DESIRED TRACK WAS REACHED
5652                  /       60      /SELF DIAGNOSTIC ERROR
5653                  /       70      /DESIRED SECTOR COULD NOT BE FOUND AFTER LOOKING AT 52 HEADERS
5654                  /       100     /WRITE PROTECT ERROR
5655                  /       110     /MORE THAN 400US AND NO SEP CLOCK SEEN
5656                  /       120     /A PREAMBLE COULD NOT BE FOUND
5657                  /       130     /PREAMBLE FOUND BUT NO ID MARD FOUND WITHIN ALLOWABLE TIME
5658                  /       140     /HEADER CRC ERROR
5659                  /       150     /THE HEADER TRACK ADDRESS OF A GOOD HEADER DOES NOT COMPARE
5660                  /               /WITH THE DESIRED TRACK
5661                  /       160     /TO MANY TRIES FOR A IDAM
5662                  /       170     /DATA AM NOT FOUNT WITHIN ALLOTED TIME
5663                  /       200     /DATA CRC ERROR
5664                  /       210     /ALL PARITY ERRORS
5665                  /
5666                  /RECAL IF DEFINITIVE ERROR CODE IS A SEEK ERROR
5667                  /
5668                  / (NOT CODES 140, 200, OR 210)
5669                  /
5670  6073  4572    RECALIF, LAS
5671  6074  0373            AND (SW6)
5672  6075  7640            SZA CLA
5673  6076  5311            JMP LASSWO
5674  6077  1127            TAD BSTATUS
5675  6100  1372            TAD (-140)
5676  6101  7450            SNA
5677  6102  5311            JMP LASSWO
5678  6103  1371            TAD (-40)
5679  6104  7450            SNA
5680  6105  5311            JMP LASSWO
5681  6106  1370            TAD (-10)
5682  6107  7640            SZA CLA
5683  6110  4447            INIT
5684  6111  4572    LASSWO, LAS
5685  6112  7700            SMA CLA
```

```
5686  6113  4461          HLT16, HLT      /AC SW 0 = 1 (HALT ON ERROR)
5687  6114  5767'         JMP ERETURN
5688                      /
5689  6115  6115    INITSWITCH, .
5690  6116  1766'         TAD XWAIT
5691  6117  1365          TAD (-@ONSECOND)
5692  6120  7640          SZA CLA
5693  6121  2315          ISZ INITSWITCH
5694  6122  5715          JMP I INITSWITCH
5695                      /
5696                      /GENERATES TIMING FOR APT IF NEEDED.
5697                      /
5698  6123  0000    XOK,  0
5699  6124  7000          NOP
5700  6125  2323          ISZ   XOK                       /SKIP.
5701  6126  5723          JMP I XOK
5702                      /
5703                      /VT78/ROUTINE TO SELECT WHICH FLOPPY UNITS TO TEST
5704                      /
5705  6127  0000    SELUNT, 0
5706  6130  1114          TAD   DTESTP          /GET TEST PARAMETERS
5707  6131  0373          AND   (40             /TEST BIT 6
5708  6132  7640          SZA CLA               /DO ONE OR BOTH UNITS?
5709  6133  7001          IAC                   /BOTH
5710  6134  7040          CMA                   /EITHER A OR B
5711  6135  3351          DCA   CHECKU          /7777=EITHER , 7776=BOTH
5712  6136  1351          TAD   CHECKU
5713  6137  7001          IAC
5714  6140  7640          SZA CLA
5715  6141  5346          JMP   SETUNT          /BOTH UNITS SELECTED- DO A THEN B
5716  6142  1114          TAD   DTESTP
5717  6143  0364          AND   (1000           /TEST BIT 2
5718  6144  7640          SZA CLA               /A OR B?
5719  6145  7001          IAC                   /B ONLY
5720  6146  3135    SETUNT, DCA   UNITCK        /UNIT A=0  UNIT B=1
5721  6147  4451          CKUNIT                /SET UP FOR UNIT A OR UNIT B
5722  6150  5727          JMP I SELUNT          /RETURN
5723  6151  0000    CHECKU, 0
5724  6164  1000
5725  6165  1340
5726  6166  1722
5727  6167  5520
5728  6170  7770
5729  6171  7740
5730  6172  7640
5731  6173  0040
5732  6174  5530

5733  6175  0001
5734  6176  1332
5735  6177  5525
            6200          PAGE
5736                      /VT78/ SELECT IOT TO SELECT EITHER UNIT A OR UNIT B
5737                      /IF AC11 (0) SELECT UNITA,  IF AC11 (1) SELECT UNIT B
5738                      /
5739  6200  0000    XSEL,   0
```



```
5740  6201  6750    K67X0,  6750
5741  6202  5600          JMP I XSEL
5742                      /THE CONTENTS OF THE AC AT ENTRY ARE THE CONTENTS OF PROGRAM LOCATION "TCOMMAND"
5743                      /
5744  6203  6203    XLCD,   .
5745  6204  3112          DCA COMMAND
5746  6205  1112          TAD COMMAND
5747  6206  6751    K67X1,  6751
5748  6207  5603          JMP I XLCD
5749                      /LOAD THE COMMAND FOR: FILL BUFFER, AND EMPTY BUFFER
5750                      /WITH THE RX01 INTERRUPT ENABLED
5751                      /
5752                      /FORM: (AC) IS  COMMAND; LCDA; NORMAL RETURN; ERROR RETURN
5753                      /
5754  6210  6210    XLCDA,  .
5755  6211  1777'         TAD UNIT
5756  6212  3112          DCA COMMAND
5757                      /THE CONTENTS OF THE AC WILL = 100 IF 8 BIT MODE
5758                      /
5759  6213  7307          CLL CLA IAC RTL
5760  6214  0132          AND TESTP
5761  6215  7640          SZA CLA
5762  6216  1376          TAD (100)
5763  6217  1112          TAD COMMAND
5764  6220  3112          DCA COMMAND
5765  6221  1112          TAD COMMAND
5766  6222  4436          LCD
5767  6223  1210          TAD XLCDA
5768  6224  3775'         DCA RETURN
5769  6225  2210          ISZ XLCDA
5770  6226  2210          ISZ XLCDA
5771  6227  1374          TAD (PI)
5772  6230  3002          DCA IPI
5773  6231  7201          CLA IAC
5774  6232  4446          INTP
5775  6233  6001          ION
5776  6234  5610          JMP I XLCDA
5777                      /
5778                      /LOAD THE COMMAND AND THE TRACK AND SECTOR ADDRESSES AND GO WITH INTERRUPT ENABLE I
5779                      /
5780                      /FORM: (AC) IS COMMAND; LCDB; NORMAL RETURN; ERROR
5781                      /
5782  6235  6235    XLCDB,  .
5783  6236  1777'         TAD UNIT                        / 0 OR 20
5784  6237  3112          DCA COMMAND                     /TEMPORARY STORAGE
5785                      /
5786                      /WHEN THE CONTENTS OF " GOSIT " ARE = 0 ; NO PROGRAM IRQ IS EXPECTED FROM THE DISK
5787                      /
5788  6240  7307          CLL CLA IAC RTL                 / 4
5789  6241  0132          AND TESTP                       /TESTP FOR 8/12 BIT MODE SELECTION
5790  6242  7640          SZA CLA
5791  6243  1376          TAD (100)                       / 100 FOR 8 BIT MODE SELECTION
5792  6244  1112          TAD COMMAND                     / 4, 14 OR 6
5793  6245  3112          DCA COMMAND
5794  6246  1112    LCDBL,  TAD COMMAND
```

```
 5795    6247  4436            LCD
 5796                    /
 5797                    /LOAD THE TRACK AND SECTOR ADDRESSES FOR THE COMMANDS!
 5798                    /
 5799                    /WRITE, OR WRITE DELETED DATA, OR READ SECTOR
 5800                    /
 5801    6250  1373            TAD (LCDBRETURN)
 5802    6251  3775'           DCA RETURN
 5803    6252  1372            TAD (NOP)
 5804    6253  3315            DCA XLCDBRETURN
 5805    6254  7201            CLA IAC
 5806    6255  4446            INTR                    /ENABLE RX01 INTERRUPT
 5807    6256  4443            STR
 5808    6257  5256            JMP .-1                 /SKIP ON TRANSFER REQUEST FLAG
 5809    6260  1124            TAD STARGET
 5810    6261  4442            XDROUT          / SECTOR
 5811    6262  4443            STR
 5812    6263  5262            JMP .-1                 /SKIP ON TRANSFER REQUEST FLAG
 5813    6264  1131            TAD TARGET
 5814    6265  4442            XDROUT          / TRACK
 5815    6266  1374            TAD (PI)
 5816    6267  3002            DCA IPI
 5817                    /
 5818                    /WAIT FOR A PROGRAM INTERRUPT REQUEST
 5819                    /
 5820                    / ! BUT WHILE WAITING, DISPLAY IN THE MQ THE CODED INFORMATION
 5821                    /AS INDICATED BY ACCUMULATOR SWITCHES 9, 10, AND 11 AT RUN-TIME
 5822                    /
 5823                    /               0 = TARGET TRACK AND SECTOR
 5824                    /               1 = TEST PARAMETERS (SELECTED FROM SA 200)
 5825                    /               2 = " A " STATUS
 5826                    /               3 = " COMMAND " WORD TO RX01
 5827                    /
 5828    6270  6001    XPI,    ION
 5829    6271  1371            TAD (-40)
 5830    6272  3116            DCA HANGER
 5831    6273  4572            LAS
 5832    6274  0370            AND (SW10+SW11)
 5833    6275  1367            TAD (TAD I DISPLAY)
 5834    6276  3277            DCA .+1
 5835    6277  1710            TAD I DISPLAY
 5836    6300  7421            MQL
 5837    6301  2153            ISZ H1
 5838    6302  5273            JMP XPI+3
 5839    6303  2116            ISZ HANGER
 5840    6304  5273            JMP XPI+3
 5841    6305  7200            CLA

 5842    6306  1366            TAD (XPI)
 5843    6307  5765'           JMP HUNGUP
 5844    6310  0151    DISPLAY, XTARGET
 5845    6311  0132            TESTP
 5846    6312  0126            ASTATUS
 5847    6313  0112            COMMAND
 5848                    /RETURN TO HERE IF ANY ERROR OCCURS (OR IF "DONE" FLAG OCCURS)
 5849                    /
```



```
 5850                    /IF A PARITY ERROR OCCURS THEN RETRY TO LOAD THE COMMAND
 5851                    /
 5852                    /IF NOT A PARITY ERROR THEN THIS MUST BE THAT "DONE" FLAG I MENTIONED
 5853                    /
 5854    6314  5326    LCDBRETURN, JMP OTHERRORS               / "JMP OTHERRORS" IF RETURN IS OK
 5855    6315  7000    XLCDBRETURN, NOP
 5856    6316  7305            CLL CLA IAC RAL
 5857    6317  0126            AND ASTATUS
 5858    6320  7650            SNA CLA
 5859    6321  5326            JMP OTHERRORS
 5860                    /PARITY ERROR = RETRY
 5861                    /
 5862    6322  2146            ISZ PRETRY
 5863    6323  5246            JMP LCDBL
 5864    6324  4502            SCOPE
 5865    6325  5453            EXIT
 5866                    /
 5867                    /THESE ARE ALL OTHER ERRORS WHICH MAY OCCUR
 5868                    /
 5869    6326  1364    OTHERRORS, TAD (JMP OTHERRORS)
 5870    6327  3315            DCA XLCDBRETURN
 5871                    /
 5872    6330  1373            TAD (LCDBRETURN)
 5873    6331  7041            CIA
 5874    6332  1775'           TAD RETURN
 5875    6333  1235            TAD XLCDB
 5876    6334  3235            DCA XLCDB
 5877    6335  5635            JMP I XLCDB
 5878                    /TRANSFER DATA REGISTER (FROM) THE RX01 CONTROL
 5879                    /
 5880    6364  5326
 5881    6365  3341
 5882    6366  6270
 5883    6367  1710
 5884    6370  0003
 5885    6371  7740
 5886    6372  7000
 5887    6373  6314
 5888    6374  5417
 5889    6375  5517
 5890    6376  0100
 5891    6377  4242
               6400            PAGE
 5892    6400  6400    XXDRIN, .
 5893    6401  6752    K67X2A, 6752
 5894    6402  5600            JMP I XXDRIN
 5895                    /TRANSFER DATA REGISTER (TO) THE RX01 CONTROL
 5896                    /
 5897    6403  6403    XXDROUT, .
 5898    6404  6752    K67X2B, 6752
 5899    6405  7200            CLA
 5900    6406  5603            JMP I XXDROUT
 5901                    /SKIP ON TRANSFER REQUEST
 5902                    /
 5903    6407  6407    XSTR,   .
```

```
 5904    6410  6753    K67X3A, 6753
 5905    6411  5607            JMP I   XSTR
 5906    6412  2207            ISZ     XSTR
 5907    6413  5607            JMP I   XSTR
 5908                    /
 5909    6414  6414    XSER,   .
 5910    6415  6754    K67X4A, 6754
 5911    6416  5614            JMP I   XSER
 5912    6417  2214            ISZ     XSER
 5913    6420  5614            JMP I   XSER
 5914                    /SKIP ON RX01 DONE FLAG
 5915                    /
 5916    6421  6421    XSDN,   .
 5917    6422  6755    K67X5A, 6755
 5918    6423  5621            JMP I   XSDN
 5919    6424  2221            ISZ     XSDN
 5920    6425  5621            JMP I   XSDN
 5921                    /ENABLE / DISABLE RX01 INTERRUPT ENABLE
 5922                    /
 5923                    /   AC = 1 AT ENTRY TO ENABLE INTERRUPT
 5924                    /
 5925                    /FORM: (AC = 0, OR 1); INTR
 5926                    /
 5927                    / (GOBIT) = 0, NO RX01 PI IS EXPECTED
 5928                    /
 5929                    / (GOBIT) = 1, AN RX01 PI IS EXPECTED
 5930                    /
 5931    6426  6426    XINTR,  .
 5932    6427  3154            DCA GOBIT
 5933    6430  1154            TAD GOBIT
 5934    6431  6756    K67X6, 6756
 5935    6432  7200            CLA
 5936    6433  5626            JMP I XINTR
 5937                    /INITIALIZE (POWER CLEAR) THE RX01 SUBSYSTEM
 5938                    /
 5939    6434  6434    XINIT,  .
 5940    6435  6757    K67X7A, 6757
 5941                    /THE LABLE " SDNSECOND " MUST RESIDE HERE BECAUSE OF REFERENCES WITHIN " ERROR "
 5942                    /
 5943    6436  4451            CKUNIT                  /GO CHECK IF ON UNIT A(RXA) OR UNIT B
 5944    6437  4471            WAIT
 5945    6440  4445    SDNSECOND, SDN
 5946    6441  5237            JMP     .-2
 5947    6442  3006            DCA     6                       /WAIT POINTER
 5948    6443  4444            SER
 5949    6444  5246            JMP XXINIT
 5950                    /AN ERROR HAS OCCURED FROM THE "INIT"

 5951                    /
 5952                    / (HOME) WAS THE TARGET
 5953                    /
 5954    6445  4576            FORCE
 5955    6446  3123    XXINIT, DCA BSTART
 5956    6447  5634            JMP I XINIT
 5957                    /
 5958                    /
```



```
 5959                    /
 5960    6450  6450    XINITB, .
 5961    6451  6757    K67X7B, 6757
 5962    6452  5650            JMP I XINITB
 5963    6453  3737    REMOVE, TEXT    "__REMOVE DIAGNOSTIC DISKETTE"
         6454  2205
         6455  1517
         6456  2605
         6457  4004
         6460  1101
         6461  0716
         6462  1723
         6463  2411
         6464  0340
         6465  0411
         6466  2313
         6467  0524
         6470  2405
         6471  0000
 5964    6472  3737    MIDENTIFICATION,TEXT    "__MAINDEC-08-DIRXA-D"
         6473  1501
         6474  1316
         6475  0405
         6476  0355
         6477  6070
         6500  5504
         6501  1122
         6502  3001
         6503  5504
         6504  0000
 5965    6505  3737    MSELECT,        TEXT "__SELECT PARAMETERS (INCLUDING DEVICE CODE)"
         6506  2305
         6507  1405
         6510  0324
         6511  4020
         6512  0122
         6513  0115
         6514  0524
         6515  0522
         6516  2340
         6517  5011
         6520  1603
         6521  1425
         6522  0411
         6523  1607
         6524  4004
         6525  0526
         6526  1103
         6527  0540
         6530  0317
         6531  0405
         6532  5100
 5966    6533  3737    MDTESTP,        TEXT  "__TEST PARAMETERS: "
         6534  2405
         6535  2324
```

```
                6436  4020
                6437  0122
                6440  0115
                6441  0524
                6442  0522
                6443  2372
                6444  4000
 5967           6445  3737    MXEHEADER,      TEXT "__ERR  FAT  FAST      EAC  GOOD PASS"
                6446  0522
                6447  2240
                6450  4006
                6451  0124
                6452  4040
                6453  0601
                6454  2324
                6455  4040
                6456  4040
                6457  4040
                6460  0501
                6461  0340
                6462  4007
                6463  1717
                6464  0440
                6465  2001
                6466  2323
                6467  0000
 5968           6470  3727    MX2HEADER,      TEXT "_WORD GOOD BAD"
                6471  1722
                6472  0440
                6473  0717
                6474  1704
                6475  4002
                6476  0104
                6477  0000
 5969           6500  5440    MCOMMA,         TEXT ", "
                6501  0000
 5970           6502  3700    MCRLF,          TEXT "_"
 5971           6503  3705    MEOT,           TEXT "_END OF TEST "
                6504  1604
                6505  4017
                6506  0640
                6507  2405
                6510  2324
                6511  4000
 5972           6512  3704    MHUNGPC,        TEXT "_DEVICE TEST HUNG AT PC "
                6513  0526
                6514  1103

                6515  0540
                6516  2405
                6517  2324
                6520  4010
                6521  2516
                6522  0740
                6523  0174
                6524  4020
```



```
                6525  0340
                6526  0000
 5973           6527  3737    MEHEADER,       TEXT "__FAT  CMND XOR  CODE  RSTA  START     TARGET    TEST PASS"
                6530  0601
                6531  2440
                6532  4003
                6533  1516
                6534  0440
                6535  3004
                6536  2240
                6537  4003
                6540  1704
                6541  0540
                6542  4022
                6543  2324
                6544  0140
                6545  4023
                6546  2401
                6547  2224
                6550  4040
                6551  4040
                6552  4024
                6553  0122
                6554  0705
                6555  2440
                6556  4040
                6557  4024
                6560  0523
                6561  2440
                6562  2001
                6563  2323
                6564  0000
 5974           6565  3310    MHOME,          TEXT "[HOME]"
                6566  1715
                6567  0535
                6570  0000
 5975           6571  1116    MINIT,          TEXT "INIT"
                6572  1124
                6573  0000
 5976           6574  3737    MOD,            TEXT "__OD = "
                6575  1704
                6576  4075
                6577  4000
 5977           6700  4011    MID,            TEXT " ID = "
                6701  0440
                6702  7540
                6703  0000
 5978           6704  4006    MFIRST,         TEXT " FIRST = "
                6705  1122
                6706  2324
                6707  4075
                6710  4000
 5979           6711  4014    MLAST,          TEXT " LAST = "
                6712  0123
                6713  2440
```

```
                6714  7540
                6715  0000
5980            6716  3727    MWRITE,         TEXT "_WRITE-"
                6717  2211
                6720  2405
                6721  5500
5981            6722  3722    MREAD,          TEXT "_READ-"
                6723  0501
                6724  0455
                6725  0000
5982            6726  1617    MDNSERROR,      TEXT "NO CRC BUT"
                6727  4003
                6730  2203
                6731  4002
                6732  2524
                6733  0000
5983            6734  0322    MDWESERROR,     TEXT "CRC AND"
                6735  0340
                6736  0116
                6737  0400
5984            6740  0322    MSNDERROR,      TEXT "CRC BUT NO DATA ERROR"
                6741  0340
                6742  0225
                6743  2440
                6744  1617
                6745  4004
                6746  0124
                6747  0140
                6750  0522
                6751  2217
                6752  2200
5985            6753  4004    MDATAERROR,     TEXT " DATA ERROR_"
                6754  0124
                6755  0140
                6756  0522
                6757  2217
                6760  2237
                6761  0000
5986            6762  2717    MWORD,          TEXT "WORD"
                6763  2204
                6764  0000
5987            6765  0231    MBYTE,          TEXT "BYTE"
                6766  2405
                6767  0000
5988            6770  4007    MGB,            TEXT " GOOD BAD"
                6771  1717
                6772  0440

                6773  0201
                6774  0400
5989            6775  3723    MSUMCHECK,      TEXT "_SUM-CHECK IS "
                6776  2515
                6777  5503
                7000  1005
                7001  0313
                7002  4011
```



```
                7003  2340
                7004  0000
5990            7005  1713    MOK,            TEXT "OK"
                7006  0000
5991            7007  3724    MDESUMMARY,     TEXT "_TOTAL BAD = "
                7010  1724
                7011  0114
                7012  4002
                7013  0104
                7014  4075
                7015  4000
5992            7016  7200    MCOLON,         TEXT ":"
5993            7017  5500    MDASH,          TEXT "-"
5994            7020  3715    MEDDDIDNOT,     TEXT "_MISSING DD MARK"
                7021  1123
                7022  2311
                7023  1607
                7024  4004
                7025  0440
                7026  1501
                7027  2213
                7030  0000
5995            7031  3725    MDDDDID,        TEXT "_UNEXPECTED DD MARK"
                7032  1605
                7033  3020
                7034  0503
                7035  2405
                7036  0440
                7037  0404
                7040  4015
                7041  0122
                7042  1300
5996            7043  3725    MSDNUNEXPECTED, TEXT "_UNEXPECTED RX01 IRQ"
                7044  1605
                7045  3020
                7046  0503
                7047  2405
                7050  0440
                7051  2230
                7052  6061
                7053  4011
                7054  2221
                7055  0000
5997            7056  3715    MNOSER,         TEXT "_MISSING ERROR FLAG"
                7057  1123
                7060  2311
                7061  1607
                7062  4005
                7063  2222
                7064  1722
                7065  4006
                7066  1401
                7067  0700
5998            7070  3737    MUNKNOWN,       TEXT "__UNKNOWN IRQ"
                7071  2516
```

```
          7072  1316
          7073  1727
          7074  1640
          7075  1122
          7076  2100
  5999    7077  3704    NDEV,   TEXT "-DEVICE CODE TO BE USED  "
          7100  0526
          7101  1103
          7102  0540
          7103  0317
          7104  0405
          7105  4024
          7106  1740
          7107  0705
          7110  4025
          7111  2305
          7112  0440
          7113  4000
  6000                  /THE FOLLOWING IS THE WRITE BUFFER ALLOCATED STORAGE
  6001                  /
  6002          7114    *BUFFER*.
  6003          7314    RBUFFER=*BUFFER+200
  6004          7514            *RBUFFER+200
  6005
  6006
  6007
  6008
  6009          0200                    *200                    /AUTO START BINARY
  6010
  6011                  $$$
```



```
0000  11100000  11110000  11101111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11000001  11111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11110000  00000000  00000000  00011111  11111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11100000  00000000  01111111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11100000  01111111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11000000  00111111  11111111  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111110  00011111  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  00000011  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111110  00111111  11111111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111100  00001111  11111111

3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  11111111  11111111  11111111  11111110  00111111  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11110000  00001111  11111111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00111111

3600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3700  11111111  11111111  11111111  11111111  11111111  11111111  11110011  11111111
```

```
4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11111111  11111111  11111111  11111111  11100000  00000000  11111111

4200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4300  11111111  11111111  11111111  11111111  11111111  11111111  11000000  00001111

4400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4500  11111111  11111111  11111111  11111111  11111111  11111111  11000000  00111111

4600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10111111


5000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5100  11111111  11111111  11111111  11111111  11111111  11100000  01111111  11111111

5200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5300  11111111  11111111  11111111  11111111  11111111  11111111  10011111  11111111

5400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5500  11111111  11111111  11111111  11111111  11111110  00000000  00001111  11111111

5600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5700  11111111  11111111  11111111  11111111  11111111  10000000  00111111  11111111


6000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6100  11111111  11111111  11111111  11111111  11111111  11000000  00001111  11111111

6200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6300  11111111  11111111  11111111  11111100  00000000  00000000  00001111  11111111

6400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

6600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111


7000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
7100  11111111  11110000  00000000  00000000  00000000  00000000  00000000  00000000

7200
7300


7400
7500

7600
7700
```



```
A10       0010        C8K217    0413        CKUNIT    4451        E2        0617
A11       0011        C8K215    0412        CLKCNT    4151        E20       0655
A12       0012        C8K240    0045        CNOTFI    3720        E21       0660
A13       0013        C8K260    0046        CNTVAL    0663        E210      4557
A14       0014        C8K275    0047        COMMAN    0112        E211      2320
ACL       7701        C8K277    0050        COMP      2746        E212      2332
ACTIVE    0741        C8K303    0414        COMPAR    3601        E22       0663
AERROR    4467        C8K307    0415        COMPRE    0113        E23       0666
ALT12     1400        C8K322    0051        COUNT     4152        E24       0671
ALT12L    1403        C8K323    0052        CRCERR    3456        E240      2030
ANDRET    4113        C8K336    0416        CSTATU    0130        E241      2070
APTR      4470        C8K7      0044        DASHAL    5725        E242      2101
APOUND    0233        C8K77     0407        DASHBC    5731        E245      2033
ASTATU    0126        C8LOPA    0231        DATAER    3643        E25       0674
BELL      0207        C8M10     0042        DCAC11    0732        E26       0704
BITMOD    3763        C8M260    0043        DCADDA    2531        E27       0712
BLANK     0170        C8M3      0037        DCATAR    4332        E270      2135
BSTATU    0127        C8M4      0040        DDERRO    5537        E271      2140
BSW       4433        C8M40     0410        DDIGNO    5475        E272      2151
BSWAC     2623        C8M5      0041        DIGITS    5063        E28       0720
BSWLIN    2624        C8MODE    0035        DISPLA    6310        E2PRE     0415
BSWBAL    2622        C8OCTA    4427        DNTYPE    6060        E3        0623
BUSY      0111        C8PASS    4426        DNS       3510        E30       0744
C8T600    0417        C8PFLD    0543        DNSLOG    0143        E3PRE     0425
C8BLD     0400        C8PRNT    4426        DOA       2536        E40       1044
C8BY1     0640        C8PSW     0216        DOB       2537        E41       1060
C8CDF     0033        C8RET2    0526        DOCNT     0660        E42       1021
C8CDI     0032        C8RET3    4131        DONE      4454        E4PRE     0450
C8CHAR    0031        C8RET4    3517        DOPACK    0611        E50       1105
C8CK22    1060        C8RTN     0402        DOSET     0662        E51       1114
C8CKP     1057        C8SFLG    0404        DRVZRO    2743        E52       1123
C8CKSW    4425        C8SRLP    0252        DTESTP    0114        E53       1111
C8CNTL    0420        C8STAR    0200        DTYPE     5535        E54       1120
C8CNTR    0036        C8STRT    0401        DNESEN    3700        E55       1127
C8CRLF    0523        C8SWR     0034        DWS       3510        E56       1102
C8CTLC    0465        C8TEMP    0030        DWSLOG    0142        E60       1142
C8CTLG    0457        C8TEST    0337        E0        0607        E61       1154
C8CTLQ    0455        C8TMP1    1056        E0PRE     0412        E62       1157
C8CTLS    0437        C8TTY     0514        E1        0613        E63       1162
C8DN1     1005        C8TYP     0502        E10       0647        E70       1212
C8DN4     1043        C8WAIT    0444        E100      1226        E7000     2405
C8ECHO    0475        CAF       6007        E11       0632        E7001     2416
C8ENTR    0200        CCNT      5066        E110      1252        E7002     2432
C8ERR     0316        CHARLI    5320        E120      1311        E7003     2446
C8EXI1    0531        CHECKC    4424        E121      1315        E7004     2457
C8EXT2    0541        CHECKU    6151        E122      1321        E7005     2511
C8EXTB    0707        CHEK22    4472        E123      1326        E7006     2473
C8FLG     0403        CHGMSK    2750        E124      1276        EA120     1412
C8GET1    0704        CHNDEV    5067        E130      1513        EA121     1416
C8K100    0411        CKCOUT    0642        E131      1526        EA122     1440
C8K177    0405        CKSFLG    5400        E140      1661        EA123     1451
C8K200    0406        CKSWIT    4572        E1PRE     0445        EAC       0167
```

```
        EB      1622            INMODE  0351            MDASM   7017            NUREAD  3521
        EBCOMP  1630            INSUMC  3762            MDATAE  6753            NUWORD  5253
        EBLOOP  1639            INTR    4446            MDESUM  7007            NXTUNT  0523
        EBOK    1663            IOF     6002            MDEV    7077            OD      0027
        ECOMMA  0152            ION     6001            MDNSER  6726            OK      4465
        ERROR   5645            IPI     0002            MDTEST  6833            ONESTAR 4643
        EMPTY   3617            IRDWR   2000            MDWESE  6734            ONECRL  5671
        EMPTYE  4011            ISZCUM  3757            MEDOD1  7020            OTHERR  6326
        EMPTYL  4000            ISZDIG  5042            MEHEAD  6627            OUTPUT  4263
        EMPTYD  4022            JUPDIG  5032            MEQT    6603            PACKDO  4531
        ENDCOM  3636            JUPICO  3600            MESPAS  0664            PASCNT  0661
        EPCSCD  1364            JUPWHI  3263            MESSAG  5262            PASS    0163
        ERETUR  5520            K0007   0174            MFIRST  6704            PAT2    3125
        ERRNK   4452            K6500   4150            MGB     6770            PAT3    3126
        ERRORS  1365            K6520   4481            MHOME   6665            PAT4    3127
        EXIT    5453            K67X0   6201            MHUNGP  6612            PAT5    3130
        EXITCK  4534            K67X1   6206            MID     6700            PAT6    3140
        FB      1472            K67X2A  6401            MIDENT  6472            PATSUM  0155
        FB1388  4541            K67X2B  6404            MINIT   6671            PATTER  3115
        FBER    1477            K67X2C  3623            MLAST   6711            PCLF    6662
        FILL    3221            K67X3A  6410            MNOSER  7056            PCSCUP  1366
        FILLER  3226            K67X3B  0707            MOD     6674            PHOME   6032
        FILLOK  3237            K67X4A  6415            MOK     7005            PI      5417
        FIRST   0031            K67X4B  0715            MORETE  0452            PIEXIT  5510
        FIRSTE  0115            K67X5A  6422            MQA     7501            PISDN   5434
        FIRSTT  0453            K67X5B  0701            MQL     7421            PNTEXT  5341
        FORCE   4576            K67X6   6431            MREAD   6722            PNTID   1531
        GENTES  3131            K67X6B  3622            MSB     0161            POLL    4237
        GETAPA  4455            K67X6C  3637            MSDNUM  7043            PRETES  0400
        GETASP  4456            K67X7A  6435            MSELEC  6505            PRETRY  0146
        GETNTR  4457            K67X7B  6451            MSNDER  6740            PRINT   4473
        GETNXT  4460            K7000   0173            MSUMCH  6775            PSIB    6665
        GUBTT   0154            K7377   1561            MUDDDI  7031            PSKE    6663
        GNOM    0166            K7777   0117            MUNKNO  7070            PSKF    6661
        GTF     6004            KRETRY  0121            MWORD   6762            PSTB    6664
        HI      0153            LAS     4572            MWRITE  6716            PTSTUR  1033
        HALT    4461            LASSWQ  6111            MX      0522            Q46ID   4505
        HANGER  0116            LASSWR  5642            MX2MEA  6570            Q46UD   4513
        HLT     4461            LAST    0032            MXEMEA  6545            Q4DD    4454
        HLTI6   6113            LCD     4436            NEXT    4210            Q6DD    4500
        HLTIA   4101            LCDA    4437            NEXTAC  0746            QUIET   3335
        HLTT    3507            LCDB    4440            NEXTSE  4625            R1      4726
        HLTWUP  1562            LCDBL   6246            NOHEAD  5655            R1RETR  0140
        HUNGPC  3353            LCDBRE  6314            NONORE  0465            R2      4727
        HUNGUP  3341            LOCKUP  4464            NOPRIN  6061            R2RETR  0141
        ID      0330            LSB     0160            NORX01  0431            RANGEN  4712
        IF      4710            MASK    0136            NOSCDP  1340            RBUFFE  7314

        INIT    4447            MASK1   2747            NOSER   3322            RDC     0120
        INITB   4450            MBYTE   6765            NOSET   0652            RDORWR  3552
        INITSE  4462            MCOLON  7016            NOTCLR  4537            READ    4474
        INITSW  6115            MCOMMA  6800            NOTEST  5453            READCU  4475
        INITTR  4463            MCRLF   6602            NULINE  5302            READER  3441
```



```
        READL   3422            SW0     4000            TADLAS  3273            XAC     5515
        READOK  3531            SW1     2000            TARGET  0131            XAERRD  4346
        READRE  3425            SW10    0002            TEST    0171            XANDRE  4120
        REBRGI  0511            SW11    0001            TEST1   2524            XAPTR   1545
        RECALI  6073            SW2     1000            TEST2   2522            XASTAT  3761
        REFILL  3214            SW3     0400            TEST3   2516            XBSW    2600
        REMOVE  6453            SW4     0200            TEST4   2514            XC      0300
        REREAD  3432            SW5     0100            TEST5   2526            XCSCKA  0350
        RESPEK  3434            SW6     0040            TESTP   0132            XCSENT  4425
        RESPQU  4274            SW7     0020            TESTS   4730            XCSOCT  1035
        RETURN  5517            SW8     0010            TESTX   2532            XCSPAS  0600
        REWRIT  3206            SW9     0004            TESTXL  2535            XCSPNT  1000
        RWORGE  3547            T0      0600            THEL    3003            XCSSW   0673
        ROX     3543            T1      0626            THENEX  4114            XCHECK  4516
        RSI     4476            T10     1215            THETES  3000            XCHK22  5144
        RSTART  0200            T11     1233            TICK    4466            XCKSWI  3400
        RSTR    4477            T12     1260            TRACKS  0147            XCKUNT  2335
        RXERRD  5600            T13     1456            TSTUNT  2732            XCNT    0175
        RXHERE  0165            T14     1603            TTRACK  0150            XCOMPA  3663
        SAVRBS  5613            T15     1601            TTYBUS  0162            XCRCER  3505
        SAVRCS  5626            T16     1455            TWOCRL  5667            XD      0400
        SCODE   4502            T17     1602            TX      2303            XDEVIC  5133
        SCUBIN  1357            T2      0652            TYIASC  5321            XDONE   4243
        SDN     4445            T20     1600            TYIOCT  4505            XDRIN   4441
        SDRELC  6440            T20STR  2323            TYSOCT  4434            XDROUT  4442
        SDNONE  3320            T20XDR  2310            TYASTA  5740            XEMPTY  4072
        SECTOR  0122            T21     1675            TYCSTA  6000            XERROR  2625
        SEL     4435            T22     1674            TYPEIT  4506            XFLENG  3715
        SELINT  6127            T23     2265            UNIT    4242            XFORCE  5530
        SEQ     4276            T24     1714            UNITCK  0135            XGETAP  3035
        SEQA00  4306            T25     1716            UNITS   4235            XGETAS  4607
        SEQA01  4317            T26     1720            UNITX   4241            XGETAT  4261
        SEQA10  4400            T27     2107            UNIT2   4240            XGETUN  4200
        SEQ100  4444            T3      0723            UNKNOW  5505            XHALT   4121
        SEQ111  4330            T30     2200            UREAD   3524            XHUNG   3344
        SEQ7    4422            T31     2202            VERIFY  5500            XI      1100
        SEQ6    4465            T32     2223            VT78CK  1165            XINIT   6434
        SER     4444            T33     2241            WAIT    4471            XINITB  6450
        SETINT  6146            T34     2300            WAITTY  4507            XINITS  4600
        SETUP   4500            T35     2276            WBUFFE  7114            XINITT  4250
        SHIFT   5015            T36     2277            WHICHR  3267            XINTR   6426
        SHIFTS  5065            T37     2275            WNOTOK  3264            XK67X2  5135
        SND     3510            T4      1000            WORDX   0156            XK67X3  5136
        SNDLOG  0144            T48     1004            WORDY   0157            XK67X4  5137
        SPECIA  4501            T5      1071            WRESEE  3212            XK67X5  5140
        SRETRY  0145            T6      1132            WRITE   4510            XK67X6  5141
        SSTART  0123            T7      1200            WRITEL  3204            XK67X7  5142
        STARGE  0124            T70K    1213            WRITEO  3257            XKCC    0323
        START   0125            TAB     4504            WRITER  3246            XLCD    6203
        STOBNT  1034            TAB12   5712            WUNITS  4236            XLCDA   6210
        STR     4443            TAB31   6002            XA10    0133            XLCDB   6235
        SUBRCD  4503            TAB43   6022            XA11    0134            XLCDBR  6315
```

```
XLINK   5516            XXX     0137
XLOCKU  2545            XYTHEL  3026
XMESSA  3334            ZERO    5057
XMX     0657
XNOPR1  2715
XNULIN  5311
XOCTAL  5062
XOK     6123
XOUTPU  5263
XPAT6   3145
XPATTE  3103
XPI     6270
XPRINT  5244
XPDC    3420
XREAD   3416
XREADC  3412
XRETUR  5521
XRST    2441
XPSTB   2400
XSCOPE  1333
XSDN    6421
XSEL    6200
XSEQ    4333
XSEQ2   4413
XSEQ3   4433
XSLD    6414
XSETUP  4103
XSHIFT  5020
XSPECI  5352
XSS-OP  1344
XSTARG  4711
XSTR    6407
XTAB    5215
XTABL   5221
XTARGE  0151
XTCP    5344
XTHEL   3016
XTICK   4133
XTYIOC  5000
XTYWUC  5200
XTYPEI  5305
XWAIT   1722
XWAITT  5412
XWRITE  3200
XXOMP   5064
XXORIN  6400
XXOWOU  6403

XXFORC  5525
XXGETA  4610
XXIMIT  6446
XXTAB   5243
XXTWEO  3024
```



```
ERRORS DETECTED: 0

LINKS GENERATED: 179

RUN-TIME:  10 SECONDS

3K CORE USED
```

A10 884# 1166 1179 1744 1760 2404 2409 2437 2533 2536 2540 3526 3564 3620
3467 3675 5007 5014 5016
A11 885# 2537 2542 3533 3536 3565 3621 5009 5010
A12 886# 3518 3519
A13 887# 1434 1486
A14 5177# 5181 5185 5201
ACL 31#
ACTIVE 1746 1750 1753# 1755 1759
AEPROR 1409# 3339 3777 5472
ALT12 2146 2300#
ALT12L 2303# 2307
ANDRET 4148 4357#
APT8 1411# 2154
AROUND 1181 1193# 2485
ASTATU 1475# 3880 4055 5294 5315 5339 5552 5846 5857
BELL 3405# 3412 5637
BITMOD 4066 4094 4243#
BLANK 1138# 1399 1400 1805 1806 1811 1813 1833 1837 1867 2335 2336 2357 2423
2460 2722 2723 2768 2769 2780 2817 2823 3034 3081 3095 3228 3233 3236
3307
BSTATU 1476# 5442 5556 5674
BSW 78# 941# 5141 5198
BSWAC 3316 3321 3328 3331 3334#
BSWLIN 3318 3329 3335#
BSWREL 3320 3326 3333#
BUSY 1062# 1168 3340 3419 3787 5278 5281 5349 5369 5379 5382 5383
C87600 232# 292
C8BLD 153 186 190 217# 343 355
C8B11 190 392 411 417# 431
C8CDF 83#
C8CD1 82#
C8CHAN 81# 114 294 339 350 1295
C8CK22 384 569# 576 577
C8CKP 548 557 561#
C8CKSW 45#
C8CNTL 116 238#
C8CNTR 86# 129 140 152 191
C8CRDF 121 197 276 329# 334 338 349 395 407
C8CTLC 162 240 267 285#
C8CTLG 165 243 276#
C8CTLU 246 271#
C8CTLS 249 256#
C8D01 503# 524
C8D06 549# 558
C8ECHO 252 294#
C8ENIP 103# 112 413 416 911 5239
C8EPR 177 180 194#
C8EXT1 168 338#
C8EXT2 171 349#
C8&XTR 460 464#
C8FLG 154 182 220# 341 353
C8GET1 459 461#
C8K100 226#

SEQ 0154

C8K177 222# 323
C8K200 223# 324
C8K212 228# 332
C8K215 227# 330
C8K240 93# 155
C8K260 94# 137
C8K275 95# 126
C8K277 96# 195 296
C8K303 229# 289
C8K307 230# 279
C8K322 97# 124
C8K323 98# 122
C8K336 231# 277 286
C8K7 92# 136 184
C8K77 223#
C8LOPA 132# 141
C8M10 90# 178
C8M260 91# 175
C8M3 87# 166 169
C8M4 86# 128 163
C8M40 225#
C8M5 89# 151
C8MODE 85# 110 250 258
C8OCTA 49#
C8PASS 43# 912# 1470
C8PFLD 260 272 298 351#
C8PRNT 47#
C8PSA 121# 198 281
C8RET2 1471 1502#
C8RET3 4174 4379#
C8RET4 2487 3760 3762#
C8RIN 113 219# 354 357
C8SFLG 221# 251 257 263 271 285 306 5234
C8SRLP 157# 192
C8&TAR 1161#
C8STRT 218# 342 345
C8SWR 84# 108 130 134 135 139
C8TEMP 80# 158 159 172 174 183 185 189
C8TEST 1286#
C8TMP1 546 549 553 556 560#
C8TTY 157 264 319# 325
C8TYP 123 125 127 138 156 173 196 278 280 287 289 295 297 305#
315 331 333 513 522 552
C8WAIT 262# 270 308
CAF 32# 291 1346 2453
CCNT 4969 4974 4979 4990#
CHARLI 5106 5166 5173 5175#
CHECKC 407# 1186 1266 1469 3757 4372
CHECKU 1452 5711 5712 5723#
CHEK22 1015# 2476 4385 4574 5131 5182
CKGM8K 3427 3446# 3451
CKNDEV 1192 4995# 4999 5034
CKCOUT 391 404 406 419# 433 434

SEQ 0155

```
CKSFLG    5184    5231#   5237    5240
CKSWIT     945    1144#
CKUNIT     977#   1347    2160    2190    2302    5721    5943
CLKCNT    1490    4388    4391    4399#
CNOTFI    4141    4195#
CNTVAL     424     439#
COMMAN    1063#   2397    2422    2432    2526    2558    2585    2717    2720    5307    5422    5745    5746    5756
          5763    5764    5765    5784    5792    5793    5794    5847
COMP      1401'   3433    3437    3440#
COMPAR    3919    3994    4028    4048#
COMPRE    1064#   2552    3920    3995    4139    4200    4228    4264    4306    4324    4330    4337    5488
COUNT     2640    4390    4400#
CRCERR    3982    3916#
CSTATU    1077#   5454    5575
DASHAL    5526    5540#
DASHBC    5539    5544#
DATAER    4098    4116#
DCACII    1746#   1761
DCADOA    3961    3269#
DCATAR    4524    4527    4535    4538    4543#
DDERRO    5328    5393#
DDIGNO    5300    5329#
DIGITS    4948    4970    4987#
DISPLA    5833    5835    5844#
DMTYPE    5420    5623    5627#
DMS       3899    3945#   3999
DMSLOG    1101#   3863    4118    4145
DOA       3269    3275#
DOB       3259    3267    3276#
DOCNT      426     429     436#
DONE       985#   3038    3279    3487    3497
DOPACK     385     391#
DOSET      420     427     432     438#
DRVZRO    3431    3436#
DTESTP    1065#   1191    1193    1199    1207    1483    4996    5706    5716
DTYPE     5386#   5395
DWESER    4170    4174#
DWS       3900#   3924
DWSLOG    1100#   3862    4120
E0         717    1558#
E0PRE      707    1350#
E1         718    1571#
E10        724    1628#
E100       774    2074    2081#
E11       1614#
E110       778    2122    2129#
E120       783    2193#
E121       784    2197#
E122       785    2201#

E123       786    2206#
E124       782    2155    2178#
E130       817    2426#
E131       818    2440#
```



```
E140       835    2582#
E1PRE      710    1409#
E2         719    1575#
E20       1656#
E21        728    1659#
E210       839    4746#
E211       847    3093#
E212       848    3103#
E22        729    1662#
E23        730    1674#
E24        731    1677#
E240       856    2741#
E241       858    2789#
E242       861    2800#
E245       857    2747#
E25        732    1680#
E26        733    1694#
E27        734    1700#
E270       865    2838#
E271       867    2844#
E272       868    2855#
E28        735    1706#
E2PRE      708    1353#
E3         720    1579#
E30        739    1756#
E3PRE      709    1368#   2689    2691
E40        746    1847#
E41        749    1850    1865#
E42        743    1825#
E4PRE      714    1426#
E50        754    1910#
E51        756    1917#
E52        758    1924#
E53        755    1914#
E54        757    1921#
E55        759    1928#
E56        753    1907#
E60        763    1945    1953#
E61        764    1986#
E62        765    1989#
E63        766    1992#
E70        770    2048#
E7000      798    3149#
E7001      799    3158#
E7002      800    3160    3170#
E7003      807    3191#
E7004      808    3200#
E7005      810    3240#
E7006      809    3202    3221#
EA120      787    2305    2310#
EA121      788    2314#
EA122      789    2345#
EA123      792    2363#
```

EAC 1137# 1402 1403 1408 1620 1621 1627 1821 1823 1831 1843 1846 1858 1859
1864 2338 2339 2344 2362 2725 2727 2735 2740 2771 2781 2782 2787 2799 SEQ 0158
2820 2822 2832 2837 2854 3086 3087 3092 3154 3157 3162 3169 3172 3174
3175 3196 3199 3213 3220 3231 3239 3337 3338 3391
EB 2538# 2543
EBCOMP 2539 2548#
EBLOOP 2554# 2591
EBOK 2569 2584#
ECOMMA 1111# 5423 5517
EERROR 5427 5431 5471#
EMPTY 4072# 4073 4103
EMPTYE 4061 4271#
EMPTYL 4060 4255# 4265 4277
EMPTYO 4260 4292#
ENDCOM 4099# 4229
EPCSCO 2559 2269# 3343
ERETUR 3783 5363# 5687
ERROR 081# 1350 1353 1368 1409 1426 1558 1571 1575 1579 1614 1628 1656 1659
1662 1674 1677 1680 1694 1700 1706 1756 1825 1847 1865 1907 1910 1914
1917 1921 1924 1928 1953 1986 1989 1992 2048 2081 2132 2181 2193 2197
2201 2206 2310 2314 2345 2363 2426 2440 2582 2741 2747 2788 2800 2838
2844 2855 3093 3103 3149 3158 3170 3191 3200 3221 3240 4746
ERRORS 1342 1433 2229 2238 2247 2270# 3345 3514
EXIT 083# 1004 1581 1630 1708 1739 1762 1871 1930 1994 2050 2083 2134 2372
2108 2598 2631 2634 2809 2864 3040 3281 3499 5865
EXITCK 4718# 4722
FB 2407# 2411
FB12BB 2615 2970 2989 4732# 4748
FBEB 2407 2414# 2417 2418 2420 2442 2538
FILL 3673# 3674 3677
FILLEP 3670 3680#
FILLOK 3669 3692#
FIRST 036# 1247 1251 1252 1259 2913 2946 3005 3743 4761 4835
FIRSTE 1066# 1341 1461 1488 3354 3413 5473 5631
FIRSTT 1433# 1491
FORCE 1149# 3775 3789 4147 4312 5954
GENTES 3617 3586#
GETAPA 087# 2402 2531 3271 3466
GETASE 089# 3647 3855
GETATP 091# 3274 3493
GETUNI 093# 2719 2917 3009 3035 3273 3468 3492
GOBIT 1113# 1169 2047 2140 2161 2179 5288 5932 5933
GOOD 1136# 1397 1405 1536 1608 1626 1689 1690 1696 1702 1742 1748 1822 1840
1841 1861 1891 2203 2333 2341 2356 2361 2434 2435 2554 2565 2739 2766
2784 2798 2807 2836 2853 2861 3089 3168 3219 3230 3234 3395 4733 4737
5013 5015
GTF 304
HI 1112# 2684 5837
HALT 34 945 996#
HANGEP 1067# 1176 2686 3798 5830 5839
HLT 34# 389 995# 1189 1482 3288 3416 3761 3782 3944 4344 4424 4582 5686
HLT16 5680#
HLT6 4344#

HLT7 3944#
HLTNOP 2483 2487#
HUNGPC 3788 3796 3800# SEQ 0159
HUNGUP 2493 3787# 5843
ID 035# 1231 1235 1236 1244 4464 4534 4552 4606 4627 4694
IF 4775 4778 4784 4786 4799 4872#
INIT 073# 2971 5683
INITB 075# 2159 2189 2301
INITSE 098# 3646 3852
INITSW 5505 5578 5597 5689# 5693 5694
INITTH 1000# 3272 3467 3491
INMODE 109 1280 1290 1293 1296#
INSUMC 3822 3997 4059 4091 4092 4242# 4296 4299 4309 4315 4322 4339
INTP 071# 1949 1984 2039 2073 2125 2129 2158 2178 5291 5774 5806
IOF 044# 4392 4577 4713 5180
ION 043# 1502 2037 2076 3419 4102 4717 5196 5354 5371 5384 5775 5828
IPI 072 078# 1946 2036 2075 2123 2156 5193 5772 5816
IRDAR 2649 2651 2653 2717#
ISZCOM 4136 4202 4228#
ISZDIG 4062 4970# 4980
JMPDIG 4062# 4981
JMPICO 4028# 4341 4345
JMPTHI 3650 3720#
K0007 1187# 4960
K6500 4395 4398#
K6520 4681 4584#
K67X0 5037 5740#
K67X1 5038 5747#
K67X2A 5039 5893#
K67X2B 5019 5898#
K67X2C 4082# 5021
K67X3A 5040 5904#
K67X3B 1697# 5023
K67X4A 5041 5910#
K67X4B 1703# 5025
K67X5A 1741 5042 5917#
K67X5B 1691# 5027
K67X6 5043 5934#
K67X6B 4078# 5029
K67X6C 4100# 5031
K67X7A 5044 5940#
K67X7B 5033 5961#
K7000 1146# 2482 4964
K7777 2480 2486#
K7777 1068# 4537 4947
KRETRY 1070# 3660 3662 3692 3853 3856 3866 3868 3946 4057
LAS 045# 1190 1479 2264 3285 3291 3348 3400 3407 3414 3512 3683 3706 3771
3780 3886 3929 3942 3953 4132 4195 4274 4300 4342 5457 5632 5670 5684
5831
LASSAO 5673 5677 5680 5684#
LASSAV 5657#
LAST 037# 3736 3740 3741 3749 4759 4823
LCD 055# 1554 1610 1618 1654 1740 1803 1814 1903 1904 1948 1983 2034 2078

	2117	2118	2169	2170	2188	2395	2524	2724	2819	3083	3146	3188	4735	5433
	5445	5766	5795											
LCDA	957#	3668	4259											
LCDB	959#	3697	3871											
LCDBL	5794#	5863												
LCDBRE	5801	5854#	5872											
LOCKUP	1602#	1432	2222	2643										
LSB	1130#	3371	3373	3377	3379	4207	4209	4221	4223					
MASK	1083#	2337	2779	3436	3448									
MASK1	3432	3441#	3450											
MBYTE	4186	5987#												
MCOLON	5492#													
MCOMMA	5969#													
MCRLF	3359	4204	5498	5500	5970#									
MDASH	5541	5545	5549	5993#										
MDATAL	4177	5985#												
MDESUM	4128	5991#												
MDEV	5999#													
MDNSER	4172	5982#												
MDTEST	1205	5986#												
MDWESE	4175	5983#												
MEDDDI	5386	5994#												
MEHEAD	5476	5973#												
MEOI	5971#													
MESFAS	398	440#												
MESSAG	5136	5137	5139	5140	5144#									
MFIRST	1257	5978#												
MGB	4191	5988#												
MHOME	5587	5606	5974#											
MHONGF	3794	5972#												
MID	1242	5977#												
MIDENT	2456	5964#												
MINIT	5514	5975#												
MLAST	3747	5979#												
MNOSER	3769	5997#												
MOD	1226	5976#												
MOK	4119	5990#												
MORETE	984	1432#												
MQA	36#	946#												
MQL	33#	947#	5836											
MREAD	3939	4158	5981#											
MSB	1131#													
MSDNUN	3767	5996#												
MSELEC	2460	5965#												
MSNDER	3041	5984#												
MSUMCH	4114	5989#												
MUDDDI	5387	5995#												
MUNKNO	5348	5998#												
MWORD	4180	4189	5986#											
MWRITE	3936	4155	5980#											
MX	435	1455	1465	1474	1493#									
MX2HEA	5968#													
MXEHEA	3357	5967#												

NEXT	4419#	4429												
NEXTAC	1752	1754	1758#											
NEXTSE	4797#	4827	4837											
NOHEAD	5474	5485#												
NOMORE	1455#	2224	2645	4926										
NOPRIN	5460	5631#												
NORXOI	1363	1397#	3435	3438										
NOSCOP	2238#	2267												
NOSER	3769#	5342												
NOSET	423	429#												
NOTCLR	4709	4721#												
NOTEST	1604#	1535	1890	1970	2102	2949	2953	2956	3799	4511				
NULINE	5154	5161#												
NUREAD	3731	3962#	3970											
NUWORD	5137#	5143												
NXTUNI	1453	1495#												
OD	834#	1216	1220	1222	1228	1238	2909	2950	3001	3480	4466	4523	4563	4604
	4625	4629	4684	4696										
OK	1005#	1349	1352	1425	1570	1574	1578	1913	1920	1927	2192	2196	2200	2309
	2313	2425	3102	3148	3190	4745								
OKSTAR	4805	4811#												
ONECRL	5477	5490	5496	5499#										
OTHERR	5851	5859	5869#	5869										
OUTPUT	5138	5142	5145#											
PACKDO	4711	4715#												
PASCNT	393	399	437#	1173										
PASS	1133#	1170	1171	1475	1477	1503	1505	3399	5621	5622				
PAT2	3572	3581#												
PAT3	3573	3582#												
PAT4	3574	3583#												
PAT5	3575	3584#												
PAT6	3576	3609#												
PATSUM	1119#	3527	3560	3562	4862									
PATTER	3547	3549	3570#											
PCLF	26#													
PCSCOP	1344	1437	2240	2268	2271#	3383								
PHOME	5598	5605#												
PI	878	5192	5252#	5771	5815									
PIEXIT	1292	5151	5190	5268	5280	5351#								
PISON	5259	5277#												
PNTEXT	5132	5183	5195#											
PNTID	1184	2452#	2463											
POLL	4417	4419	4421	4422	4443#									
PRETES	1340#	1497	3752											
PRETRY	1104#	3663	3680	3687	3693	3869	4058	4271	4278	5862				
PRINT	1017#	1204	1225	1241	1256	1473	2455	2457	2459	3356	3358	3746	3778	3793
	3935	3938	3940	4154	4157	4171	4174	4176	4188	4190	4203	4313	4318	4327
	5347	5475	5497	5499	5513	5540	5544	5548	5586	5605	5626			
PSIE	29#													
PSKE	27#													
PSKF	25#													
PSTB	28#													
PTSTOR	501	503	514	523	525#									

Q461D 4655 4678 4690#
Q460D 4660 4686 4696#
Q40D 4639 4652#
Q60D 4669 4682#
QUIET 3774 3780#
R1 4879 4892 4885 4889#
R1RETR 1098# 3011 3854 3962 3971
R2 4880 4883 4886 4887 4890#
R2RETR 1099# 3857 3948 3963
RANGEN 3451 3570 4541 4877# 4888
RBUFFR 2532 2534 2550 6003# 6004
RDC 1069# 2906 2998 3644 3851 3916 3991 4134 4776
RDDRWR 3933 3969 4013# 4020 4021 4152
READ 1019# 3256 3264 3276
READCO 1021# 3258 3262 3484 3494
READER 3879#
READL 3853# 4005
READOR 3872 3990#
READRE 3818 3732 3856#
REBEGI 1430 1483# 1508
RECAL1 5670#
REFILD 3666# 3686
REMOVE 2458 5963#
REREAD 3966# 3956
RESEEK 3868# 3889
RESEQU 4495# 4556 4565
RETURN 5361# 5383 5372 5768 5802 5874
REWRIT 2925 3649# 3972
RLOGGE 3885 3891 3964 3974 4004#
ROK 3893 4000#
RST 1023# 2370 3037
RSTART 918 915#
RST0 1025# 2358 2793 2848
RXERRO 5131 5380 5402 5420#
RXHERE 1135# 1198 1361 1533 1888 1968 2100 2144
SAVEBS 5432#
SAVECS 5443#
SCOPE 1031# 1343 1580 1629 1707 1747 1757 1812 1866 1929 1993 2049 2082 2133
2207 2300 2441 2583 2801 2856 3104 3241 4747 5864
SCOPIN 2931 2264#
SDN 969# 1365 1424 1577 1655 1673 1909 1912 1985 2119 2191 2306 2419 2732
2928 3099 3115 3151 3193 4742 5286 5435 5447 5945
SDNSEC 5691 5945#
SDNUNI 3767# 5290
SECTOR 1071# 2922 3015 3722 4004 4762
SEL 953# 3114
SELUNI 1203 1456 5705# 5722
SEQ 4491 4493 4508#
SEQ000 3479 3482 4496 4508 4519# 4610
SEQ001 4609 4539# 4609
SEQ010 4510 4591#
SEQ100 4512 4636#
SEQ111 4515 4541#

SEQ3 4511 4614#
SEQ6 4514 4666#
SER 967# 1351 1573 1661 1679 1923 1926 1991 2199 2312 2424 2746 2843 3101
3117 3155 3197 4744 5329 5399 5438 5450 5948
SETUNI 5715 5720#
SETUP 1027# 4939 5099 5210
SHIFI 4019# 4971
SHIFTS 4050 4956 4989#
SND 3999# 3900
SNDLOG 1102# 3861 3925 3990
SPECIA 1029# 3411 5636
SRETRY 1103# 3661 3703 3710 3729 3867 3883 3890 3947
SSTART 1072# 1177 3719 4003 5583 5594 5955
STAPGF 1073# 2914 3006 3718 4002 4813 4825 4833 4844 4858 5613 5809
START 1074# 3475 3717 4001 4486 5590
STOPNI 926#
STR 965# 1348 1569 1658 1676 1916 1919 1988 2195 2303 2308 2415 2729 2825
3096 3119 3147 3189 3673 4072 4739 5807 5811
SUBSCO 1033# 1559 1572 1576 1615 1657 1660 1663 1675 1678 1681 1695 1701 1826
1852 1908 1911 1915 1918 1922 1925 1954 1987 1990 2182 2194 2198 2202
2311 2315 2346 2364 2427 2742 2748 2789 2839 2845 3094 3150 3161 3171
3192 3203 3222
SW0 1048# 1201
SW1 1049# 1201 3684 3707 3887 3954 4275
SW10 1058# 5832
SW11 1059# 3408 5633 5832
SW2 1050# 3292 3513
SW3 1051# 1480
SW4 1052# 3349 3772 3930 4133 4301 5458
SW5 1053# 4196
SW6 1054# 5671
SW7 1055# 3286
SW8 1056#
SW9 1057#
T0 1139 1533# 4894
T1 1608# 4895
T10 2072# 4902
T11 2100# 4903
T12 2184# 4904
T13 2195# 3586 4905
T14 2523# 4906
T15 2511# 4907
T16 2391# 3587 4908
T17 2419# 2931 2975 3028 4909
T2 1653# 4896
T20 2509# 4910
T20STR 3084 3096# 3100
T20XDR 3085# 3098
T21 2615# 4911
T22 2609# 2629 4912
T23 3033# 3039 4913
T24 2648# 2776 4914
T25 2650# 2759 4915

```
T26       2652#  2763   4916
T27       2816#  4917
T3        1739#  4897
T30       2984#  4918   5298
T31       2900#  4919
T32       2946#  4920
T33       2988#  4921
T34       3073#  3589   4922
T35       3065#  3589   4923
T36       3069#  3590   4924
T37       3061#  3591   4925
T4        1902#  4898
T4B       1806#  1870
T5        1888#  4899
T6        1944#  4900
T7        2032#  4901
T70K      2035   2049#
TAB       1035#  3374   3380   3384   3388   3392   3396   3403   3750   4210   4224   4331   5503   5518
          5542   5546   5553   5557   5576   5591   5595   5610   5614   5618
TAB12     5515   5518#
TAB31     5550   5576#
TAB43     5588   5595#
TADLAS    1260   3736#
TARGET    1078#  1178   2910   3002   3474   3481   3716   4000   4485   4525   4536   4543   4554   4561
          4623   4630   4682   4697   4840   4851   5609   5813
TEST      1439#  1345   1435   1436   1439   2628   2758   2762   2775   3294   3376   3522   5297   5471
          5502
TEST1     3964#
TEST2     3962#
TEST3     3958#
TEST4     2885   3956#
TEST5     3966#
TESTP     1079#  2401   2530   2884   2904   2991   3074   3529   3544   3610   3695   4051   4184   4215
          4293   4488   4782   5312   5617   5760   5789   5845
TESTS     1485   4894#
TESTX     3271#  3280
TESTXL    3274#  3278
THEL      3472#  3486
THENEX    4361#  4982   5119   5215
THETES    3075   3466#  3488
TICK      1007#  5370
TRACKS    1108#  3277   3477   3485   3495   4467   4468   4520   4531   4592   4595   4598   4599   4607
          4615   4619   4620   4637   4645   4647   4653   4658   4667   4672   4674   4675   4691
TSTUNT    1379   3426#
TTRACK    1109#  3476   4470   4519   4530   4591   4601   4614   4622   4636   4657   4686   4677   4690
TTYBUS    1132#  1167   1276   1281   4363   4938   5150   5188   5191   5246   5264   5277
TWOCRL    5487   5497#
TX        2816   2808   2862   3080#  3105
TX1ASC    5165   5169   5171   5179#  5205
TY4OCT    1037#  1206   1227   1243   1258   3372   3378   3382   3386   3390   3394   3748   3795   4208
          4922   4226   4321   4329   5089   5501   5516   5551   5555   5574   5589   5593   5608   5612
          5816
TY8OCT     951#  3398   5620
```



```
TYASTA    5538   5551#
TYCSTA    5559   5574#
TYPEIT    1039#  4968   4984   5116   5159   5214
UNIT      2721   3036   4439   4451#  5443   5755   5783
UNITCK    1092#  1496   2462   3113   5720
UNITS     1902   2316   2632   2954   3428   4415   4441#
UNITX     4431   4432   4450#
UNITZ     4412   4427   4436   4449#  4853
UNKNOW    5287   5347#
UREAD     3950   3969#
VERIFY    5330   5339#
VT78CK    1049   1885   1965   1997#  2001   2002   2097   3159   3201   3426   4785
WAIT      1013#  1364   5434   5446   5944
WAITTY    1041#  1944   2032   2072   2114   4347   4357   4368   4712   5133
WBUFFE    2403   2405   2548   2578   2589   3525   3538   3666   4205   4256   4852   4859   4864   4864
          6002#  6003
WHICHR    3649   3720   3729#
WNOTOR    3705   3711   3722#
WORDX     1128#  3539   3541   4865   4866   4867
WORDY     1129#  3542   4869
WRESEE    3662#  3709
WRITE     1043#  3021   3268   3275   3483   4018
WRITEL    3647#  3723
WRITED    3698   3736#
WRITER    3703#
WUNITS    1138   2718   2900   2988   4413   4416   4425   4434   4435   4442#  4456
XA10      1080#  2406   2438   2535   2549   2554   2561   2579   2588   4083   4090   4096   4227
XA11      1081#  2551   2555   2567   2581   4093   4101   4206   4218   4257
XAC       5252   5353   5356#
XAERRO    1010   4572#  4576
XANDRE    4351   4361   4362   4364   4365#
XAPTR     1012   2474#  2478
XASTAT    4056   4116   4168   4236#
XBSW       942   3315#  3332
XC        2635#  2644
XC8CHA    1274   1295#
XC8ENT     910#  1187   1287   3758   4373
XC8OCT      50    400    543#   559
XC8PAS      44    382#   412    418    913
XC8PNT      48    397    405    498#   500    502    506    517
XC8SW       46    386    408    452#   464
XCHECK     908   4704#  4710   4718   4720   4721
XCHK22    1016   5054#  5058   5059   5060
XCKSWI    1145   3818#  3822   3827
XCKUNT     978   3111#  3121
XCNT      1148#  4972   4978   5088
XCOMPA    4152#  5429   5536
XCRCEP    3918   3932   3942#
XD        1451#  1454
XDEVIC    5008   5037#
XDONE      986   4455#  4458   4459
XDRIN      961#  1398   1619   1830   1857   1905   2204   2334   2541   2767   3085   3153   3195   5292
          5440   5452
```

```
XDROUT     963#   2410    2728    2824    3676    4738    5810    5814
XEMPTY    4273    4279    4303    4311    4326    4333    4337#
XERROR     982    3336#   3341    3370    3420
XFLENG    4181    4187    4189#
XFORCE    5301#   5642
XGETAB     988    3502#   3516    3521    3567    3623
XGETAS     990    4770#   4870
XGETAT     992    3473    4484#   4566
XGETUN     994    4411#   4440
XHALT      997    4367#   4377    4380
XHUNG     3793#   5425    5524
XI        2918#   2223
XINIT      974    5939#   5956
XINITB     976    5960#   5962
XINITS     999    4750#   4764
XINITT    1001    4463#   4471
XINTR      972    5931#   5936
XK67X2    5018    5020    5039#
XK67X3    5022    5040#
XK67X4    5024    5041#
XK67X5    5026    5042#
XK67X6    5028    5030    5043#
XK67X7    5032    5044#
XKCC      1770#   5257
XLCD       956    5744#   5748
XLCDA      958    5754#   5767    5769    5770    5776
XLCDB      960    5782#   5875    5876    5877
XLCDBH    5804    5855#   5870
XLINK     5954    5351    5357#
XLOCKU    1003    3284#   3295
XMESSA    3770    3776    3779#
XMX        402     435#
XNOPRI    3351    3407#
XNULIN    5163    5168#
XOCTAL    4943    4944    4945    4951    4958    4959    4986#
XOK       1006    5698#   5700    5701
XOUTPU    5146#   5150    5161
XPAT6     3614#   3622
XPATTE    3650    3551#   3566
XPI       5828#   5838    5840    5842
XPRINT    1018    4349    5130#   5134    5135    5195    5197
XROC      3833    3851#
XREAD     1020    3017    3832    3849#   4006    4015
XREADC    1022    3830#   3831
XRETUR    5743    5369#
XRST      1024    3186#   3242
XRSTR     1026    3144#   3176
XSCOPE    1032    2227#   2239    2241    2246    2249    2257    2261
XSDN       970    5916#   5918    5919    5920

XSEL       954    5739#   5741
XSEG      4952#   4631    4698
XSEQ2     4594    4604#
XSEQ3     4617    4623#
```



```
XSEP       968    5909#   5911    5912    5913
XSETUP    1028    4346#   4350    4352    4353
XSHIFT    4952#   4957
XSPECI    1030    5209#   5211    5212    5213
XSSCOP    1034    2244#   2245
XSTARG    4763    4797    4801    4802    4809    4810    4812    4873#
XSTP       966    5903#   5905    5906    5907
XTAB      1036    5098#   5100    5104    5114
XTABL     5102#   5111
XTAPGE    1110#   4845    5844
XTCF      1794    5200#   5266
XTHEL     3472    3483#
XTICK     1008    2642    4384#   4387    4389    4396
XTY40C    1038    4936#   4940    4941    4942    4973
XTYBUC     952    5081#   5082    5084    5092    5093
XTYPEI    1040    5162    5164#   5167    5174    5204
XWAIT     1014    2678#   2685    2687    2688    2692    5690
XWAITT    1042    5245#   5249
XWRITE    1044    2924    3642#   3682    3688    3724
XXDMP     4363    4966    4988#
XXDRIN     967    5892#   5894
XXDROU     964    5897#   5900
XXFORC    1150    5284    5378#   5385    5424    5428    5485    5493    5509    5523    5535    5601    5640
XXGETA    4774#
XXINIT    5494    5510    5602    5949    5955#
XXTAB     5101    5103    5105    5109    5113    5117    5120#
XXTHEI    3491#   3498
XXX       1096#   3552    3561    3563    3617    3618    3619    4016    4017    4573    4578    5396    5401
XYTHEI    3493#   3496
ZERO      4976    4983#
.L0357    1794    1301#
.L0360    1982    1302#
.L0361     171     201#   1272    1303#
.L0362     168     202#   1271    1304#
.L0363     165     203#   1260    1305#
.L0364     162     204#   1253    1306#
.L0365     160     205#   1234    1307#
.L0366     157     206#   1221    1308#
.L0367     154     182     207#   1219    1309#
.L0370     153     186     190     208#   1203    1310#
.L0371     123     125     127     138     156     173     196     209#   1202    1311#
.L0372     121     197     210#   1201    1312#
.L0373     116     211#   1195    1197    1313#
.L0374     113     212#   1192    1314#
.L0375     109     213#   1184    1315#
.L0376     107     214#   1178    1316#
.L0377     104     215#   1173    1317#
.L0563    1490    1510#
.L0564    1485    1511#
.L0565    1484    1512#
.L0566    1464    1513#
.L0567    1456    1514#
.L0570    1454    1480    1515#
```

```
,L0571    344     356     361#   1452    1516#
,L0572    281     362#    1438   1517#
,L0573    268     363#    1401   1518#
,L0574    247     364#    1382   1519#
,L0575    244     365#    1379   1520#
,L0576    241     366#    1344   1437    1521#
,L0577    238     265     367#   1342    1433    1522#
,L0767    462     467#
,L0770    455     468#
,L0771    416     469#    1758   1763#
,L0772    413     470#    1745   1764#
,L0773    400     471#    1743   1765#
,L0774    197     405     472#   1741    1766#
,L0775    195     407     473#   1622    1767#
,L0776    187     409     474#   1609    1617    1625    1653    1768#
,L0777    184     475#    1553   1769#
,L1165    574     584#
,L1166    572     585#
,L1167    551     586#
,L1170    550     587#
,L1171    547     588#
,L1172    521     589#
,L1173    520     590#    1999   2004#
,L1174    518     591#    1948   2005#
,L1175    515     592#    1839   2006#
,L1176    513     522     552    593#    1832    1868    2007#
,L1177    504     594#    1802   1902    1947    2008#
,L1367    2224    2272#
,L1370    2223    2273#
,L1371    2155    2274#
,L1372    2146    2275#
,L1373    2122    2276#
,L1374    2097    2277#
,L1375    2074    2278#
,L1376    2035    2279#
,L1377    2033    2077    2116    2168    2280#
,L1571    2485    2488#
,L1572    2405    2489#
,L1573    2403    2490#
,L1574    2400    2491#
,L1575    2391    2396    2431    2433    2492#
,L1576    2318    2493#
,L1577    2316    2494#
,L1752    2693    2695#
,L1753    2691    2696#
,L1754    2689    2697#
,L1755    2652    2698#
,L1756    2649    2651    2653    2699#
,L1757    2644    2700#

,L1760    2642    2701#
,L1761    2640    2702#
,L1762    2632    2703#
,L1763    2629    2704#
```



```
,L1764    2616    2705#
,L1765    2615    2706#
,L1766    2589    2707#
,L1767    2578    2708#
,L1770    2563    2609    2709#
,L1771    2548    2710#
,L1772    2538    2711#
,L1773    2534    2645    2712#
,L1774    2532    2550    2713#
,L1775    2529    2714#
,L1776    2525    2557    2584    2586    2715#
,L1777    2519    2716#
,L2163    2852    2865#
,L2164    2849    2866#
,L2165    2816    2867#
,L2166    2808    2862    2868#
,L2167    2797    2869#
,L2170    2794    2870#
,L2171    2776    2871#
,L2172    2770    2806    2860    2872#
,L2173    2765    2873#
,L2174    2763    2874#
,L2175    2759    2875#
,L2176    2721    2876#
,L2177    2718    2877#
,L2356    3082    3122#
,L2357    3075    3123#
,L2360    3073    3124#
,L2361    3065    3069    3125#
,L2362    3036    3126#
,L2363    3033    3127#
,L2364    3018    3128#
,L2365    3017    3129#
,L2366    3016    3130#
,L2367    2970    2989    3131#
,L2370    2954    3132#
,L2371    2931    2975    3028    3133#
,L2372    2926    3134#
,L2373    2924    3135#
,L2374    2923    3136#
,L2375    2903    3137#
,L2376    2900    2988    3138#
,L2377    2885    3139#
,L2562    3286    3296#
,L2563    3268    3297#
,L2564    3258    3262    3298#
,L2565    3256    3264    3299#
,L2566    3232    3300#
,L2567    3229    3301#
,L2570    3218    3302#
,L2571    3215    3303#
,L2572    3187    3304#
,L2573    3173    3305#
```

```
,L2574    3164    3292    3306#
,L2575    3163    3167    3214    3260    3266    3307#
,L2576    3159    3201    3308#
,L2577    3145    3309#
,L2764    3449    3453#
,L2765    3447    3454#
,L2766    3438    3455#
,L2767    3435    3456#
,L2770    3429    3457#
,L2771    3428    3458#
,L2772    3426    3459#
,L2773    3408    3460#
,L2774    3349    3461#
,L2775    3345    3462#
,L2776    3343    3463#
,L2777    3319    3464#
,L3162    3616    3624#
,L3163    3551    3570    3625#
,L3164    3547    3626#
,L3165    3543    3627#
,L3166    3538    3628#
,L3167    3532    3629#
,L3170    3531    3630#
,L3171    3525    3631#
,L3172    3517    3632#
,L3173    3514    3633#
,L3174    3513    3634#
,L3175    3479    3482    3635#
,L3176    3473    3636#
,L3177    3472    3637#
,L3364    3797    3802#
,L3365    3783    3803#
,L3366    3772    3804#
,L3367    3769    3805#
,L3370    3767    3806#
,L3371    3762    3807#
,L3372    3739    3808#
,L3373    3732    3809#
,L3374    3731    3810#
,L3375    3684    3707    3811#
,L3376    3666    3812#
,L3377    3649    3813#
,L3572    4018    4022#
,L3573    3972    4023#
,L3574    3930    4024#
,L3575    3922    3997    4025#
,L3576    3919    3994    4026#
,L3577    3887    3956    4027#
,L3766    4920    4244#

,L3767    4905    4245#
,L3770    4196    4246#
,L3771    4186    4247#
,L3772    4180    4248#
```



```
,L3773    4152    4249#
,L3774    4133    4250#
,L3775    4064    4251#
,L3776    4062    4252#
,L3777    4060    4253#
,L4170    4349    4401#
,L4171    4348    4402#
,L4172    4343    4345    4403#
,L4173    4301    4404#
,L4174    4298    4405#
,L4175    4296    4299    4309    4315    4339    4406#
,L4176    4275    4407#
,L4177    4256    4408#
,L4374    4442    4585#
,L4375    4441    4586#
,L4376    4491    4587#
,L4377    4487    4588#
,L4572    4734    4749#
,L4573    4707    4750#
,L4574    4631    4698    4751#
,L4575    4610    4752#
,L4576    4609    4753#
,L4577    4597    4754#
,L4772    4859    4864    4927#
,L4773    4853    4928#
,L4774    4852    4863    4929#
,L4775    4808    4930#
,L4776    4803    4931#
,L4777    4785    4932#
,L5161    5056    5062#
,L5162    5033    5063#
,L5163    5031    5064#
,L5164    5029    5065#
,L5165    5027    5066#
,L5166    5025    5067#
,L5167    5023    5068#
,L5170    5021    5069#
,L5171    5019    5070#
,L5172    5008    5071#
,L5173    5002    5072#
,L5174    4997    5073#
,L5175    4982    5074#
,L5176    4980    5075#
,L5177    4967    4983    5076#
,L5363    5202    5216#
,L5364    5192    5217#
,L5365    5184    5218#
,L5366    5172    5219#
,L5367    5170    5220#
,L5370    5168    5221#
,L5371    5155    5222#
,L5372    5152    5223#
,L5373    5151    5190    5224#
```

,L5374	5147	5225#												
,L5375	5119	5215	5226#											
,L5376	5115	5227#												
,L5377	5107	5228#												
,L5564	5395	5403#												
,L5565	5342	5404#												
,L5566	5340	5405#												
,L5567	5314	5406#												
,L5570	5306	5407#												
,L5571	5298	5331	5380	5402	5408#									
,L5572	5293	5409#												
,L5573	5290	5410#												
,L5574	5266	5411#												
,L5575	5257	5412#												
,L5576	5239	5413#												
,L5577	5234	5414#												
,L5762	5559	5560#												
,L5763	5550	5561#												
,L5764	5505	5562#												
,L5765	5494	5510	5563#											
,L5766	5460	5564#												
,L5767	5458	5565#												
,L5770	5444	5566#												
,L5771	5443	5567#												
,L5772	5441	5453	5568#											
,L5773	5432	5569#												
,L5774	5429	5536	5570#											
,L5775	5425	5524	5571#											
,L5776	5424	5428	5485	5493	5509	5523	5535	5572#						
,L5777	5420	5573#												
,L6164	5717	5724#												
,L6165	5691	5725#												
,L6166	5690	5726#												
,L6167	5687	5727#												
,L6170	5681	5728#												
,L6171	5678	5729#												
,L6172	5675	5730#												
,L6173	5671	5707	5731#											
,L6174	5442	5732#												
,L6175	5433	5733#												
,L6176	5402	5734#												
,L6177	5601	5640	5735#											
,L6364	5R69	5880#												
,L6365	5R43	5881#												
,L6366	5R42	5882#												
,L6367	5R33	5883#												
,L6370	5R32	5884#												
,L6371	5R29	5885#												
,L6372	5R03	5886#												
,L6373	5R01	5872	5887#											
,L6374	5771	5815	5888#											
,L6375	5768	5802	5874	5889#										
,L6376	5762	5791	5890#											

,L6377	5755	5783	5891#											
,V0001	3408	3460#	5633	5733#										
,V0002	3n65	3069	3125#	4597	4754#									
,V0003	5R32	5884#												
,V0004	4062	4252#												
,V0007	550	587#												
,V0010	1758	1763#												
,V0012	3187	3304#	5170	5220#	5444	5566#								
,V0014	2652	2698#												
,V0015	5168	5221#												
,V0016	3145	3309#	5306	5407#	5432	5569#								
,V0020	107	214#	344	356	361#	462	467#	3286	3296#					
,V0021	104	215#	455	468#										
,V0022	572	585#												
,V0032	3739	3808#												
,V0037	1484	1512#												
,V0040	1382	1519#	2318	2493#	2519	2716#	2852	2865#	5671	5707	5731#			
,V0052	1219	1309#												
,V0053	1234	1307#												
,V0070	2797	2869#	4487	4588#										
,V0073	5340	5405#												
,V0077	515	592#	3449	3453#										
,V0100	520	590#	1832	1868	2007#	2391	2396	2431	2433	2492#	2525	2557	2584	2586
	2715#	2765	2873#	3616	3624#	4196	4246#	4734	4749#	5314	5406#	5762	5791	5890#
,V0102	3082	3122#												
,V0110	5107	5228#												
,V0115	2816	2867#												
,V0177	1271	1304#	1553	1769#	4542	4585#								
,V0200	413	470#	1272	1303#	1609	1617	1625	1653	1768#	1802	1902	1947	2008#	2033
	2077	2116	2168	2208#	3033	3127#	3349	3461#	3772	3804#	3930	4024#	4133	4250#
	4301	4404#	5239	5413#	5458	5565#								
,V0201	416	469#												
,V0216	281	362#												
,V0231	2485	2488#												
,V0240	521	589#	5115	5227#										
,V0260	551	586#	4967	4983	5076#									
,V0277	3232	3300#	3447	3454#										
,V0300	2644	2700#												
,V0323	5257	5412#												
,V0351	109	213#												
,V0377	1839	2006#	2563	2609	2709#	2770	2806	2860	2872#	3173	3305#	4220	4244#	4298
	4405#	5293	5409#	5441	5453	5568#								
,V0400	153	186	190	208#	387	409	474#	574	584#	1454	1480	1515#	3762	3807#
	4707	4750#												
,V0402	113	212#												
,V0403	154	182	207#											
,V0404	5234	5414#												
,V0420	116	211#												
,V0425	2691	2696#												
,V0427	3438	3455#												
,V0430	3435	3456#												
,V0457	155	203#												
,V0465	162	204#	2224	2272#	2534	2645	2712#							

,V0502	123	125	127	138	156	173	196	209#	513	522	552	593#		
,V0514	157	206#												
,V0523	121	197	210#	395	407	473#								
,V0531	168	202#												
,V0541	171	201#												
,V0661	1173	1317#												
,V0664	2478	2708#	4205	4245#										
,V0665	2405	2489#	2589	2707#										
,V0700	4997	5073#												
,V0701	5027	5066#												
,V0707	5023	5068#												
,V0715	5025	5067#												
,V1000	397	405	472#	1999	2004#	3073	3124#	3164	3292	3306#	3513	3634#	5717	5724#
,V1035	400	471#												
,V1060	384	475#												
,V1100	2023	2273#												
,V1142	1945	2005#												
,V1165	2097	2277#	3159	3201	3308#	3426	3459#	4785	4932#					
,V1213	2035	2279#												
,V1226	2074	2278#												
,V1252	2122	2276#												
,V1276	2155	2274#	4491	4587#										
,V1315	3547	3626#												
,V1332	5494	5510	5563#	5602	5734#									
,V1340	5691	5725#												
,V1364	3343	3463#												
,V1365	1342	1433	1522#	3145	3462#	3514	3633#							
,V1366	1344	1437	1521#											
,V1400	2146	2275#												
,V1477	2538	2711#												
,V1531	1184	1315#												
,V1602	2931	2975	3028	3133#										
,V1710	5833	5883#												
,V1722	5490	5726#												
,V2000	2649	2651	2653	2699#	3684	3707	3811#	3887	3954	4027#	4275	4407#		
,V2272	2923	3136#												
,V2284	3016	3130#												
,V2303	2616	2705#	2808	2862	2868#									
,V2514	2985	3139#												
,V2732	1379	1520#												
,V2746	1401	1518#												
,V3000	3075	3143#	3215	3303#										
,V3016	3172	3637#												
,V3130	3517	3632#												
,V3200	2924	3135#												
,V3206	3972	4023#												
,V3207	2925	3134#												
,V3270	4018	4022#												
,V3273	1260	1305#												
,V3320	5290	5410#												
,V3322	5342	5404#												
,V3341	2493	2695#	5843	5881#										
,V3416	3017	3129#												

,V3425	3018	3128#	3732	3809#										
,V3521	3731	3810#												
,V3552	4152	4249#												
,V3600	4341	4345	4403#											
,V3601	3919	3994	4026#											
,V3622	5029	5065#												
,V3623	5021	5069#												
,V3637	5031	5064#												
,V3702	5155	5222#												
,V3740	518	591#												
,V3762	3922	3997	4025#	4296	4299	4309	4315	4339	4406#					
,V4000	3429	3457#	4060	4253#	5056	5062#								
,V4100	5152	5223#												
,V4113	4348	4402#												
,V4114	4982	5074#	5119	5215	5226#									
,V4115	5429	5536	5570#											
,V4133	2642	2701#												
,V4151	1490	1510#												
,V4152	2640	2702#												
,V4235	1302	1311#	2316	2494#	2632	2703#	2954	3132#	3428	3458#				
,V4236	1438	1517#	2718	2877#	2900	2988	3138#							
,V4240	4853	4928#												
,V4242	2721	2876#	3036	3126#	5443	5567#	5755	5783	5891#					
,V4261	3473	3636#												
,V4396	3479	3482	3635#	4610	4752#									
,V4317	4409	4753#												
,V4333	4631	4698	4751#											
,V4434	5425	5524	5571#											
,V4474	3956	3264	3299#											
,V4475	3258	3262	3298#											
,V4510	3268	1297#												
,V4541	2615	2706#	2970	2989	3131#									
,V4712	3851	3570	3625#	4541	4586#									
,V4727	1485	1511#												
,V5000	3218	3302#												
,V5067	1192	1314#												
,V5132	5008	5071#												
,V5242	4980	5075#												
,V5244	4349	4401#												
,V5267	3649	3813#												
,V5326	5869	5880#												
,V5344	1294	1301#	5266	5411#										
,V5400	5184	5219#												
,V5417	5192	5217#	5771	5815	5868#									
,V5500	1464	1513#												
,V5510	1292	1302#	5151	5190	5224#									
,V5517	5768	5802	5874	5889#										
,V5520	3783	3803#	5687	5727#										
,V5525	5424	5428	5485	5493	5509	5523	5535	5572#	5601	5640	5735#			
,V5530	5642	5732#												
,V5535	5395	5403#												
,V5600	5298	5331	5380	5402	5408#									
,V6000	1201	1312#	2400	2491#	2529	2714#	2903	3137#	5559	5560#				

,V6002	5550	5561#										
,V6060	2763	2874#	5620	5573#								
,V6061	5460	5564#										
,V6062	2759	2875#										
,V6064	2776	2871#										
,V6104	2629	2704#										
,V6115	5505	5562#										
,V6127	1203	1310#	1456	1514#								
,V6151	1452	1516#										
,V6270	5842	5882#										
,V6314	5801	5872	5887#									
,V6404	5019	5070#										
,V6422	1741	1766#										
,V6451	5033	5063#										
,V6700	5002	5072#										
,V6705	1745	1764#										
,V6762	4180	4248#										
,V6765	4186	4247#										
,V7000	1195	1197	1313#	3163	3167	3214	3260	3266	3307#	3543	3627#	5803	5886#
,V7043	3767	3806#										
,V7056	3769	3805#										
,V7113	2403	2490#	2548	2710#	3666	3812#						
,V7114	4256	4408#	4852	4863	4929#							
,V7115	3425	3631#	4859	4864	4927#							
,V7116	3438	3628#										
,V7313	2532	2550	2713#									
,V7353	2689	2697#										
,V7400	4069	4251#										
,V7571	5202	5216#										
,V7575	160	205#	238	265	367#							
,V7600	1622	1767#										
,V7640	5675	5730#										
,V7669	1221	1308#										
,V7670	5172	5219#										
,V7700	504	594#	3531	3630#	5147	5225#						
,V7704	3432	3629#										
,V7710	2794	2870#										
,V7740	1175	1316#	2849	2856#	3797	3802#	5678	5729#	5829	5885#		
,V7745	4803	4931#										
,V7746	1253	1306#										
,V7747	4806	4930#										
,V7762	268	363#										
,V7766	244	365#										
,V7770	5681	5728#										
,V7771	1743	1765#										
,V7772	3319	3464#										
,V7773	3229	3301#										
,V7774	241	366#	547	588#								