IDENTIFICATION

PRODUCT CODE:	AC-T473A-MC
PRODUCT NAME:	CNRXDA0 RX02 SS PERF EXER
PRODUCT DATE:	DEC 1982
MAINTAINER:	DIAGNOSTICS SERVICES/ISS
AUTHOR:	L. S. PRUCHA

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS PROGRAM EXERCISES TWO RX02 SUBSYSTEMS (FOUR DRIVES), IN SBC-11/21 PROCESSOR, MAINTAINS DRIVE STATISTICS AND PROVIDES RUN SUMMARIES SO THAT SEEK AND DATA ERROR RATES MAY BE DETERMINED. THE PERFORMANCE EXERCISER WILL GIVE THE USER CONFIDENCE, AFTER RUNNING SUCCESSFULLY, THAT THE SYSTEM IS PERFORMING WITHIN SPECIFICATION.

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

SBC-11/21 PROCESSOR WITH 16K OR MORE OF MEMORY
CONSOLE DEVICE (LA30, LA36, VT50, ETC.)

1.2.2 SOFTWARE REQUIREMENTS

THIS DIAGNOSTIC IS DESIGNED TO RUN WITH THE DIAGNOSTIC SUPERVISOR AS DESCRIBED IN PARAGRAPH 2.0.

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ SUPERVISOR/USERS MANUAL CHQUS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

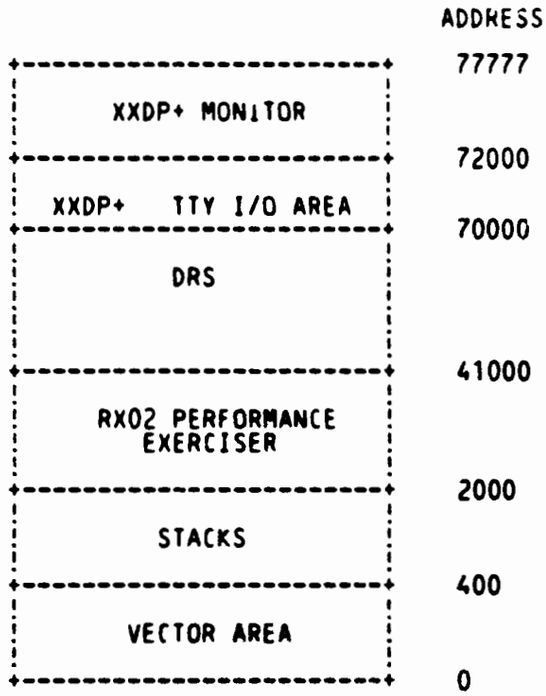
NONE

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE SUBSYSTEM BEING TESTED IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, MEMORY, ETC., DO NOT FUNCTION PROPERLY.

1.6 MEMORY MAP

MEMORY LAYOUT ON 16K MACHINE - XXDP ENVIRONMENT



IN A MACHINE WITH MORE MEMORY FREE SPACE WILL OCCUR BETWEEN THE DIAGNOSTIC AND THE DRS.

2.0 OPERATING INSTRUCTIONS

THIS IS A REV A SUPERVISOR DIAGNOSTIC SPECIFIC TO SBC-11/21 PROCESSOR: FOR OPERATING INSTRUCTIONS, PLEASE SEE CHAPTER 5 OF XXDP+ OPERATOR'S MANUAL. THEY ARE NO LONGER INCLUDED IN THE DIAGNOSTIC LISTING BECAUSE IT IS DESIRED THAT A CHANGE IN THOSE INSTRUCTIONS NOT REQUIRE A RE-ASSEMBLY OF ALL SUPERVISOR DIAGNOSTICS.

2.1 HARDWARE QUESTIONS

THE FOLLOWING SERIES OF QUESTIONS COMPRISE THE PARAMETERS NECESSARY TO IDENTIFY EACH FLOPPY DISK SUBSYSTEM.

RX BUS ADR -
THIS PARAMETER DEFINES THE BASE BUS ADDRESS FOR THE FLOPPY DISK SUBSYSTEM.

VECTOR ADR -
THIS PARAMETER DEFINES THE INTERRUPT VECTOR ADDRESS FOR THE FLOPPY DISK SUBSYSTEM INTERFACE.

DRIVE # -
THIS PARAMETER DEFINES THE FLOPPY DISK SUBSYSTEM DRIVE NUMBER (0 - 1).

EXP WRD-TYPE -
THIS PARAMETER IS TO BE USED FOR FUTURE EXPANSION. TYPE A CARRIAGE RETURN.

2.2 SOFTWARE QUESTIONS

EXERCISE # -
ENTER # FROM TABLE SHOWN IN PARAGRAPH 6.3.

DATA PATTERN # -
ENTER # FROM TABLE SHOWN IN PARAGRAPH 6.2.

TRACK SEQUENCE # -
ENTER # FROM TABLE SHOWN IN PARAGRAPH 6.4.

DEVICE FATAL THRESHOLD LEVEL -
THE DEVICE FATAL THRESHOLD LEVEL (DFTL) IS INITIALLY SET=1.
THIS THRESHOLD LEVEL EQUALS THE # OF HARD ERRORS THAT
WILL CAUSE A DEVICE FATAL ERROR WHEN THE DRS "EVL" FLAG
IS SET. THE "EVL" FLAG WILL ALSO CAUSE 10 SOFT ERRORS
TO BE RECLASSIFIED A HARD ERROR, WHICH IF DFTL = 1 WILL
BECOME A DEVICE FATAL ERROR.

RUN TEST IN DOUBLE DENSITY -
IF TEST IS IN WRONG DENSITY - OPERATOR WILL BE ASKED IF
THE DISKETTE IS TO BE REFORMATTED.

RUN TEST IN DELETED DATA MODE -
IF ANSWERED YES, DELETED DATA MODE WILL BE DONE FIRST.

ANY PROGRAM CONTROL FLAGS -
IF ANSWERS YES THE FOLLOWING QUESTIONS WILL BE ASKED.

RETRY ON ERROR, LOG SOFT + HARD ERRORS?
IF RETRY IS NOT SET, THEN SOFT ERRORS
WILL ALSO LOG AS HARD ERRORS.
RECALIBRATE ON SEEK ERRORS?
PRINT ONLY 10 DATA ERRORS + CONTINUE?
CLEAR STATISTICAL TABLES BEFORE NEXT PASS?

MODIFY TRACK ADDRESS LIMITS -
IF ANSWERING YES, THEN THE FOLLOWING WILL BE ASKED:

OUTER DIAMETER ADR #?
INNER DIAMETER ADR #?

MODIFY SECTOR ADDRESS LIMITS -
IF ANSWERING YES, THEN THE FOLLOWING WILL BE ASKED:

MIN. SECTOR ADR #?
MAX. SECTOR ADR #?

RXXX EXPANSION <CR>
THIS WORD IS FOR FUTURE EXPANSION, ANSWER WITH A
CARRIAGE RETURN.

3.0 ERROR INFORMATION

THIS PROGRAM HAS FOUR TYPES OF ERROR CLASSIFICATIONS; SYSTEM FATAL, DEVICE FATAL, HARD AND SOFT.

SYSTEM FATAL ERRORS

SYSTEM FATAL ERRORS ARE USED TO INDICATE THAT AN ERROR WAS DETECTED BY THE DIAGNOSTIC SUPERVISOR IN RELATION TO LOADING/ CONTROLLING THE DIAGNOSTIC PROCESS.

THE CONTENT OF EACH ERROR IS SUCH THAT IT SHOULD BE SELF - EXPLANATORY. HOWEVER, THE MESSAGES UTILIZE SOME TERMS THAT ARE SPECIFIC TO THE FLOPPY DISK SUBSYSTEM, AND MAY REQUIRE SOME GETTING USE TO.

DEVICE FATAL ERRORS

DEVICE FATAL ERRORS ARE A RESULT OF:

1. REACHING A DEVICE FATAL THRESHOLD LEVEL ("DFTL"). AN "DFTL" =1 WILL CAUSE 1 HARD ERROR TO BE CLASSIFIED A DEVICE FATAL ERROR. THIS LEVEL IS INITIALLY SET=1, BUT MAY BE MODIFIED BY THE OPERATOR.

2. AN ERROR THAT IS CONSIDERED FATAL TO THE DEVICE, BUT TESTING WILL CONTINUE.

HARD ERRORS

HARD ERRORS ARE A RESULT OF:

1. TEN RETRIES OF A SOFT ERROR OR
2. A NON-RECOVERABLE ERROR

SOFT ERRORS

SOFT ERRORS ARE MEDIA RELATED ERRORS AND IF RETRY ON ERROR IS SET WILL BE TRIED UP TO TEN TIMES THEN CLASSIFIED AS HARD ERRORS.

IF RETRY ON ERROR IS NOT SET THE ERROR WILL BE LOGGED AS BOTH SOFT AND HARD ERRORS.

3.1 WRITE ERROR

A WRITE ERROR IS AN ERROR WHICH OCCURRED DURING EXECUTION OF A WRITE FUNCTION.

READ ERROR

A READ ERROR IS AN ERROR WHICH OCCURRED DURING EXECUTION OF A READ FUNCTION.

3.2 CRC ERROR

THIS ERROR IS DETECTED BY THE DRIVE DURING A READ OPERATION AND ALSO BY THE PROGRAM IF A DATA CHECK IS PERFORMED.

3.3 NO CRC ERROR BUT DATA ERROR - BAD CRC

3.4 CRC ERROR BUT NO DATA ERROR - BAD CRC

THE ABOVE TWO ERRORS ARE DETECTED WHEN THE PROGRAM IS VERIFYING THE DATA READ OFF THE DISKETTE AGAINST THE DATA THAT SHOULD HAVE BEEN READ.

THE DATA PATTERNS WILL BE FORMATTED FOR DOUBLE DENSITY (SINGLE DENSITY) AS SHOWN.

```
BYTE #
  0          <TRACK ADDRESS    BITS 6 - 0>
  1          <SECTOR ADDRESS   BITS 4 - 0>
  2 - 253 (125) CONTAIN SELECTED PATTERN.

 254(126)  <THE SUM OF ALL BYTES 0 - 253(125)>
 255(127)  <THE NEGATIVE OF 2 TIMES BYTE 254(126)>
```

3.5 SEEK ERROR

A SEEK ERROR CAN BE DETECTED VIA BYTE #0 IF A CRC, DATA, CHECKSUM ERROR HAS NOT OCCURRED. ALSO THE DRIVE MAY DETECT A SEEK ERROR IF THE DISKETTE HEADER IS NOT RECOGNIZED OR COULD NOT BE FOUND. A PROGRAMMED RECALIBRATE IS ISSUED TO TRY TO CORRECT EACH SEEK ERROR, IF SELECTED DURING PROGRAM DIALOG.

3.6 CHECKSUM ERROR

THE PROGRAM WILL DETECT A CHECKSUM ERROR BY SUMMING ALL THE DATA READ FROM THE DISKETTE AND COMPARING THAT SUM WITH THE CHECKSUM BYTES. A CHECKSUM ERROR RESULTS FROM AN INCORRECT TRANSFER OF DATA INTERNAL TO THE RXV211 RX21/RX02 SUBSYSTEM.

3.7 ERROR NUMBERS

ERROR	TYPE	ERR #
SEEK	SOFT	0 -32
CRC	SOFT	1 -33
CKSUM	HARD	-34
DATA	SOFT	3 -35
DEL. DATA UNEX	HARD	-37
DEL. DATA MISSING	HARD	-38
UNK ERR	HARD	-40
FILL/EMPTY BUFFER	HARD	-41
READ	SOFT	10-42
WRITE	SOFT	11-43
INTER-BUT NO DONE	HARD	-44
DONE-BUT NO INTER	HARD	-45
ERR-BUT NO ERR BIT	HARD	-46
ERR BIT SET	HARD	-47
NO DONE ON INIT	SYS FATAL	128
NO DONE ON FUNCTION	DEV FATAL	65
NO DRIVE RDY	DEV FATAL	66
NO SIDE RDY	DEV FATAL	67
NO DONE AFTER RD STA	DEV FATAL	68
WRG DRV RESPOND	SYS FATAL	133
WRG SIDE RESPOND	SYS FATAL	134
DISKETT WRG DEN	DEV FATAL	73
DENSITY ERR	DEV FATAL	74
T.O. ON "TR" OR "DONE"	SYS FATAL	139
SYS ERR	SYS FATAL	140
INITIALIZE ERROR	DEV FATAL	200
ADDRESSING ERROR	SYS FATAL	400

NOTES:
1. SOFT ERRORS HAVE TWO ERROR NUMBERS:
   LOW # = SOFT ERROR
   HIGH # = HARD ERROR (RECLASSIFIED SOFT ERROR)

2. IF "EVL" FLAG IS SET HARD ERRORS WILL BE RE-CLASSIFIED DEVICE FATAL ERRORS, BUT THE ERROR NUMBER WILL REFLECT THE ORIGINAL HARD ERROR.

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS A STATISTICAL REPORT WILL BE PRINTED OUT OF ALL ACCUMULATED ERRORS.

5.0 DEVICE INFORMATION TABLES

RX02 REGISTER BITS

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
RXCS:	ERR	INT	XM	XM	RX2		SID	DEN	TR	IE	DON	DRV	FUN	FUN	FUN	GO
RXWC:	X	X	X	X	X	X	X	X	WORD COUNT							
RXBA:	BUS ADDRESS															
RXES:	X	X	X	X	NXM	WC OVF	SID #1	DRV #1	DRV RDY	DEL DAT	DSK DEN	DEN ERR	AC LOW	INT DON	SID RDY	CRC
RXTA:	X	X	X	X	X	X	X	X	0	TRACK ADDRESS						
RXSA:	X	X	X	X	X	X	X	X	0	0	0	SECTOR ADDRESS				
RXDB:	DATA BUFFER															

READ ERROR CODE REGISTERS - (SEE LABLE "XERUUT")

WORD	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
#1	WORD COUNT								ERROR CODE							
#2	CURRENT TRACK DRV #1								CURRENT TRACK DRIVE #0							
#3	TARGET SECTOR								TARGET TRACK							
#4	BAD TRACK-ONLY VALID IF ERRCODE=150								UNT SEL	DV1 DEN	HD LD	DV0 DEN	X	X	X	LCD DEN

5.2 DEVICE PROTOCOL

RX02 FUNCTIONAL PROCESS

FUNCTION CODE BIT # 3 2 1	FUNCTION	PROCEDURE (PROTOCOL)
0 0 0	FILL BUFFER	FUNCTION WORD --->TR--->WC--->TR--->BA--->DONE
0 0 1	EMPTY BUFFER	FUNCTION WORD --->TR--->WC--->TR--->BA--->DONE
0 1 0	WRITE SECTOR	FUNCTION WORD --->TR--->SA--->TR--->TA--->DONE
0 1 1	READ SECTOR	FUNCTION WORD --->TR--->SA--->TR--->TA--->DONE
1 0 0	SET DENSITY	FUNCTION WORD --->TR--->VW--->DONE
1 0 1	READ MAINT. STATUS	FUNCTION WORD --->DONE
1 1 0	WRITE SECTOR WITH DELETED DATA	FUNCTION WORD --->TR--->SA--->TR--->TA--->DONE
1 1 1	READ ERROR CODE	FUNCTION WORD --->TR--->BA--->DONE

TR = WAIT FOR TR BIT
DONE = WAIT FOR DONE BIT
BA = BUS ADDRESS (OUTPUT TO RX)
VW = VERIFICATION WORD (OUTPUT TO RX)
WC = WORD COUNT (OUTPUT TO RX)
SA = SECTOR ADDRESS (OUTPUT TO RX)
TA = TRACK ADDRESS (OUTPUT TO RX)

6.0 TEST SUMMARIES

6.1 UNIT/DRIVE SELECTION

UNIT AND DRIVE SELECTION WILL BE ACCOMPLISHED BY MODIFYING HARDWARE P-TABLES DURING A START DIALOG.

6.2 DATA PATTERNS

AVAILABLE DATA PATTERNS ARE SELECTED BY MODIFYING THE SOFTWARE P-TABLE DURING START OR RESTART DIALOG. DATA PATTERNS AVAILABLE ARE:

0 = DEFAULT TO 7
1 = ZEROS
2 = ONES
3 = FLOATING ZERO
4 = FLOATING ONE
5 = 125
6 = 333
7 = RANDOM

6.3 EXERCISE OPTIONS

AVAILABLE EXERCISES ARE SELECTED BY MODIFYING THE SOFTWARE P-TABLE DURING A START OR RESTART DIALOG. EXERCISES AVAILABLE ARE:

0 = DEFAULT TO 7
1 = WRITE ONLY
2 = WRITE/READ
3 = WRITE/READ/DATA CHECK
4 = READ/DATA CHECK ONLY
5 = READ ONLY (CRC CHECK)
6 = WRITE/READ/DATA CHECK ON ALTERNATING DRIVES (*)
7 = WRITE/READ/DATA CHECK +/READ/DATA CHECK (**)

(*) TEST 6 WRITES THEN READ CHECKS ANY SELECTED DATA PATTERN USING ANY TRACK SEQUENCE, BUT ONE TRACK AT A TIME. FIRST ON DRIVE 0 THEN DRIVE WHEN BOTH UNIES HAVE ACCESSED THAT TRACK, IT GOES BACK TO UNIT 0 FOR THE NEXT TRACK, ETC.

(**) THE FIRST HALF OF TEST 7 FORCES THE TRACK SEQUENCE TO INCREMENT UP THROUGH ALL TRACKS DOING WRITE/READ/DATA CHECK FUNCTIONS. THIS VERIFIES THAT ALL TRACKS ARE ACCESSABLE. THE SECOND HALF OF THE PASS WILL USE THE SEQUENCE SELECTED BY THE OPERATOR AS INDICATED BELOW, AND ONLY READ AND CHECK THE DATA JUST WRITTEN. THIS VERIFIES THAT THE DATA CAN BE READ FROM A TRACK AFTER THE HEAD HAS BEEN MOVED AWAY FROM AND BACK TO THAT TRACK. AT THE COMPLETION OF THE PASS THE DELETED DATA BIT IN TEST CONDITIONS IS COMPLEMENTED AND THE NEXT PASS WILL BE RUN UNDER THIS NEW CONDITION.

6.4 TRACK SEQUENCING

TRACK SEQUENCE OR TYPE OF HEAD MOVEMENT MAY BE SELECTED BY MODIFYING THE SOFTWARE P-TABLE OF THE DIAGNOSTIC SUPERVISOR. TRACK SEQUENCES AVAILABLE FOR SELECTION ARE:

0 = DEFAULT TO 7
1 = INCREMENT O.D. UP TO I.D.
2 = DECREMENT I.D. DOWN TO O.D.
3 = INCREMENT O.D., THEN DECREMENT I.D.
4 = BOUNCE BETWEEN O.D. AND I.D.
5 = BOUNCE BETWEEN DECREASING I.D. AND INCREASING O.D.
6 = BOUNCE BETWEEN O.D. AND DECREASING I.D.
7 = RANDOM

O.D. = OUTSIDE DIAMETER (TRACK)
I.D. = INSIDE DIAMETER (TRACK)

6.5 SECTOR/TRACK ADDRESSING

IT WILL BE POSSIBLE TO TEST THE DISKETTES BETWEEN TRACK AND SECTOR ADDRESS LIMITS OTHER THAN BETWEEN THE NORMAL OUTER DIAMETER (OD) AND INNER DIAMETER (ID) TRACK ADDRESSES, AND/OR MINIMUM (FIRST) AND MAXIMUM (LAST) SECTOR ADDRESS, BY MODIFYING THE SOFTWARE P-TABLE DURING A START OR RESTART DIALOG.

6.6 DISKETTE DENSITY

ALL TESTS WILL RUN AT DOUBLE DENSITY UNLESS SELECTED AS SINGLE DENSITY DURING A START OR RESTART DIALOG.

6.7 PROGRAM CONTROL

BEHAVIOR OF THE PERFORMANCE EXERCISOR MAYBE MODIFIED BY USE OF THE FOLLOWING PROGRAM CONTROLS:

1.	HALT ON ERROR	PROVIDED BY SUPERVISOR
2.	HALT AT END OF PASS	PROVIDED BY SUPERVISOR
3.	DON'T PRINT ERROR MESSAGE	PROVIDED BY SUPERVISOR
4.	RETRY ON ERROR. LOG HARD/SOFT ERRORS	SOFTWARE P-TABLE
5.	RECALIBRATE ON SEEK ERRORS	SOFTWARE P-TABLE

<FF>

7.0 HISTORY FILE

THIS DIAGNOSTIC HAS BEEN MODIFIED TO RUN IN SBC-11/21 PROCESSOR FROM CZFXDB0 SS PERF EXER.

8.0 LISTING INDEX

```
 84- 2760        MOD 1.3.1 - SET DATA PATTERN
 86- 2866        MOD 1.3.2 - SET TRACK SEQUENCE
 86- 3015        MOD 1.3.3 - CLEAR STATISTICAL TABLES
 88- 3029        MOD 2.0 - SCHEDULE SYSTEM EXERCISE
 90- 3133        MOD 2.1 - GET A TEST
 92- 3240        -   EXERCISE/TEST TABLE
 94- 3298        MOD 2.2 - GET A DRIVE
 96- 3337        MOD 2.3 - EXECUTE DRIVE TEST
100- 3461        MOD 2.3.1 - GET A SECTOR
100- 3550        MOD 2.3.1.A - SET SECTOR DONE
102- 3562        MOD 2.3.2 - GET A TRACK
106- 3634        MOD 2.3.3 - GET A DRIVE FUNCTION
108- 3668        MOD 2.3.4 - OUTPUT DRIVE FUNCTION
108- 3743        MOD 2.3.4.1 - OUTPUT SINGLE WORD
110- 3757        MOD U.2.3.4  - WATCH DOG TIMER
110- 3787        MOD U.2.3/4 DELAY
112- 3815        MOD 2.4 - EVALUATE TEST RESULTS
114- 3833        MOD 2.4.1 - EVALUATE DATA
116- 3915        MOD 2.4.2 - EVALUATE DRIVE STATE
118- 4032        MOD 2.4.2.1 - EVALUATE DPIVE RESPONSE
120- 4065        MOD 2.4.3 - UPDATE DRIVE STATISTICS
122- 4178        MOD 2.4.3.1 - UPDATE HARD ERROR STATISTICS
122- 4193        MOD 2.4.3.2 - UPDATE CRC STATISTICS
124- 4222        MOD 2.4.3.3 - UPDATE SOFT ERROR STATISTICS
126- 4251        MOD 2.4.3.4 - UPDATE SECTOR WRITTEN/READ COUNTERS
128- 4284        -   MOD 2.4.U.1 - SOFT ERROR LOGGER
130- 4317        MOD 2.4.4 - EVALUATE UNIT ERROR CODE
132- 4375        MOD 2.5 - OUTPUT ERROR TYPE
134- 4490        MOD 2.5.1 - PRINT RETRY
136- 4544        MOD 2.6 - SET DRIVES DONE
138- 4569        MOD 3.0 - OUTPUT EXERCISE COMPLETE
140- 4579        MOD 4.0 - OUTPUT SYSTEM ERROR
144- 4680        -   MOD INTR.1 - INTERRUPT HANDLER #0
144- 4687        -   MOD INTR.2 - INTERRUPT HANDLER #1
144- 4694        MOD U.INTR.U - SAVE UNIT REG
144- 4705        -   READ ERROR CODE BUFFER
144- 4717        -   TRACK TABLE
144- 4724        -   DATA BUFFERS
146- 4748        HARDWARE PARAMETER CODING SECTION
148- 4824        SOFTWARE PARAMETER CODING SECTION
152- 4930        -   PATCH AREA
```

7.1 LISTING

```
                                .TITLE PROGRAM HEADER AND TABLES
                                .SBTTL  PROGRAM HEADER

                                        .ENABL  ABS,AMA
        002000                  .       =       2000

002000                                  BGNMOD

                                ;++
                                ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                                ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                                ;--

002000                                  POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,ERRTBL,BGNSETUP


002000                                  HEADER  CNRXDA0,0,0,2100,1

                                ;-------------------------------------------------------------------------
002122                          DESCRIPT        ^$RX02 SS PERF EXER      $
                                        .EVEN
                                ;-------------------------------------------------------------------------

                                .SBTTL  DISPATCH TABLE

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

002152                                  DISPATCH 1

```

```
                                .SBTTL  DEFAULT HARDWARE P-TABLE

                                ;++
                                ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
                                ;--

002156                          BGNHW   DFPTBL

002160  177170                 .WORD   177170          ;UNIBUS ADDRESS
002162  000264                 .WORD   264             ;VECTOR ADDRESS
002164  000000                 .WORD   0               ;DRIVE #
002166  000000                 .WORD   0               ;FUTURE EXPANSION


002170                          ENDHW



                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;--

002170                          BGNSW   SFPTBL

002172  000000                 RXXX:   .WORD   0               ;FUTURE EXPANSION-R.
002174  000000                         .WORD   0               ;P-TABLE CONTROL WORD
002176  000000                 TSTN:   .WORD   0               ;TEST #
002200  000000                 TSTPAT: .WORD   0               ;TEST PATTERN #
002202  000000                 TRKSEQ: .WORD   0               ;TRACK SEQUENCE #
002204  000021                 SWREG:  .WORD   21              ;SOFTWARE SWITCH REG
002206  000000                 OTDITK: .WORD   0               ;OUTSIDE DIA. TRACK LIMIT
002210  000114                 INDITK: .WORD   114             ;INSIDE DIA. TRACK LIMIT.
002212  000001                 MINSEC: .WORD   1               ;MINIMUM SECTOR LIMIT
002214  000032                 MAXSEC: .WORD   32              ;MAXIMUM SECTOR LIMIT
002216  000001                 DFTL:   .WORD   1               ;DEVICE FATAL THRESHOLD LVL


002220                          ENDSW

002220                          ENDMOD
```

```
                                .TITLE GLOBAL AREAS
                                .SBTTL  GLOBAL EQUATES SECTION

002220                                  BGNMOD

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

002220                                  EQUALS

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

```
                000300                  PRI06== 300
                000240                  PRI05== 240
                000200                  PRI04== 200
                000140                  PRI03== 140
                000100                  PRI02== 100
                000040                  PRI01== 40
                000000                  PRI00== 0
                                        ;
                                        ;OPERATOR FLAG BITS
                                        ;
                000004                  EVL==     4
                000010                  LOT==    10
                000020                  ADR==    20
                000040                  IDU==    40
                000100                  ISR==   100
                000200                  UAM==   200
                000400                  BOE==   400
                001000                  PNT==  1000
                002000                  PRI==  2000
                004000                  IXE==  4000
                010000                  IBE== 10000
                020000                  IER== 20000
                040000                  LOE== 40000
                100000                  HOE== 100000
    984
    985                                 ;
    986                                 ;BIT DEFINITIONS
    987                                 ;
    988         100000                  BIT15== 100000
    989         040000                  BIT14== 40000
    990         020000                  BIT13== 20000
    991         010000                  BIT12== 10000
    992         004000                  BIT11== 4000
    993         002000                  BIT10== 2000
    994         001000                  BIT09== 1000
    995         000400                  BIT08== 400
    996         000200                  BIT07== 200
    997         000100                  BIT06==100
    998         000040                  BIT15== 40
    999         000020                  BIT04== 20
   1000         000010                  BIT03== 10
   1001         000004                  BIT02== 4
   1002         000002                  BIT01== 2
   1003         000001                  BIT00=  1
   1004                                 ;
   1005         001000                  BIT9==  BIT09
   1006         000400                  BIT8==  BIT08
   1007         000200                  BIT7==  BIT07
   1008         000100                  BIT6==  BIT06
   1009         000040                  BIT5==  BIT05
   1010         000020                  BIT4==  BIT04
   1011         000010                  BIT3==  BIT03
   1012         000004                  BIT2==  BIT02
   1013         000002                  BIT1==  BIT01
   1014         000001                  BIT0==  BIT00
   1015                                 ;
   1016                                 ;EVENT FLAG DEFINITIONS
```

```
1017                            ;       EF32:EF17       RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
1018                            ;       EF16:EF01       AVAILABLE FOR PROGRAM USE
1019        000040              EF.START==      32.             ;START COMMAND WAS ISSUED.
1020        000037              EF.RESTART==    31.             ;RESTART COMMAND WAS ISSUED.
1021        000036              EF.CONTINUE==   30.             ;CONTINUE COMMAND WAS ISSUED.
1022        000035              EF.NEW==        29.             ;A NEW PASS HAS BEEN STARTED.
1023        000034              EF.PWR==        28.             ;A POWER FAIL/POWER-UP OCCURRED
1024                            ;
1025        000020              EF16==  16.
1026        000017              EF15==  15.
1027        000016              EF14==  14.
1028        000015              EF13==  13.
1029        000014              EF12==  12.
1030        000013              EF11==  11.
1031        000012              EF10==  10.
1032        000011              EF09==  9.
1033        000010              EF08==  8.
1034        000007              EF07==  7
1035        000006              EF06==  6
1036        000005              EF05==  5
1037        000004              EF04==  4
1038        000003              EF03==  3
1039        000002              EF02==  2
1040        000001              EF01==  1
1041                            ;
1042                            ;PRIORITY LEVEL DEFINITIONS
1043                            ;
1044        000340              PRI07== 340
1045        000300              PRI06== 300
1046        000240              PRI05== 240
1047        000200              PRI04== 200
1048        000140              PRI03== 140
1049        000100              PRI02== 100
1050        000040              PRI01== 40
1051        000000              PRI00== 0
1052                            ;
1053                            ;PROGRAM DEFINITIONS
1054                            ;
1055        000200              TRBIT==200
1056        000040              DNBIT==40
1057        004000              RX2BIT==BIT11
1058        000003              SOFT==3
1059        000002              HARD==2
1060        000001              DVFT==1
1061        000000              SYFT==0
1062        000004              BTRP4==4
1063        000006              BTRP6==6
1064        000002              RESTAR==BIT1
1065        000001              POWERF==BIT0
1066        004000              SYSERR==BIT11
```

```
1080                                    .SBTTL  GLOBAL DATA SECTION
1081
1082                                    ;++
1083                                    ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
1084                                    ; IN MORE THAN ONE TEST.
1085                                    ;--
1086
1087                                    ;
1088                                    ; STORAGE FOR DEVICE REGISTERS
1089                                    ;
1090
1091                                    ;-------------------------------------------------------------------------
1092 002220  000000                     U0ADR:  .WORD   0               ;UNIT 0 ADR
1093 002222  000000                     U1ADR:  .WORD   0               ;UNIT 1 ADR
1094 002224  000000                     U0VECT: .WORD   0               ;UNIT 0 VECTOR
1095 002226  000000                     U1VECT: .WORD   0               ;UNIT 1 VECTOR
1096                                    ;-------------------------------------------------------------------------
1097 002230  000000                     SDD:    .WORD   0               ;SYSTEM DRIVES DONE (SEE REG. DEF. BELOW)
1098 002232  000000                     SUT:    .WORD   0               ;SYSTEM UNDER TEST (SEE REG. DEF. BELOW)
1099 002234  000000                     UUT:    .WORD   0               ;UNIT UNDER TEST (SEE REG. DEF. BELOW)
1100 002236  000000                     UUTADR: .WORD   0               ;UUT UNIBUS ADR
1101 002240  000000                     UUTOFF: .WORD   0               ;UUT TABLE ADDRESSING OFFSET
1102 002242  000000                     DEN:    .WORD   0               ;DENSITY FLAG
1103 002244  000000                     DELDAT: .WORD   0               ;DELETED DATA FLAG
1104 002246  000000                     CSRUUT: .WORD   0               ;CONT/STATUS REG UUT
1105 002250  000000                     ESRUUT: .WORD   0               ;ERROR/STATUS REG UUT
1106                                    ;-------------------------------------------------------------------------
1107 002252  000000                     WDCNT:  .WORD   0               ;WORD COUNT
1108 002254  000000                     TRACK:  .WORD   0               ;TRACK ADR
1109 002256  000000                     SECTOR: .WORD   0               ;SECTOR ADR
1110 002260  000000                     TRKDN:  .WORD   0               ;TRACK DONE (UUT) FLAG
1111 002262  000000                     SECDN:  .WORD   0               ;SECTOR DONE (UUT) FLAG
1112                                    ;-------------------------------------------------------------------------
1113 002264  000000                     FLGDRS: .WORD   0               ;"DRS" FLAGS
1114 002266  000000                     FLAGS:  .WORD   0               ;DIAGNOSTIC FLAGS
1115 002270  000000                     ABORT:  .WORD   0               ;ABORT FLAG
1116 002272  000000                     PRTECD: .WORD   0               ;PRINT ERR CODE FLAG
1117                                    ;-------------------------------------------------------------------------
1118 002274  000000                     ERRSY:  .WORD   0               ;ERROR SYSTEM
1119 002276  000000                     ERRTY:  .WORD   0               ;ERROR TYPE
1120 002300  000000                     HARDER: .WORD   0               ;HARD ERROR
1121 002302  000000                     HDERCT: .WORD   0               ;HARD ERROR COUNTER (USED FOR "DFTL")
1122                                    ;-------------------------------------------------------------------------
1123 002304  000000                     RETRY:  .WORD   0               ;//(10)DATART/(4)RDRT/(2)WTRT/(1)SEEK/ SEE BELOW
1124 002306  000000                     SEEKRT: .WORD   0               ;SEEK RETRY COUNT
1125 002310  000000                     CKSMRT: .WORD   0               ;CHECK SUM RETRY COUNT
1126 002312  000000                     CRCBRT: .WORD   0               ;CRC BAD RETRY COUNT
1127 002314  000000                     CRCERT: .WORD   0               ;CRC ERR RETRY COUNT
1128 002316  000000                     DATART: .WORD   0               ;DATA RETRY COUNT
1129 002320  000000                     DARDRT: .WORD   0               ;DATA READ RETRY COUNT
1130 002322  000000                     DAWTRT: .WORD   0               ;DATA WRITE RETRY COUNT
1131 002324  000000                     READRT: .WORD   0               ;READ RETRY COUNT
1132 002326  000000                     WRTRT:  .WORD   0               ;WRITE RETRY COUNT
1133 002330  000000                     DDERCT: .WORD   0               ;D.D. ERR RETRY COUNT
1134                                    ;-------------------------------------------------------------------------
```

```
1137
1138 002332  000000
1139 002334  177777
1140 002336  177777
1141 002340  177777
1142 002342  177777
1143 002344  177777
1144
1145
1146
1147
1148
1149
1150
1151
1152
1153
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1177
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1181
1182
```

```
;-----------------------------------------------------------------------
CMD:    0                       ;COMMAND FOR PRINT
UNIT:   -1                      ;UNIT # FOR PRINT
UT00:   -1                      ;**** UUT CODE# TABLE ****
UT01:   -1                      ;     >STORAGE OF USER UNIT #
UT10:   -1                      ;      FOR PRINT OUT, LOOKUP
UT11:   -1                      ;      & STATISTICAL TABLE PRINT
;-----------------------------------------------------------------------
;       ***** SOFTWARE REGISTER DEFINITIONS *****
;-----------------------------------------------------------------------
;           !    BIT#
;           ! 03! 02! 01! 00
;    -------+---+---+---+---+
;    SDD:   ! 11! 10! 01! 00! <- UUT CODES-EQUIV TO A BIT SET IN THIS REG
;     &  ---+---+---+---+---+             -THAT IS UUT=00 IS SDD BIT#0 SET
;    SUT:   ! 11! 10! 01! 00! <- UUT CODES-
;    -------+---+---+---+---+
;
;-----------------------------------------------------------------------
;
;       !       RX02            !    RXXX-FUTURE EXPANSION
;      +-----------------------+-------------------------
;UUT:  ! 00 = UNIT#0/DRV#0      !    SIDE#0/DRV#0
;      ! 01 = UNIT#0/DRV#1      !    SIDE#0/DRV#1
;      ! 10 = UNIT#1/DRV#0      !    SIDE#1/DRV#0
;      ! 11 = UNIT#1/DRV#1      !    SIDE#1/DRV#1
;        ^^
;        !!
;        !!---<DRIVE #
;        !----<UNIT # (RX02) OR SIDE # (RXXX)
;-----------------------------------------------------------------------
;        !   !   !   !   !   !   !   !   !   !   !   !   !   !   !   !
;        ! 15! 14! 13! 12! 11! 10! 09! 08! 07! 06! 05! 04! 03! 02! 01! 00!
;        !---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---!
;ERRTY:  !ERR!ERR!DON!ITR!WRT! RD!FIL!UNK!   ! DD! DD!   !   ! CK!   !   !
;        !BIT!NOT! NO! NO!ERR!ERR!EMP!ERR! - !MIS!UNX! - !DAT!SUM!CRC!SEK!
;        !   !SET!ITR!DON!   !   !ERR!   !   !   !   !   !   !   !   !
;=======!===+===+===+===+===+===+===+===+===+===+===+===+===+===+===+===!
;        !   !   !   !DRV!   !   ! WRONG !DON!SID!DRV!NO DONE!  FUNCTION  !
;ERRSY:  !UNR! TO!DEN!DEN!SYS!DAG!-------!FUN!RDY!RDY!-------!   CAUSING   !
;        !ERR!ERR!ERR!ERR!ERR!ERR!SID!DRV! #2!ERR!ERR!FUN!INT!    ERROR    !
;=======+===+===+===+===+===+===+===+===+===+===+===+===+===+===+===+===!
;        !                                   !   !CRC!DAT! RD!WRT!SEK!
;RETRY:  !                                   !   ! RT! RT! RT! RT! RT!
;-----------------------------------------------------------------------!
;NOTE:  RXXX IS REFERENCE FOR FURTHER EXPANSION
```

```
                                .SBTTL  GLOBAL TEXT SECTION

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

                                ;
                                ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                ;
002346                                 DEVTYP  <RX02>

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

```
                                        .SBTTL  GLOBAL ERROR REPORT SECTION

                                        ;++
                                        ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
                                        ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
                                        ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
                                        ;--

                                        .SBTTL  -    MOD U.SFT.ERR - ERROR REPORT
                                        ;-------------------------------------------------------------------------
002354  012737  004506  002402  ERROR:  MOV     #NONE,ERRBLK    ;SETUP ERROR BLOCK CODE
002362  013737  002334  002074          MOV     UNIT,L$LUN      ;SETUP LUN FOR PRINT
002370                                  ERROR                   ;
002372  000207                          RETURN                  ;
                                        ;-------------------------------------------------------------------------
002374                                  ERRTBL
002374  000000                  ERRTYP::        .WORD   0
002376  000000                  ERRNBR::        .WORD   0
002400  000000                  ERRMSG::        .WORD   0
002402  000000                  ERRBLK::        .WORD   0
                                        ;-------------------------------------------------------------------------

                                        .SBTTL  -    MOD U.PRT.ERR - PRINT ERRORS
                                        ;-------------------------------------------------------------------------
002404                          PRTERR: PRINTB  #IDENT1,UNIT,CSRUUT,ESRUUT,CMD
002444  005737  002272          IFAUP:  TST     PRTECD          ;IF ERR CODE FLAG
002450  001452                          BEQ     ENDUP           ;SET, THEN
002452                                  PRINTX  #XER1,<B,XERUUT>,<B,WC>,<B,CTK0>,<B,CTK1>
002522                                  PRINTX  #XER2,<B,TTRK>,<B,TSEC>,<B,SFTSTS>,<B,BTRK>
002572  005037  002272                  CLR     PRTECD          ;CLEAR ERR CODE FLAG
002576  005037  002604          ENDUP:  CLR     ERRREG          ;CLEAR ERR REGISTER
002602  000207                          RTS     PC              ;RETURN
                                        ;-------------------------------------------------------------------------
002604  000000                  ERRREG: 0                       ;
                                        ;-------------------------------------------------------------------------
002606      045     101     040 IDENT1: .ASCIZ  /%A UNIT#%O1%A RXCSR=%O%A RXESR=%O%A CMD=%O%N/
002663      045     101     040 XER1:   .ASCIZ  /%A ERCD=%O3%A WC=%O3%A CTRK0=%D2%A. CTRK1=%D2%A./
002744      045     101     040 XER2:   .ASCIZ  /%A TTRK=%D2%A. TSEC=%D2%A. SFTSTAT=%O3%A BTRK=%D2%A.%N/
                                        .EVEN
                                        ;MOD U.PRT.ERR ----- END MODULE ----------------------------------------
```

```
1277
1278                                    .SBTTL  -    MOD U.PRT.EC - PRINT UNIT ERROR CODE
1279                                    ;-------------------------------------------------------------------
1280
1281 003034  105737  033544    XERPRT: TSTB    XERUUT          ;IF ERROR
1282 003040  001424              BEQ     ENDXER          ;NOT=0, THEN
1283 003042  013701  033544      MOV     XERUUT,R1       ;SAVE EXTENDED ERR CODE IN TEMP #1
1284 003046  042701  177400      BIC     #177400,R1      ;CLR TOP BYTE
1285 003052  006201              ASR     R1              ;FORMAT E.C.
1286 003054  006201              ASR     R1              ;FORMAT E.C. FOR ADR
1287 003056  062701  003114      ADD     #ECTAB-2,R1     ;FIND ADR OF ERROR MSG
1288 003062  011137  003114      MOV     (R1),EXMSG      ;SET ADR OF ERROR MSG FOR PRINT
1289 003066                      PRINTX  EXMSG           ;PRINT UNIT CODE ERROR MSG
1290 003106  105037  033544      CLRB    XERUUT          ;CLEAR ERROR CODE
1291 003112  000207    ENDXER:   RTS     PC              ;RETURN
1292                                    ;-------------------------------------------------------------------
1293
1294 003114  000000    EXMSG:    0                       ;MSG ADR FOR PRINT
1295                                    ;-------------------------------------------------------------------
1296
1297 003116  003170    ECTAB:    .WORD   EC1
1298 003120  003236              .WORD   EC2
1299 003122  003304              .WORD   EC3
1300 003124  003332              .WORD   EC4
1301 003126  003400              .WORD   EC5
1302 003130  003451              .WORD   EC6
1303 003132  003477              .WORD   EC7
1304 003134  003555              .WORD   EC10
1305 003136  003603              .WORD   EC11
1306 003140  003660              .WORD   EC12
1307 003142  003714              .WORD   EC13
1308 003144  003773              .WORD   EC14
1309 003146  004021              .WORD   EC15
1310 003150  004107              .WORD   EC16
1311 003152  004153              .WORD   EC17
1312 003154  004207              .WORD   EC20
1313 003156  004254              .WORD   EC21
1314 003160  004311              .WORD   EC22
1315 003162  004360              .WORD   EC23
1316 003164  004413              .WORD   EC24
1317 003166  004442              .WORD   EC25
1318                                    ;-------------------------------------------------------------------
```

```
                                        ;-----------------------------------------------------------------------
 003170      045     101     040    EC1:      .ASCIZ  /%A   >NO HOME ON INITIALIZE-DRV #0.%N/
 003236      045     101     040    EC2:      .ASCIZ  /%A   >NO HOME ON INITIALIZE-DRV #1.%N/
 003304      045     101     040    EC3:      .ASCIZ  /%A   >ILL ERR CODE.%N/
 003332      045     101     040    EC4:      .ASCIZ  /%A   >TRIED TO ACCESS A TRACK > 76.%N/
 003400      045     101     040    EC5:      .ASCIZ  /%A   >HOME FOUND BEFORE DESIRED TRACK.%N/
 003451      045     101     040    EC6:      .ASCIZ  /%A   >ILL ERR CODE.%N/
 003477      045     101     040    EC7:      .ASCIZ  /%A   >52 HEADERS PASSED & SECTOR NOT FOUND.%N/
 003555      045     101     040    EC10:     .ASCIZ  /%A   >ILL ERR CODE.%N/
 003603      045     101     040    EC11:     .ASCIZ  /%A   >NO SEPCLOCK SEEN IN 40 MICROSECONDS.%N/
 003660      045     101     040    EC12:     .ASCIZ  /%A   >PREAMBLE NOT FOUND.%N/
 003714      045     101     040    EC13:     .ASCIZ  /%A   >PREAMBLE FOUND BUT NO ID MARK IN TIME.%N/
 003773      045     101     040    EC14:     .ASCIZ  /%A   >ILL ERR CODE.%N/
 004021      045     101     040    EC15:     .ASCIZ  /%A   >GOOD TRACK ADDRESS HEADER NOT=SELECTED TRACK.%N/
 004107      045     101     040    EC16:     .ASCIZ  /%A   >TOO MANY TRIES FOR AN IDAM.%N/
 004153      045     101     040    EC17:     .ASCIZ  /%A   >NO DATA AM IN TIME.%N/
 004207      045     101     040    EC20:     .ASCIZ  /%A   >CRC ERROR ON READING SECTOR.%N/
 004254      045     101     040    EC21:     .ASCIZ  /%A   >UNASSIGNED ERR CODE.%N/
 004311      045     101     040    EC22:     .ASCIZ  /%A   >R-W ELECT. FAILED MAINT. TEST.%N/
 004360      045     101     040    EC23:     .ASCIZ  /%A   >WORD CNT OVERFLOW.%N/
 004413      045     101     040    EC24:     .ASCIZ  /%A   >DENSITY ERROR.%N/
 004442      045     101     040    EC25:     .ASCIZ  /%A   >SET DENSITY WRONG KEY WORD.%N/
                                              .EVEN
                                        ;-----------------------------------------------------------------------

                                        .SBTTL  -    ERROR PRINT CALLS/MSG CALLS
                                        ;-----------------------------------------------------------------------
 004506                                           BGNMSG  NONE
 004506                                           ENDMSG
                                        ;-----------------------------------------------------------------------
 004510                                           BGNMSG  PRTB1
 004510  004737  004536                           CALL    PRTB1S
 004514                                           ENDMSG
                                        ;-----------------------------------------------------------------------
 004516                                 PRTB0S:   PRINTB  R1
 004534  000207                                   RETURN
                                        ;-----------------------------------------------------------------------
 004536                                 PRTB1S:   PRINTB  R1.R2
 004556  000207                                   RETURN
                                        ;-----------------------------------------------------------------------
```

```
                                        .SBTTL  GLOBAL SUBROUTINES SECTION

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

                                        ;++
                                        ; FUNCTIONAL DESCRIPTION:
                                        ;    SUBROUTINE TO....
                                        ; INPUTS:  NONE
                                        ; IMPLICIT INPUTS:  NONE
                                        ; OUTPUTS:  RANUM
                                        ; IMPLICIT OUTPUTS:  NONE
                                        ; SUBORDINATE ROUTINES USED:  NONE
                                        ; FUNCTIONAL SIDE EFFECTS:  NONE
                                        ; CALLING SEQUENCE:  SUB
                                        ;--


                                        .SBTTL  -    MOD U.1.0 - RANDOM GENERATOR
                                        ;---------- RANDOM GENERATOR ----------------------------------------
004560  012700  000001          RANGEN: MOV     #1,R0
004564  063700  004646                  ADD     RAN1,R0
004570  063700  004650                  ADD     RAN2,R0
004574  042700  170000                  BIC     #170000,R0
004600  000241                          CLC
004602  006100                          ROL     R0
004604  006100                          ROL     R0
004606  010037  004646                  MOV     R0,RAN1
004612  005000                          CLR     R0
004614  013700  004650                  MOV     RAN2,R0
004620  006000                          ROR     R0
004622  006000                          ROR     R0
004624  063700  004646                  ADD     RAN1,R0
004630  042700  170000                  BIC     #170000,R0
004634  010037  004650                  MOV     R0,RAN2
004640  010037  004652                  MOV     R0,RANUM
004644  000207                          RTS     PC
                                        ;-------------------------------------------------------------------------
004646  000000          RAN1:   0
004650  000000          RAN2:   0
004652  000000          RANUM:  0
                                        ;-------------------------------------------------------------------------
```

```
1484                                    .SBTTL  -    MOD U.A.1 - CONVERSION UUT CODE --> SUTPTR
1485                                    ;-------------------------------------------------------------------
1486
1487 004654  000240                    CVUTST: NOP                     ;
1488 004656  005037  004754                    CLR     SUTCV           ;CLEAR SYS UNDER TEST CONVERTED
1489 004662  032737  000001  004752            BIT     #1,CVUNIT       ;IF DRIVE #0,
1490 004670  001014                            BNE     2$              ;SELECTED, THEN
1491 004672  032737  000002  004752            BIT     #2,CVUNIT       ;IF UNIT #0 OR RXXX SIDE #0,
1492 004700  001004                            BNE     1$              ;THEN
1493 004702  052737  000001  004754            BIS     #1,SUTCV        ;SET FOR UNIT CODE=00 IN SUT WORD
1494 004710  000417                            BR      ENDCVT          ;BR TO END
1495 004712  052737  000004  004754  1$:       BIS     #4,SUTCV        ;ELSE, SET FOR UNIT CODE=10 IN SUT WORD
1496 004720  000413                            BR      ENDCVT          ;BR TO END
1497 004722  032737  000002  004752  2$:       BIT     #2,CVUNIT       ;IF UNIT #0 OR RXXX SIDE #0,
1498 004730  001004                            BNE     3$              ;THEN
1499 004732  052737  000002  004754            BIS     #2,SUTCV        ;SET FOR UNIT CODE=01 IN SUT WORD
1500 004740  000403                            BR      ENDCVT          ;BR TO END
1501 004742  052737  000010  004754  3$:       BIS     #10,SUTCV       ;ELSE, SET FOR UNIT CODE=11 IN SUT WORD
1502 004750  000207                    ENDCVT: RTS     PC              ;RETURN
1503                                    ;-------------------------------------------------------------------
1504 004752  000000                    CVUNIT: 0                       ;UNIT CODE TO BE CONVERTED
1505 004754  000000                    SUTCV:  0                       ;SYS UNDER TEST AS CONVERTED
1506                                    ;MOD U.A.1 ----- END MODULE ----------------------------------------
1507
1508                                    .SBTTL  -    MOD U.A.2 - CONVERSION SUTPTR --> UUT CODE
1509                                    ;-------------------------------------------------------------------
1510
1511 004756  013705  021426            CVSTUT: MOV     SUTPTR,R5       ;SAVE SUT POINTER IN R5
1512 004762  005004                            CLR     R4              ;CLEAR R4 (RESET UNIT CODE)
1513 004764  032705  000001            1$:     BIT     #1,R5           ;IF LSB R5
1514 004770  001003                            BNE     2$              ;EQUALS 1 ,THEN BR TO 2$
1515 004772  006205                            ASR     R5              ;SHIFT RIGHT R5
1516 004774  005204                            INC     R4              ;INCREMENT R4
1517 004776  000772                            BR      1$              ;BR TO 1$
1518 005000  010437  005024            2$:     MOV     R4,UNITST       ;THEN R4 CONTAINS UUT CODE
1519 005004  006304                            ASL     R4              ;DOUBLE UNIT CODE FOR ADR
1520 005006  010437  002240                    MOV     R4,UUTOFF       ;SET UUT OFFSET
1521 005012  062704  002336                    ADD     #UUTOO,R4       ;GET UUT UNIT# FOR PRINT
1522 005016  011437  002334                    MOV     (R4),UNIT       ;SET UNIT=PRINT UNIT#
1523 005022  000207                            RTS     PC              ;RETURN
1524                                    ;-------------------------------------------------------------------
1525 005024  000000                    UNITST: 0                       ;
1526                                    ;MOD 2.0A ----- END MODULE ----------------------------------------
```

```
1529                                    .SBTTL  -    MOD U.DEV.REC - DEVICE READ ERROR CODE
1530                                    ;-------------------------------------------------------------------
1531
1532 005026  000240                     RDERCD: NOP                     ;
1533 005030  013705  002236                     MOV     UUTADR,R5       ;SET R5 = UUT ADDRESS
1534 005034  012737  000001  002272             MOV     #1,PRTECD       ;SET PRINT ERROR CODE FLAG
1535 005042  012737  000017  005136             MOV     #17,RECCMD      ;SET UUT EXTENDED ERROR CODE
1536 005050  053737  002242  005136             BIS     DEN,RECCMD      ;SET DEN FOR CMD
1537 005056  013715  005136                     MOV     RECCMD,(R5)     ;SEND CMD TO UUT
1538 005062  013701  002236                     MOV     UUTADR,R1       ;GET UUT ADDR
1539 005066  062701  000002                     ADD     #2,R1           ;CAL DATA ADR
1540 005072  013737  002236  025332             MOV     UUTADR,CSRADR   ;SET CSR ADR
1541 005100  012737  000200  025330             MOV     #TRBIT,RDYWD    ;SET "TR" BIT TEST
1542 005106  004737  025230                     CALL    DELAY           ;CALL DELAY MODULE-WAIT FOR TR
1543 005112  032715  000200             IAREC:  BIT     #200,(R5)       ;IF TR
1544 005116  001004                             BNE     LAREC           ;NOT SET
1545 005120  052737  040007  002274             BIS     #40007,ERRSY    ;THEN SET "TR" ERR ON FUNCTION
1546 005126  000402                             BR      XREC            ;BR TO END MOD
1547 005130  012711  033544             LAREC:  MOV     #XERUUT,(R1)    ;SEND BASE ADDR FOR EXTEND ERR CODE
1548 005134  000207                     XREC:   RETURN                  ;RETURN
1549                                    ;-------------------------------------------------------------------
1550 005136  000000                     RECCMD: 0                       ;COMMAND WORD USED IN THIS MODULE
1551                                    ;-------------------------------------------------------------------
1552
1553 005140                                     ENDMOD
1554
```

```
                                        .TITLE MISCELLANEOUS SECTIONS
                                        .SBTTL  REPORT CODING SECTION
                                
005140                                          BGNMOD
                                
                                        ;++
                                        ; THE REPORT CODING SECTION CONTAINS THE
                                        ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
                                        ;--
                                
                                        ;-------------------------------------------------------------------------
005140                                          BGNRPT
005140  000240                  REPORT: NOP                     ;
005142  012737  006074  005504          MOV     #PT20SP,PRT1    ;SETUP CTR HDR
005150  012737  006274  005506          MOV     #PTUNT2,PRT2    ;
005156  004737  005414                  CALL    PRTHDR          ;PRINT HEADER
005162  004737  005646                  CALL    PRTCTR          ;PRINT SEQ CTR
005166  012737  006105  005504          MOV     #PT19SP,PRT1    ;SETUP REPORT HEADER PART 1
005174  012737  006253  005506          MOV     #PTUNT1,PRT2    ;
005202  004737  005414                  CALL    PRTHDR          ;PRINT HEADER
005206  000240                          NOP                     ;SETUP DATA PART 1
005210  005037  005636                  CLR     LINECT          ;       ZERO LINE COUNTER
005214  005037  005644                  CLR     PRNUM           ;       CLEAR PRINT MODE
005220  012702  007354                  MOV     #CKSML,R2       ;       SET BEGIN ADR OF DATA-PART 1
005224  012701  006360                  MOV     #PRIDXX,R1      ;       SET BEGIN ADR OF TABLE LABLES-PART 1
005230  012737  000023  005640          MOV     #19.,LINES      ;       SET # OF LINES TO PRINT
005236  004737  005510                  CALL    PRTDAT          ;PRINT DATA
005242  012737  006200  005504          MOV     #PTEC,PRT1      ;SETUP HEADER PART 2
005250  012737  006253  005506          MOV     #PTUNT1,PRT2    ;
005256  004737  005414                  CALL    PRTHDR          ;PRINT HEADER
005262  000240                          NOP                     ;SETUP DATA PART 2
005264  012737  000001  005636          MOV     #1,LINECT       ;       SET LINE COUNTER=1
005272  012737  000001  005644          MOV     #1,PRNUM        ;       SET PRINT MODE=1
005300  012702  007604                  MOV     #ECLOG,R2       ;       SET BEGIN ADR ERROR CODE DATA-PART 2
005304  012701  006327                  MOV     #PTECN,R1       ;       SET ERROR CODE PRINT-FORMATED MSG-PART 2
005310  012737  000027  005640          MOV     #23.,LINES      ;       SET # OF LINES TO PRINT
005316  012737  006327  005642          MOV     #PTECN,LINTYP   ;
005324  004737  005510                  CALL    PRTDAT          ;PRINT DATA
005330  012737  006225  005504          MOV     #PTTK,PRT1      ;SETUP HEADER PART 3
005336  012737  006253  005506          MOV     #PTUNT1,PRT2    ;
005344  004737  005414                  CALL    PRTHDR          ;PRINT HEADER
005350  005037  005636                  CLR     LINECT          ;
005354  012737  000001  005644          MOV     #1,PRNUM        ;
005362  012702  010070                  MOV     #TKXX,R2        ;SETUP DATA PART 3
005366  012737  000115  005640          MOV     #77.,LINES      ;
005374  012737  006343  005642          MOV     #PTTKN,LINTYP   ;
005402  004737  005510                  CALL    PRTDAT          ;PRINT DATA PART 3
005406                          ENDRPT: ENDRPT
                                        ;-------------------------------------------------------------------------
005410  000000                  UTTST:  0                       ;UNIT #
005412  000000                  UTCNT:  0                       ;UNIT COUNT
                                        ;-------------------------------------------------------------------------
```

```
                                        .SBTTL  -       PRINT REPORT HEADER
                                        ;---------------------------------------------------------------------
005414  005003                        PRTHDR: CLR     R3                      ;
005416  013705  005504                        MOV     PRT1,R5                 ;SETUP 1ST PART OF HEADER PRINT
005422  004737  006030                        CALL    PREPT2                  ;PRINT 1ST PART
005426  012737  002336  005410                MOV     #UT00,UTTST             ;GET BEGIN ADR OF UNITS-->TESTED FLAGS
005434  012737  000004  005412                MOV     #4,UTCNT                ;SET UNIT COUNTER
005442  005777  177742                1$:     TST     @UTTST                  ;IF UNIT TESTED FLAG
005446  100407                              BMI     2$                      ;NOT=-1, THEN
005450  017737  177734  006026              MOV     @UTTST,PAR              ;SET UNIT TESTED # FOR PRINT
005456  013705  005506                      MOV     PRT2,R5                 ;SET UNIT MSG
005462  004737  006002                      CALL    PREPT1                  ;PRINT UNIT #
005466  062737  000002  005410        2$:     ADD     #2,UTTST                ;ADVANCE ADR OF UNIT TESTED FLAG
005474  005337  005412                      DEC     UTCNT                   ;DECREMENT UNIT COUNT
005500  001360                              BNE     1$                      ;IF UNIT COUNT=0, THEN
005502  000207                              RTS     PC                      ;RETURN
                                        ;---------------------------------------------------------------------
005504  000000                        PRT1:   0                               ;
005506  000000                        PRT2:   0                               ;
                                        ;---------------------------------------------------------------------

                                        .SBTTL  -       PRINT REPORT DATA
                                        ;---------------------------------------------------------------------
005510  000240                        PRTDAT: NOP                             ;
005512  005737  005644                1$:     TST     PRNUM                   ;IF MODE
005516  001410                              BEQ     2$                      ;
005520  013737  005636  006026              MOV     LINECT,PAR              ;SETUP LINE # TO PRINT
005526  013705  005642                      MOV     LINTYP,R5               ;SETUP LINE TYPE TO PRINT
005532  004737  006002                      CALL    PREPT1                  ;PRINT LINE #
005536  000403                              BR      3$                      ;
005540  012105                        2$:     MOV     (R1)+,R5                ;SETUP LOG TITLE ADR
005542  004737  006030                      CALL    PREPT2                  ;PRINT LOG TITLES
005546  012737  002336  005410        3$:     MOV     #UT00,UTTST             ;GET UNIT # FOR PRINT
005554  012737  000004  005412              MOV     #4,UTCNT                ;SETUP UNIT COUNT
005562  012237  006026                4$:     MOV     (R2)+,PAR               ;SETUP DATA TO PRINT
005566  005777  177616                      TST     @UTTST                  ;IF UNIT # NOT = -1
005572  100404                              BMI     5$                      ;THEN
005574  012705  006243                      MOV     #PTDAT1,R5              ;SETUP TO PRINT
005600  004737  006002                      CALL    PREPT1                  ;PRINT DATA
005604  062737  000002  005410        5$:     ADD     #2,UTTST                ;SETUP TO CK NEXT UNIT
005612  005337  005412                      DEC     UTCNT                   ;DECREMENT UNIT COUNT
005616  001361                              BNE     4$                      ;IF DONE ALL UNITS THEN
005620  005237  005636                      INC     LINECT                  ;INCREMENT LINE COUNT
005624  023737  005640  005636              CMP     LINES,LINECT            ;IF DONE ALL
005632  101327                              BHI     1$                      ;LINES, THEN
005634  000207                              RTS     PC                      ;RETURN
                                        ;---------------------------------------------------------------------
005636  000000                        LINECT: 0                               ;LINE COUNTER
005640  000000                        LINES:  0                               ;# OF LINES TO PRINT
005642  000000                        LINTYP: 0                               ;LINE PRINT TYPE.
005644  000000                        PRNUM:  0                               ;PRINT MODE
                                        ;---------------------------------------------------------------------
```

```
1711                                    .SBTTL  -    PRINT READ/WRITE SECTOR COUNTERS
1712                                    ;-------------------------------------------------------------------
1713
1714 005646  000240                     PRTCTR: NOP                     ;
1715 005650  005037  005640                     CLR     LINES           ;CLEAR LINE COUNTER
1716 005654  012702  007314                     MOV     #READSC,R2      ;GET ADDRESS OF READ SECTOR CTR
1717 005660  012705  006116                     MOV     #PTRDSC,R5      ;SETUP READ SECTORS MSG
1718 005664  004737  006002             1$:     CALL    PREPT1          ;CALL PRINT REPORT-MSG
1719 005670  012737  002336  005410             MOV     #UT00,UTTST     ;GET UNIT # FOR PRINT
1720 005676  012737  000004  005412             MOV     #4,UTCNT        ;SETUP UNIT COUNT
1721 005704  005777  177500             2$:     TST     @UTTST          ;IF UNIT #
1722 005710  100410                             BMI     5$              ;NOT=-1, THEN
1723 005712  062702  000002                     ADD     #2,R2           ;INCREMENT ADR TO UPPER WORD
1724 005716  011204                             MOV     (R2),R4         ;SETUP DATA UPPER PART FOR PRINT
1725 005720  014203                             MOV     -(R2),R3        ;SETUP DATA LOWER PART FOR PRINT
1726 005722  012705  006315                     MOV     #PTFMN1,R5      ;SETUP TO PRINT DATA
1727 005726  004737  006050                     CALL    PREPT3          ;PRINT DATA
1728 005732  062737  000002  005410     5$:     ADD     #2,UTTST        ;SETUP TO CK NEXT UNIT
1729 005740  062702  000004                     ADD     #4,R2           ;SET ADR TO NEXT CTR
1730 005744  005337  005412                     DEC     UTCNT           ;DECREMENT UNIT COUNT
1731 005750  001355                             BNE     2$              ;IF DONE THIS LINE, THEN
1732 005752  005237  005640                     INC     LINES           ;INCREMENT LINE CTR
1733 005756  022737  000002  005640             CMP     #2,LINES        ;DO WHILE LINE CTR
1734 005764  001405                             BEQ     6$              ;EQUALS <2
1735 005766  012702  007334                     MOV     #WRITSC,R2      ;GET ADDRESS OF WRITE SECTOR CTR
1736 005772  012705  006147                     MOV     #PTWTSC,R5      ;SETUP WRITE SECTORS MSG
1737 005776  000732                             BR      1$              ;BR TO WRITE SECTORS SECTION
1738 006000  000207                     6$:     RETURN                  ;RETURN
1739                                    ;-------------------------------------------------------------------
```

```
                                        .SBTTL  -    PRINT REPORT TYPE 1
                                        ;-------------------------------------------------------------------------
006002                                  PREPT1: PRINTS  R5,PAR
006024  000207                                  RTS     PC              ;
                                        ;-------------------------------------------------------------------------
006026  000000                          PAR:    0                       ;
                                        ;-------------------------------------------------------------------------
                                        .SBTTL  -    PRINT REPORT TYPE 2
                                        ;-------------------------------------------------------------------------
006030                                  PREPT2: PRINTS  R5
006046  000207                                  RTS     PC
                                        ;-------------------------------------------------------------------------
                                        .SBTTL  -    PRINT REPORT TYPE 3
                                        ;-------------------------------------------------------------------------
006050                                  PREPT3: PRINTS  R5,R4,R3
006072  000207                                  RETURN
                                        ;-------------------------------------------------------------------------
006074      045     116     045         PT20SP: .ASCIZ  /%N%N%S20/
006105      045     116     045         PT19SP: .ASCIZ  /%N%N%S19/
006116      045     116     045         PTRDSC: .ASCIZ  /%N%A# SECTOR READS  (8)=/
006147      045     116     045         PTWTSC: .ASCIZ  /%N%A# SECTOR WRITES (8)=/
006200      045     116     045         PTEC:   .ASCIZ  /%N%N%AERR%N%ACODE#  /
006225      045     116     045         PTTK:   .ASCIZ  /%N%N%ATRACK# /
006243      045     101     040         PTDAT1: .ASCIZ  /%A  %D6/
006253      045     123     061         PTUNT1: .ASCIZ  /%S1%AUNIT#%D1%S1/
006274      045     123     062         PTUNT2: .ASCIZ  /%S2%AUNIT#%D1%S5/
006315      045     123     062         PTFMN1: .ASCIZ  /%S2%06%05/
006327      045     116     045         PTECN:  .ASCIZ  /%N%02%A0%S3/
006343      045     116     045         PTTKN:  .ASCIZ  /%N%S1%D2%S3/
                                                .EVEN
                                        ;-------------------------------------------------------------------------
```

```
1785                                    ;-----------------------------------------------------------------------
1786 006360  006426                     PRIDXX: .WORD   PRID01
1787 006362  006455                             .WORD   PRID02
1788 006364  006504                             .WORD   PRID03
1789 006366  006533                             .WORD   PRID04
1790 006370  006562                             .WORD   PRID05
1791 006372  006611                             .WORD   PRID06
1792 006374  006640                             .WORD   PRID07
1793 006376  006667                             .WORD   PRID08
1794 006400  006716                             .WORD   PRID09
1795 006402  006745                             .WORD   PRID10
1796 006404  006774                             .WORD   PRID11
1797 006406  007023                             .WORD   PRID12
1798 006410  007052                             .WORD   PRID13
1799 006412  007101                             .WORD   PRID14
1800 006414  007130                             .WORD   PRID15
1801 006416  007157                             .WORD   PRID16
1802 006420  007206                             .WORD   PRID17
1803 006422  007235                             .WORD   PRID18
1804 006424  007264                             .WORD   PRID19
1805                                    ;-----------------------------------------------------------------------
1806
1807                                    ;-----------------------------------------------------------------------
1808 006426      045     116     045    PRID01: .ASCIZ  /%N%ACHECK SUM:         /
1809 006455      045     116     045    PRID02: .ASCIZ  /%N%AFILL-EMP BUFF LOG:/
1810 006504      045     116     045    PRID03: .ASCIZ  /%N%ANO ERR BIT:        /
1811 006533      045     116     045    PRID04: .ASCIZ  /%N%AINTER-NO DONE ERR:/
1812 006562      045     116     045    PRID05: .ASCIZ  /%N%AINTERRUPT ERR:     /
1813 006611      045     116     045    PRID06: .ASCIZ  /%N%ASEEK:              /
1814 006640      045     116     045    PRID07: .ASCIZ  /%N%ACRC ERR:           /
1815 006667      045     116     045    PRID08: .ASCIZ  /%N%ACRC BAD:           /
1816 006716      045     116     045    PRID09: .ASCIZ  /%N%AREAD ERR:          /
1817 006745      045     116     045    PRID10: .ASCIZ  /%N%AWRITE ERR:         /
1818 006774      045     116     045    PRID11: .ASCIZ  /%N%ADATA ERR:          /
1819 007023      045     116     045    PRID12: .ASCIZ  /%N%ADEL. DATA ERR:     /
1820 007052      045     116     045    PRID13: .ASCIZ  /%N%AHRD SEEK:          /
1821 007101      045     116     045    PRID14: .ASCIZ  /%N%AHRD CRC ERR:       /
1822 007130      045     116     045    PRID15: .ASCIZ  /%N%AHRD CRC BAD:       /
1823 007157      045     116     045    PRID16: .ASCIZ  /%N%AHRD READ:          /
1824 007206      045     116     045    PRID17: .ASCIZ  /%N%AHRD WRITE:         /
1825 007235      045     116     045    PRID18: .ASCIZ  /%N%AHRD DATA:          /
1826 007264      045     116     045    PRID19: .ASCIZ  /%N%AHRD DEL. DATA ERR:/
1827                                            .EVEN
1828                                    ;-----------------------------------------------------------------------
```

```
1831                                    .SBTTL  -    STATISTICAL TABLES
1832                                    ;-------------------------------------------------------------------
1833
1834 007314                            READSC: .BLKW   8.              ;READ SECTOR COUNTER
1835 007334                            WRITSC: .BLKW   8.              ;WRITE SECTOR COUNTER
1836 007354                            CKSML:  .BLKW   4               ;CKSUM LOG
1837 007364                            BUFERL: .BLKW   4               ;FILL/EMPTY BUFFER ERROR LOG
1838 007374                            NOERL:  .BLKW   4               ;NO ERR BIT LOG
1839 007404                            UKINT:  .BLKW   4               ;INTERRUPT - NO DONE LOG
1840 007414                            INTER:  .BLKW   4               ;INTERRUPT ERR
1841 007424                            SEK:    .BLKW   4               ;SEEK ERR
1842 007434                            CRC:    .BLKW   4               ;CRC ERR
1843 007444                            CRCBAD: .BLKW   4               ;CRC BAD ERR
1844 007454                            RD:     .BLKW   4               ;READ ERR
1845 007464                            WRT:    .BLKW   4               ;WRITE ERR
1846 007474                            DATA:   .BLKW   4               ;DATA ERR
1847 007504                            DLDTER: .BLKW   4               ;DEL DATA  ERR
1848 007514                            HSEK:   .BLKW   4               ;HARD SEEK ERR
1849 007524                            HCRC:   .BLKW   4               ;HARD CRC ERR
1850 007534                            HCRCBD: .BLKW   4               ;HARD CRC BAD ERR
1851 007544                            HRD:    .BLKW   4               ;HARD READ ERR
1852 007554                            HWRT:   .BLKW   4               ;HARD WRITE ERR
1853 007564                            HDATA:  .BLKW   4               ;HARD DATA ERR
1854 007574                            HDD:    .BLKW   4               ;HARD DEL DATA ERR
1855 007604                            ECLOG:  .BLKW   90.             ;ERROR CODE LOG
1856 010070                            TKXX:   .BLKW   308.            ;TRACK ERR LOG
1857                                    ;-------------------------------------------------------------------
1858 011240  000000                    ENDST:  .WORD   0               ;END TABLE
1859
1871
1872                                            .EVEN
1873
1874                                    .SBTTL  LOAD DEVICE PROTECTION
1875                                    ;-------------------------------------------------------------------
1876 011242                                     BGNPROT
1877 011242  000000                             .WORD   0               ;RX CSR - HARDWARE P-TABLE OFFSET
1878 011244  177777                             .WORD   -1              ;DON'T CARE
1879 011246  000004                             .WORD   4               ;RX DRIVER-HARDWARE P-TABLE OFFSET
1880 011250                                     ENDPROT
1881                                    ;-------------------------------------------------------------------
```

```
                                        .SBTTL  INITIALIZE SECTION
                                        ;++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE BEGINNING OF EACH PASS. PRI07 HAS BEEN CHANGED TO PRI06
                                        ; TO MAKE THIS DIAGNOSTIC SBC-11/21 PROCESSOR  SPECIFIC.
                                        ;----------------------------------------------------------------
011250                                  BGNINIT
011250  005037  002266          INIT:   CLR     FLAGS                   ;CLEAR ALL FLAGS
011254                                  RFLAGS  FLGDRS                  ;GET "DRS" FLAGS
011262                                  READEF  #EF.PWR                 ;IF POWER FAIL FLAG IS
011270                                  BNCOMPLETE 1$                   ;SET, THEN
011272  052737  000001  002266          BIS     #POWERF,FLAGS           ;SET POWER FAIL FLAG
011300  000507                          BR      FIN                     ;BR TO 'FIN'
011302                                  READEF  #EF.START               ;IF START FLAG
011310                          1$:     BNCOMPLETE      2$              ;SET, THEN
011312  005037  002220                  CLR     U0ADR                   ;CLEAR SYS U0 ADDRESS
011316  005037  002222                  CLR     U1ADR                   ;CLEAR SYS U1 ADDRESS
011322  005037  002224                  CLR     U0VECT                  ;CLEAR SYS U0 VECTOR
011326  005037  002226                  CLR     U1VECT                  ;CLEAR SYS U1 VECTOR
011332  005037  002232          2$:     CLR     SUT                     ;CLEAR SYS UNDER TST WORD
011336  023727  002012  000004          CMP     L$UNIT,#4               ;IF 4 UNITS OR LESS SELECTED
011344  003051                          BGT     INITER                  ;THEN
011346                                  READEF  #EF.RESTART             ;IF RESTART FLAG
011354                                  BNCOMPLETE SETUP                ;SET, THEN
011356  052737  000002  002266          BIS     #RESTAR,FLAGS           ;SET RESTART FLAG
011364  005037  002270          SETUP:  CLR     ABORT                   ;CLEAR ABORT FLAG
011370  012737  177777  002334          MOV     #-1,UNIT                ;RESTORE UNIT # CTR
011376  012737  177777  002336          MOV     #-1,UT00                ;RESET UNIT#1
011404  012737  177777  002340          MOV     #-1,UT01                ;RESET UNIT#2
011412  012737  177777  002342          MOV     #-1,UT10                ;RESET UNIT#3
011420  012737  177777  002344          MOV     #-1,UT11                ;RESET UNIT#4
011426  062737  000001  002334  1$:     ADD     #1,UNIT                 ;INCREMENT TO NEXT UNIT
011434  023737  002012  002334          CMP     L$UNIT,UNIT             ;IF LOGICAL UNIT & UNIT
011442  001426                          BEQ     FIN                     ;NOT YET EQUAL, THEN
011444                                  GPHARD  UNIT,PLOC               ;GET HARDWARE P-TABLE
011456                                  BNCOMPLETE 1$                   ;IF P-TABLE AVAILABLE, THEN
011460  000240                          NOP                             ;
011462  004737  011656                  JSR     PC,UNPKHP               ;CALL UNPACK HARDWARE P-TABLE
011466  000757                          BR      1$                      ;BR TO BEGIN DO
011470                          INITER: PRINTF  #INTER1                 ;PRINT "TOO MANY UNITS"
011510  012737  000001  002270          MOV     #1,ABORT                ;SET ABORT
011516                                  DOCLN                           ;DO CLEAN UP
011520                          FIN:    SETVEC  U0VECT,#INTH0,#PRI06    ;SET SYS U0 VECTOR
011546  005737  002226                  TST     U1VECT                  ;IF SYS U1 VECTOR
011552  001413                          BEQ     2$                      ;NOT=0, THEN
011554                          1$:     SETVEC  U1VECT,#INTH1,#PRI06    ;SET SYS U1 VECTOR
011602                          2$:     ENDINIT
                                        ;----------------------------------------------------------------
011604  000000                  PLOC:   .WORD   0
                                        ;----------------------------------------------------------------
011606     045     116     045  INTER1: .ASCIZ  /%N%AONLY FOUR UNITS ALLOWED, START OVER/
                                        .EVEN
                                        ;----------------------------------------------------------------
```

```
                                      .SBTTL  -    MOD I.1 - UNPACK HARDWARE P-TABLES
                                      ;------------------------------------------------------------------------

011656  000240                        UNPKHP: NOP                          ;
011660  005037  012330                        CLR     UNT                  ;CLEAR UNT
011664  013701  011604                        MOV     PLOC,R1              ;SAVE P-TABLE LOCATION
011670  005737  002334                IFAI1:  TST     UNIT                 ;IF UNIT
011674  001005                                BNE     IFBI1                ;IS ZERO
011676  012137  002220                        MOV     (R1)+,U0ADR          ;LOAD UNIT #0 ADR
011702  012137  002224                        MOV     (R1)+,U0VECT         ;LOAD UNIT #0 VECTOR
011706  000426                                BR      IFEI1                ;BR TO END IF 'A'
011710  021137  002220                IFBI1:  CMP     (R1),U0ADR           ;IF THIS ADR
011714  001003                                BNE     IFCI1                ;EQUALS UNIT #0 ADR
011716  062701  000004                        ADD     #4,R1                ;INCREMENT TEMP #1 BY 4
011722  000420                                BR      IFEI1                ;BR TO END IF 'A'
011724  005737  002222                IFCI1:  TST     U1ADR                ;IF UN1 ADDRESS
011730  001005                                BNE     IFDI1                ;NOT LOADED PREVIOUSLY
011732  012137  002222                        MOV     (R1)+,U1ADR          ;LOAD UNIT#1 ADR
011736  012137  002226                        MOV     (R1)+,U1VECT         ;LOAD UNIT #1 VECTOR
011742  000405                                BR      EICI1                ;BR TO END IF 'C'
011744  021137  002222                IFDI1:  CMP     (R1),U1ADR           ;IF UNIT ADR
011750  001153                                BNE     ELDI1                ;EQUALS UNIT #1 ADR
011752  062701  000004                        ADD     #4,R1                ;THEN ADD 4 TO TEMP #1
011756  012737  000001  012330        EICI1:  MOV     #1,UNT               ;SET UNT=1
011764  005737  002172                IFEI1:  TST     RXXX                 ;IF RXXX
011770  001445                                BEQ     IFII1                ;THEN
011772  005711                        IFFI1:  TST     (R1)                 ;IF DRIVE #0
011774  001021                                BNE     IFHI1                ;THEN
011776  062701  000002                IFGI1:  ADD     #2,R1                ;ADD 2 TO TEMP #1
012002  005711                                TST     (R1)                 ;IF SIDE #0 SELECTED
012004  001006                                BNE     ELGI1                ;THEN
012006  052737  000001  002232                BIS     #BIT0,SUT            ;SET SIDE #0, DRIVE #0
012014  005037  012326                        CLR     UNTCOD               ;CLEAR UNIT CODE
012020  000501                                BR      EIFI1                ;BR TO END IF 'F'
012022  052737  000004  002232        ELGI1:  BIS     #BIT2,SUT            ;SET SIDE #1, DRIVE #0
012030  012737  000002  012326                MOV     #2,UNTCOD            ;SET UNIT CODE = 10
012036  000472                                BR      EIFI1                ;BR TO END IF 'F'
012040  062701  000002                IFHI1:  ADD     #2,R1                ;ADD 2 TO TEMP #1
012044  005711                                TST     (R1)                 ;IF SIDE #0 SELECTED
012046  001007                                BNE     ELHI1                ;THEN
012050  052737  000002  002232                BIS     #BIT1,SUT            ;SET SIDE #0, DRIVE #1
012056  012737  000001  012326                MOV     #1,UNTCOD            ;SET UNIT CODE = 01
012064  000457                                BR      EIFI1                ;BR TO END IF 'F'
012066  052737  000010  002232        ELHI1:  BIS     #BIT3,SUT            ;SET SIDE #1, DRIVE #1
012074  012737  000003  012326                MOV     #3,UNTCOD            ;SET UNIT CODE = 11
012102  000450                                BR      EIFI1                ;BR TO END IF 'F'
012104  062701  000002                IFII1:  ADD     #2,R1                ;ADD 2 TO R1
012110  005711                                TST     (R1)                 ;IF SIDE
012112  001056                                BNE     ELII1                ;EQUALS 0, THEN
012114  162701  000002                IFJI1:  SUB     #2,R1                ;SUBTRACT 2 FROM TEMP #1
012120  005711                                TST     (R1)                 ;IF DRIVE
012122  001020                                BNE     IFLI1                ;EQUALS ZERO, THEN
012124  005737  012330                IFKI1:  TST     UNT                  ;IF UNIT
012130  001006                                BNE     ELKI1                ;EQUALS ZERO
012132  052737  000001  002232                BIS     #BIT0,SUT            ;SET UNIT #0, DRIVE #0
012140  005037  012326                        CLR     UNTCOD               ;CLEAR UNIT CODE
012144  000427                                BR      EIFI1                ;BR TO END IF 'F'
```

```
2020 012146  052737  000004  002232  ELKI1:  BIS     #BIT2,SUT       ;SET UNIT #1, DRIVE #0
2021 012154  012737  000002  012326          MOV     #2,UNTCOD       ;SET UNIT CODE = 10
2022 012162  000420                          BR      EIFI1           ;BR TO END IF 'F'
2023 012164  005737  012330          IFLI1:  TST     UNT             ;IF UNIT
2024 012170  001007                          BNE     ELLI1           ;EQUALS 0
2025 012172  052737  000002  002232          BIS     #BIT1,SUT       ;SET UNIT #0, DRIVE #1
2026 012200  012737  000001  012326          MOV     #1,UNTCOD       ;SET UNIT CODE = 01
2027 012206  000406                          BR      EIFI1           ;BR TO END IF 'F'
2028 012210  052737  000010  002232  ELLI1:  BIS     #BIT3,SUT       ;SET UNIT #1, DRIVE #1
2029 012216  012737  000003  012326          MOV     #3,UNTCOD       ;SET UNIT CODE = 11
2030 012224  012701  002336          EIFI1:  MOV     #UTOO,R1        ;GET BEGINING OF UNIT CODE TABLE
2031 012230  013702  012326                  MOV     UNTCOD,R2       ;GET UNIT CODE
2032 012234  006302                          ASL     R2              ;DOUBLE R2 FOR ADDRESS: 0
2033 012236  060201                          ADD     R2,R1           ;FIND ADDRESS FOR THIS UNIT CODE
2034 012240  013703  002334                  MOV     UNIT,R3         ;GET LOGICAL UNIT#
2035 012244  010311                          MOV     R3,(R1)         ;SET USER UNIT# FOR PRINT OUT
2036 012246  000426                          BR      ENDI1           ;BR TO END MOD
2037 012250                          ELII1:  PRINTF  #INMSG2,UNIT    ;PRINT "MUST SELECT RXXX TO SEL SIDE"
2038 012274                                  DOCLN
2039 012276  000412                          BR      ENDI1           ;BR TO END MOD
2040 012300                          ELDI1:  PRINTF  #INMSG3,UNIT    ;PRINT "NOT SCHEDULED-TWO BUS ADR ONLY"
2041 012324  000207                  ENDI1:  RTS     PC              ;RETURN
2042                                  ;-------------------------------------------------------------------------
2043 012326  000000                  UNTCOD: 0                       ;UNIT CODE
2044 012330  000000                  UNT:    0                       ;UNIT FLAG
2045                                  ;-------------------------------------------------------------------------
2046 012332     045     116     045  INMSG2: .ASCIZ  /%N%AUNIT#%D1%A ANS RXXX EXPANSION TO SELECT SIDE #1->START OVER/
2047 012432     045     116     045  INMSG3: .ASCIZ  /%N%AUNIT#%D1%A NOT SCHEDULED-TWO BUS ADDRESSESS ONLY%N/
2048                                          .EVEN
2049                                  ;MOD I.1 ----- END MODULE ----------------------------------------------
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE END OF EACH PASS.
                                        ;--

012522                                          BGNCLN
012522  000240                                  NOP
012524                                          CLRVEC  U0VECT
012532  005737  002226                          TST     U1VECT
012536  001403                                  BEQ     2$
012540                                          CLRVEC  U1VECT
012546                                  2$:     BRESET
012550                                          ENDCLN


                                        .EVEN
```

```
2089                                    .SBTTL  'AUTO DROP SECTION
2090                                    ;-------------------------------------------------------------------------
2091 012552                             BGNAUTO
2092 012552  005737  002220  IAATDP:    TST     U0ADR           ;IF SYS UNIT 0 ADDRESS
2093 012556  001447                     BEQ     IDATDP          ;NOT=0, THEN
2094 012560  012703  002336             MOV     #UT00,R3        ;SETUP R3 = ADR OF SELECTED UNIT
2095 012564  013702  002220             MOV     U0ADR,R2        ;GET SYS UNIT 0 ADDRESS
2096 012570  004737  012774             CALL    ADRTST          ;CALL ADDRESSING TEST
2097 012574  005737  002270  IBATDP:    TST     ABORT           ;IF ABORT FLAG
2098 012600  001436                     BEQ     IDATDP          ;SET, THEN
2099 012602  005737  002336  IGATDP:    TST     UT00            ;IF UT00 SELECTED
2100 012606  100403                     BMI     IHATDP          ;THEN
2101 012610                             DODU    UT00            ;DROP UNIT 00
2102 012616  005737  002340  IHATDP:    TST     UT01            ;IF UT01 SELECTED
2103 012622  100403                     BMI     ICATDP          ;THEN
2104 012624                             DODU    UT01            ;DROP UNIT 01
2105 012632  005737  002172  ICATDP:    TST     RXXX            ;IF RXXX DEVICE
2106 012636  001417                     BEQ     IDATDP          ;THEN
2107 012640  012703  002342             MOV     #UT10,R3        ;SETUP R3 = ADR OF SELECTED UNIT
2108 012644  005737  002342  IIATDP:    TST     UT10            ;IF UT10 SELECTED
2109 012650  100403                     BMI     IJATDP          ;THEN
2110 012652                             DODU    UT10            ;DROP UNIT 10
2111 012660  005737  002344  IJATDP:    TST     UT11            ;IF UT11 SELECTED
2112 012664  100440                     BMI     XATDP           ;THEN
2113 012666                             DODU    UT11            ;DROP UNIT 11
2114 012674  000434                     BR      XATDP           ;BR TO EXIT
2115 012676  005737  002222  IDATDP:    TST     U1ADR           ;IF SYS UNIT 1 ADDRESS
2116 012702  001425                     BEQ     IFATDP          ;NOT=0, THEN
2117 012704  012703  002342             MOV     #UT10,R3        ;SETUP R3 = ADR OF SELECTED UNIT
2118 012710  013702  002222             MOV     U1ADR,R2        ;GET SYS UNT 1 ADDRESS
2119 012714  004737  012774             CALL    ADRTST          ;CALL ADDRESSING TEST
2120 012720  005737  002270  IEATDP:    TST     ABORT           ;IF ABORT FLAG
2121 012724  001420                     BEQ     XATDP           ;SET, THEN
2122 012726  005737  002342  IKATDP:    TST     UT10            ;IF UT10 SELECTED
2123 012732  100403                     BMI     ILATDP          ;THEN
2124 012734                             DODU    UT10            ;DROP UNIT 10
2125 012742  005737  002344  ILATDP:    TST     UT11            ;IF UT11 SELECTED
2126 012746  100403                     BMI     IFATDP          ;THEN
2127 012750                             DODU    UT11            ;DROP UNIT 11
2128 012756  005737  002220  IFATDP:    TST     U0ADR           ;IF SYS UNIT 0 ADDRESS
2129 012762  001001                     BNE     XATDP           ;EQUALS 0, THEN
2130 012764                             DOCLN                   ;DO CLEAN
2131 012766  005037  002270  XATDP:     CLR     ABORT           ;CLEAR ABORT FLAG
2132 012772                             ENDAUTO
2133                                    ;-------------------------------------------------------------------------
```

```
                                        .SBTTL  -    TEST 0: ADDRESSING TEST
                                        ;-------------------------------------------------------------------
                                        ; BGNSUB
                                        ;       IF FUNCTION TEST
                                        ;       :  THEN-SETUP TEST
                                        ;       :       SETUP BUS TRAPS
                                        ;       :       READ RXCSR
                                        ;       :       RESET BUS TRAPS
                                        ;       :       IF TRAP
                                        ;       :       :  THEN-SET SYSTEM FATAL FLAG
                                        ;       :       :       CALL FUNCTION TEST ERROR
                                        ;       :       :       REPORT BUS TRAP ON RXCSR
                                        ;       :       ENDIF
                                        ;       ENDIF
                                        ; ENDSUB
                                        ;-------------------------------------------------------------------

012774  000240                  ADRTST: NOP                     ;
012776  005037  002270                  CLR     ABORT           ;CLEAR ABORT FLAG
013002                                  SETVEC  #BTRP4,#TRAP,#PR106
013030  011201                          MOV     (R2),R1         ;READ RXCSR
013032                                  CLRVEC  #BTRP4
013040  005737  002270                  TST     ABORT           ;IF ABORT FLAG
013044  001426                          BEQ     2$              ;SET, THEN
013046  012701  013144                  MOV     #TRPMS1,R1      ;SET TRAP MESSAGE
013052  012337  002074                  MOV     (R3)+,L$LUN     ;IF UNIT
013056  100005                          BPL     1$              ;NOT SELECTED, THEN
013060  011337  002074                  MOV     (R3),L$LUN      ;IF NEXT UNIT
013064  100002                          BPL     1$              ;NOT SELECTED, THEN
013066  005037  002074                  CLR     L$LUN           ;CLEAR UNIT
013072  012737  000620  002376  1$:     MOV     #400.,ERRNBR    ;SETUP ERR NBR = ADR ERR
013100  012737  013124  002400          MOV     #TOMSG,ERRMSG   ;SETUP ERROR MSG
013106  012737  004510  002402          MOV     #PRTB1,ERRBLK   ;SETUP ERROR BLK
013114  005037  002374                  CLR     ERRTYP          ;SETUP ERR TYP = SYS FTL
013120                                  ERROR                   ;CALL ERROR
013122  000207                  2$:     RETURN                  ;RETURN
                                        ;-------------------------------------------------------------------
013124     101     104     104  TOMSG:  .ASCIZ  /ADDRESSING TEST/
013144     045     101     040  TRPMS1: .ASCII  /%A BUS TRAP AT ADDRESS:%O6%N/
013200     045     101     040          .ASCIZ  /%A INTERFACE BAD OR NOT SET TO ABOVE ADDRESS%N/
                                        .EVEN
```

```
 2179                                   .SBTTL  -    MOD U.SFT.TRP - BUS TRAP HANDLER
 2180                                   ;++
 2181                                   ; FUNCTIONAL DESCRIPTION:  SUBR TO HANDLE DEVICE BUS TRAP
 2182                                   ; INPUTS:  NONE
 2183                                   ; IMPLICIT INPUTS:  BUS TRAP
 2184                                   ; OUTPUTS:  BUS TRAP ERROR, ABORT TEST
 2185                                   ; IMPLICIT OUTPUTS:  NONE
 2186                                   ; SUBORDINATE ROUTINES USED:  NONE
 2187                                   ; FUNCTIONAL SIDE EFFECTS:  NONE
 2188                                   ; CALLING SEQUENCE:  INTERRUPT
 2189                                   ;--
 2190
 2191                                   ;-----------------------------------------------------------------------
 2192
 2193 013260  052737  004000  002274  TRAP:   BIS     #SYSERR,ERRSY   ;SET SYSTEM ERROR
 2194 013266  005237  002270                 INC     ABORT           ;ABORT TEST
 2195 013272  000002                         RTI                     ;RETURN FROM TRAP INTERRUPT
 2196                                   ;-----------------------------------------------------------------------
```

```
                                .SBTTL  DROP UNIT SECTION

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


013274                                  BGNDU

013274  010037  013436                  MOV     R0,UNITDP       ;GET LOGICAL UNIT #
013300  005002                          CLR     R2              ;LET R2=UNIT CODE# & UNIT COUNT /CLEAR IT!
013302  012701  002336                  MOV     #UT00,R1        ;GET BEGIN UNIT CODE ADRESS
013306  023721  013436          1$:     CMP     UNITDP,(R1)+    ;IF USER UNIT#
013312  001417                          BEQ     2$              ;IS  = UNIT CODE - UNIT#
013314  005202                          INC     R2              ;INCREMENT UNIT CODE# & UNIT COUNT
013316  022702  000005                  CMP     #5,R2           ;IF MAX # OF UNITS
013322  101371                          BHI     1$              ;EXCEEDED, THEN
013324                                  PRINTF  #DUMSG2,UNITDP  ;PRINT UNIT# NOT FOUND
013350  000431                          BR      3$              ;BR TO EXIT
013352  012741  177777          2$:     MOV     #-1,-(R1)       ;DESELECT UNIT
013356  010237  004752                  MOV     R2,CVUNIT       ;SET UNIT CODE FOR CONVERSION
013362  004737  004654                  CALL    CVUTST          ;CALL MOD U.A.1 CONVERT UNIT# TO SUT CODE
013366  013737  004754  013440          MOV     SUTCV,SUTDRP    ;SET SUT DROP CODE = SUT CONVERTED CODE
013374  043737  013440  002232          BIC     SUTDRP,SUT      ;DROP UNIT SPEC IN SUTDRP
013402  043737  013440  002230          BIC     SUTDRP,SDD      ;CLEAR UNIT SPEC IN SUT DROP
013410                                  PRINTF  #DUMSG1,UNITDP

013434                          3$:     ENDDU
                                ;-------------------------------------------------------------------------
013436  000000                  UNITDP: 0                       ;UNIT TO BE DROPPED
013440  000000                  SUTDRP: 0                       ;SYS UNDER TST, DROP BIT
                                ;-------------------------------------------------------------------------
013442      045     116     045 DUMSG1: .ASCIZ  /%N%A DROP UNIT#%D1%A FROM TEST%N/
013503      045     116     045 DUMSG2: .ASCIZ  /%N%A COULD NOT DROP UNIT#%D1%A -NOT SELECTED%N/
                                ;-------------------------------------------------------------------------


                                        .EVEN
```

```
                                .SBTTL  ADD UNIT SECTION

                                ;++
                                ; THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ;  TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
                                ;  "EF.AUNIT" IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
                                ;--

013562                                  BGNAU


013562                                  ENDAU


                                        .EVEN
```

```
2289                            .TITLE HARDWARE TESTS
2290                            .SBTTL  TEST 1: RX02 SS PERF EXERCISER
2291                            ;++
2292                            ; TEST TO EXCERCISE RX02/XX SYSTEM
2293                            ;--
2294                            .SBTTL  MOD 0.0 - EXERCISE A SYSTEM
2295                            ;-------------------------------------------------------------------
2296                            ; BGNTST
2297                            ;  BGNDO
2298                            ;    :  BGNSUB
2299                            ;    :  :  INITIALIZE (LOCATIONS, ETC.)
2300                            ;    :  :  CALL MOD 1.0
2301                            ;    :  ENDSUB
2302                            ;    :  IF ERR SYS=1
2303                            ;    :  :  THEN-
2304                            ;    :  :     CALL MOD 4.0
2305                            ;    :  ENDIF
2306                            ;    :  IF ABORT=0
2307                            ;    :  :  THEN-
2308                            ;    :  :    BGNDO
2309                            ;    :  :    :  BGNSUB
2310                            ;    :  :    :  CALL MOD 2.0
2311                            ;    :  :    :  IF ERR SYS NOT=0
2312                            ;    :  :    :  :  THEN-
2313                            ;    :  :    :  :     CALL MOD 4.0
2314                            ;    :  :    :  :     IF ABORT=0
2315                            ;    :  :    :  :     :  THEN-
2316                            ;    :  :    :  :     :     CALL MOD 3.0
2317                            ;    :  :    :  :     ENDIF
2318                            ;    :  :    :  :  ELSE-
2319                            ;    :  :    :  :     CALL MOD 3.0
2320                            ;    :  :    :  ENDIF
2321                            ;    :  :    :  CK LOOP
2322                            ;    :  :    :  ENDSUB
2323                            ;    :  :    DO UNTIL ABORT=1 OR EXCMP=1
2324                            ;    :  ENDIF
2325                            ;  DO UNTIL SWREG BIT#15 NOT SET
2326                            ;  IF ABORT=1
2327                            ;  :  THEN-
2328                            ;  :    DO CLEAN UP
2329                            ;  :  ELSE-
2330                            ;  :    DO REPORT
2331                            ;  ENDIF
2332                            ; ENDTST
2333                            ;-------------------------------------------------------------------
```

```
2335 013564                                BGNTST
2336 013564  000240                CONTRL: NOP                     ;
2337 013566                        BG00:   BGNSUB                  ;BEGIN SUB TEST
2338 013570  005037  014020                CLR     EXCMP           ;CLEAR EXERCISE COMPLETE
2339 013574  005037  002270                CLR     ABORT           ;CLEAR ABORT FLAG
2340 013600  012737  000001  014016        MOV     #1,INITL        ;SET INITIALIZE FLAG
2341 013606  005037  002304                CLR     RETRY           ;CLEAR RETRY FLAGS
2342 013612  005037  002230                CLR     SDD             ;CLEAR SYS DRIVES DONE
2343 013616  005037  002274                CLR     ERRSY           ;CLEAR SYSTEM ERROR FLAGS
2344 013622  005037  002276                CLR     ERRTY           ;CLEAR DEVICE ERROR FLAGS
2345 013626  005037  002246                CLR     CSRUUT          ;CLEAR UUT CSR
2346 013632  005037  002250                CLR     ESRUUT          ;CLEAR UUT ESR
2347 013636  005037  033544                CLR     XERUUT          ;CLEAR UUT TEST ERROR REG
2348 013642  005037  002332                CLR     CMD             ;CLEAR COMMAND PRINT WORD
2349 013646  005037  023330                CLR     WDOT            ;CLEAR COMMAND WORD
2350 013652  012737  000001  021426        MOV     #1,SUTPTR       ;PRESET SYS UNDER TST PTR
2351 013660  004737  014022                CALL    GTSYEX          ;CALL MOD 1.0 GET SYS EXER.
2352 013664                                ENDSUB                  ;END SUB TEST
2353 013666  005737  002274        IA00:   TST     ERRSY           ;IF ERR SYS
2354 013672  001402                        BEQ     IB00            ;NOT=0, THEN
2355 013674  004737  032466                CALL    OTSYER          ;CALL MOD 4.0 - O/P SYSTEM ERROR
2356 013700  005737  002270        IB00:   TST     ABORT           ;IF ABORT
2357 013704  001030                        BNE     UG00            ;NOT SET, THEN
2358 013706                        BC00:   BGNSUB                  ;BEGIN SUB TEST
2359 013710  004737  020676                CALL    SCSYEX          ;CALL MOD 2.0 - SCHEDULE SYSTEM EXERCISE
2360 013714  005737  002274        ID00:   TST     ERRSY           ;IF ERR SYSTEM
2361 013720  001410                        BEQ     LD00            ;NOT=0, THEN
2362 013722  004737  032466                CALL    OTSYER          ;CALL MOD 4.0 - O/P SYSTEM ERROR
2363 013726  005737  002270        IE00:   TST     ABORT           ;IF ABORT
2364 013732  001005                        BNE     ED00            ;NOT SET, THEN
2365 013734  004737  032444                CALL    OTEXCM          ;CALL MOD 3.0 - O/P SYSTEM EXERCISE COMPLETE
2366 013740  000402                        BR      ED00            ;BR TO END 'D'
2367 013742  004737  032444        LD00:   CALL    OTEXCM          ;CALL MOD 3.0 - O/P SYSTEM EXERCISE COMPLETE
2368 013746                        ED00:   CKLOOP                  ;CHECK LOOP ON ERROR
2369 013750                                ENDSUB                  ;END SUB TEST
2370 013752  005737  002270        UC00:   TST     ABORT           ;DOUNTIL ABORT
2371 013756  001007                        BNE     IF00            ;OR
2372 013760  005737  014020                TST     EXCMP           ;EXERCISE COMPLETE
2373 013764  001750                        BEQ     BC00            ;SET
2374 013766  032737  100000  002204  UG00:   BIT     #100000,SWREG   ;DOUNTIL SWREG BIT#15
2375 013774  001274                        BNE     BG00            ;NOT SET
2376 013776  005737  002270        IF00:   TST     ABORT           ;IF ABORT
2377 014002  001402                        BEQ     LF00            ;SET, THEN
2378 014004                                DOCLN                   ;DO CLEAN UP
2379 014006  000401                        BR      ENDOO           ;BR TO END
2380 014010                        LF00:   DORPT                   ;DO REPORT
2381 014012                        ENDOO:  EXIT    TST             ;EXIT TEST
2382                               ;-------------------------------------------------------------------
2383 014016  000000                INITL:  0                       ;INITIALIZE POINTERS FLAG
2384 014020  000000                EXCMP:  0                       ;EXERCISE COMPLETE FLAG
2385                               ;MOD 0.0 ----- END MODULE ------------------------------------------
```

```
 ,88
 589
2390                                    .SBTTL  MOD 1.0 - GET SYSTEM EXERCISE
2391                                    ;-------------------------------------------------------------------
2392 014022  000240                     GTSYEX: NOP
2393 014024  032737  000001  002266     IFB10:  BIT     #POWERF,FLAGS   ;IF POWER FLAG
2394 014032  001002                             BNE     IFA10           ;NOT SET, THEN
2395 014034  004737  014076                     JSR     PC,GTEXCD       ;CALL GET EXERCISE CONDITION
2396 014040  032737  040000  002204     IFA10:  BIT     #40000,SWREG    ;IF NO INITIALIZE
2397 014046  001002                             BNE     ELA10           ;NOT SET, THEN
2398 014050  004737  014216                     JSR     PC,GTSYS        ;CALL GET SYSTEM TO EXERCISE
2399 014054  004737  017302             ELA10:  JSR     PC,GTEX         ;CALL GET EXERCISE
2400 014060  042737  040000  002274             BIC     #BIT14,ERRSY    ;CLEAR ANY TIME OUT ERRORS ALREADY REPORTED
2401 014066  005037  014074                     CLR     FIRST           ;CLEAR FIRST PASS FLAG
2402 014072  000207                             RTS     PC              ;RETURN
2403                                    ;-------------------------------------------------------------------
2404 014074  000001                     FIRST:  1                       ;FIRST PASS FLAG
2405                                    ;MOD 1.0 ----- END MODULE -----------------------------------------
2406
2407
2408
2409                                    .SBTTL  MOD 1.1 - GET EXERCISE CONDITIONS
2410                                    ;-------------------------------------------------------------------
2411
2412
2413 014076  000240                     GTEXCD: NOP
2414 014100  032737  000001  002204     IFA11:  BIT     #1,SWREG        ;IF SET FOR DOUBLE DENSITY
2415 014106  001404                             BEQ     ELA11           ;THEN
2416 014110  012737  000200  002252             MOV     #200,WDCNT      ;SET WORD COUNT=256 BYTES
2417 014116  000403                             BR      EIA11           ;BR TO END IF 'A'
2418 014120  012737  000100  002252     ELA11:  MOV     #100,WDCNT      ;SET WORD COUNT=128 BYTES
2419 014126  013737  002206  020650     EIA11:  MOV     OTDITK,OD       ;SET OUTSIDE TRACK ADR. (FROM SOFTW P-TAB)
2420 014134  013737  002210  020652             MOV     INDITK,ID       ;SET INSIDE TRACK ADR. (FROM SOFT P-TAB)
2421 014142  032737  000002  002204             BIT     #2,SWREG        ;IF DEL DATA SET
2422 014150  001404                             BEQ     ELB11           ;THEN
2423 014152  012737  000010  002244             MOV     #10,DELDAT      ;SET DEL DATA MODE
2424 014160  000402                             BR      IFC11           ;BR TO END IF 'B'
2425 014162  005037  002244             ELB11:  CLR     DELDAT          ;CLEAR DEL DATA MODE
2426 014166  032737  000001  002204     IFC11:  BIT     #1,SWREG        ;IF DOUBLE DEN IS SET IN SOFT SWREG
2427 014174  001404                             BEQ     ELC11           ;THEN
2428 014176  012737  000400  002242             MOV     #400,DEN        ;SET DEN=DOUBLE
2429 014204  000402                             BR      EIC11           ;BR TO END IF 'C'
2430 014206  005037  002242             ELC11:  CLR     DEN             ;SET DEN=SINGLE
2431 014212  000240                     EIC11:  NOP                     ;
2432 014214  000207                             RTS     PC              ;RETURN
2433                                    ;MOD 1.1 ----- END MODULE -----------------------------------------
```

```
2436
2437
2438                                    .SBTTL  MOD 1.2 - GET SYSTEM TO EXERCISE
2439                                    ;---------------------------------------------------------------------
2440
2441 014216                            GTSYS:  BRESET                  ;ISSUE BUS RESET
2442 014220  004737  014626                    CALL    GPSUN0          ;CALL GET PRINTABLE SYSTEM 0 UNIT #
2443 014224  012737  000040  025330            MOV     #DNBIT,RDYWD    ;SET READY WORD = DONE
2444 014232  013737  002220  025332            MOV     U0ADR,CSRADR    ;SET ADDRESS
2445 014240  004737  025230                    CALL    DELAY           ;CALL MOD - DELAY FOR DONE
2446 014244  032777  000040  165746  IFA12:    BIT     #DNBIT,@U0ADR   ;IF UNIT #0 DONE BIT
2447 014252  001006                            BNE     ELA12           ;NOT SET THEN
2448 014254  012737  016167  016130            MOV     #INTER2,ITMSG   ;SET PRINT MSG#
2449 014262  004737  016016                    CALL    ITERR           ;INITIALIZE ERR-U0-NO DONE BIT
2450 014266  000442                            BR      EIA12           ;BR TO END IF 'A'
2451 014270  012777  040000  165722  ELA12:    MOV     #40000,@U0ADR   ;ELSE-ISSUE PROG INIT TO U0
2452 014276  012737  000040  025330            MOV     #DNBIT,RDYWD    ;SET READY WORD = DONE
2453 014304  013737  002220  025332            MOV     U0ADR,CSRADR    ;SET TEST ADDRESS
2454 014312  004737  025230                    CALL    DELAY           ;CALL MOD - DELAY FOR DONE
2455 014316  032777  000040  165674  IFB12:    BIT     #DNBIT,@U0ADR   ;IF UNIT #0 DONE BIT
2456 014324  001006                            BNE     ELB12           ;NOT SET THEN
2457 014326  012737  016235  016130            MOV     #INTER3,ITMSG   ;SET PRINT MSG#
2458 014334  004737  016016                    CALL    ITERR           ;INITIALIZE ERR-U0, NO DONE BIT
2459 014340  000415                            BR      EIA12           ;BR TO END IF 'A'
2460 014342  012737  000002  015276  ELB12:    MOV     #2,UNTCNT       ;SET # DRVS TO CK
2461 014350  012737  000001  015302            MOV     #1,SUTPOS       ;SET POSITION IN SUT TO TEST = 1
2462 014356  005037  015300                    CLR     UNTCD           ;SET UUT CODE = 0
2463 014362  013704  002220                    MOV     U0ADR,R4        ;SET TEMP #4 = U0 ADDRESS
2464 014366  004737  014742                    CALL    CKDVAV          ;CALL MOD 1.2.1 - CK DRIVE STATUS
2465 014372  000412                            BR      IFC12           ;BR TO IF 'C'
2466 014374  005737  002172            EIA12:  TST     RXXX            ;IF RXXX
2467 014400  001404                    IFH12:  BEQ     ELH12           ;THEN
2468 014402  042737  000017  002232            BIC     #17,SUT         ;CLEAR RXXX U0 SELECTED DRIVES
2469 014410  000403                            BR      IFC12           ;BR TO IF 'C'
2470 014412  042737  000003  002232  ELH12:    BIC     #3,SUT          ;CLEAR RX02 U0 SELECTED DRIVES
2471 014420  005737  002172            IFC12:  TST     RXXX            ;IF RXXX
2472 014424  001401                            BEQ     IFD12           ;THEN
2473 014426  000463                            BR      IFG12           ;BR TO IF 'G'
2474 014430  032737  000014  002232  IFD12:    BIT     #14,SUT         ;IF U1
2475 014436  001457                            BEQ     IFG12           ;SELECTED THEN
2476 014440  004737  014702                    CALL    GPSUN1          ;CALL GET PRINTABLE SYSTEM 1 UNIT #
2477 014444  032777  000040  165550  IFE12:    BIT     #DNBIT,@U1ADR   ;IF U1 DONE BIT
2478 014452  001441                            BEQ     ELE12           ;SET THEN
2479 014454  012777  040000  165540            MOV     #40000,@U1ADR   ;INITIALIZE DEVICE U1
2480 014462  012737  000040  025330            MOV     #DNBIT,RDYWD    ;SET READY WORD = DONE BIT
2481 014470  013737  002222  025332            MOV     U1ADR,CSRADR    ;SET TEST ADR
2482 014476  004737  025230                    CALL    DELAY           ;CALL MOD - WAIT FOR DONE
2483 014502  032777  000040  165512  IFF12:    BIT     #DNBIT,@U1ADR   ;IF U1 DONE BIT
2484 014510  001416                            BEQ     ELF12           ;SET THEN
2485 014512  012737  000004  015302            MOV     #4,SUTPOS       ;SET POSITION IN SUT = 4
2486 014520  012737  000002  015276            MOV     #2,UNTCNT       ;SET # DRVS TO CK = 2
2487 014526  012737  000002  015300            MOV     #2,UNTCD        ;SET UUT CODE = 2
2488 014534  013704  002222                    MOV     U1ADR,R4        ;SET TEMP #4 = U1 ADR
2489 014540  004737  014742                    CALL    CKDVAV          ;CALL MOD 1.2.1 - CK DRIVE STATUS
2490 014544  000414                            BR      IFG12           ;BR TO IF 'G'
2491 014546  012737  016235  016130  ELF12:    MOV     #INTER3,ITMSG   ;SET MSG#-U1-"NO DONE BIT-PROG INT"
2492 014554  000403                            BR      EIE12           ;BR TO END IF 'E'
```

```
2493 014556  012737  016167  016130  ELF12:  MOV     #INTER2,ITMSG   ;SET MSG#-U1-''NO DONE BIT-BUS INIT''
2494 014564  004737  016016          EIE12:  CALL    ITERR           ;INIT ERR
2495 014570  042737  000014  002232          BIC     #14,SUT         ;CLEAR SYS 1 FROM TEST
2496 014576  005737  002232          IFG12:  TST     SUT             ;IF SYSTEM UNDER TEST
2497 014602  001007                          BNE     ELG12           ;EQUALS 0, THEN
2498 014604  012701  016305                  MOV     #INTER4,R1      ;SETUP PRINT - ''NO SYS TO TEST''
2499 014610  004737  004516                  CALL    PRTBOS          ;CALL PRINT BASIC-0 ARG
2500 014614  012737  000001  002270          MOV     #1,ABORT        ;SET ABORT FLAG
2501 014622  000240                  ELG12:  NOP                     ;
2502 014624  000207                          RTS     PC              ;RETURN
2503                                 ;MOD 1.2 ----- END MODULE ----------------------------------------
2504
2505                                 .SBTTL  -    MOD 1.2.U.1 - GET PRINTABLE SYSTEM 0 UNIT #
2506                                 ;-----------------------------------------------------------------
2507 014626  005037  002334          GPSUN0: CLR     UNIT            ;SET UNIT=0
2508 014632  005737  002336                  TST     UT00            ;IF UT00
2509 014636  100404                          BMI     2$              ;VALID, THEN
2510 014640  013737  002336  002334          MOV     UT00,UNIT       ;SETUP UNIT FOR PRINT
2511 014646  000414                          BR      XPSUN0          ;BR TO EXIT
2512 014650  005737  002340          2$:     TST     UT01            ;IF UT01
2513 014654  100404                          BMI     3$              ;VALID, THEN
2514 014656  013737  002340  002334          MOV     UT01,UNIT       ;SETUP UNIT FOR PRINT
2515 014664  000405                          BR      XPSUN0          ;BR TO EXIT
2516 014666  005737  002172          3$:     TST     RXXX            ;IF RXXX
2517 014672  001402                          BEQ     XPSUN0          ;THEN
2518 014674  004737  014702                  CALL    GPSUN1          ;CALL GET PRINTABLE SYSTEM 1 UNIT #
2519 014700  000207                  XPSUN0: RETURN                  ;RETURN
2520                                 ;-----------------------------------------------------------------
2521
2522                                 .SBTTL  -    MOD 1.2.U.2 - GET PRINTABLE SYSTEM 1 UNIT #
2523                                 ;-----------------------------------------------------------------
2524 014702  005037  002334          GPSUN1: CLR     UNIT            ;SET UNIT=0
2525 014706  005737  002342          1$:     TST     UT10            ;IF UT10
2526 014712  100404                          BMI     2$              ;VALID, THEN
2527 014714  013737  002342  002334          MOV     UT10,UNIT       ;SETUP UNIT FOR PRINT
2528 014722  000406                          BR      XPSUN1          ;BR TO EXIT
2529 014724  005737  002344          2$:     TST     UT11            ;IF UT11
2530 014730  100403                          BMI     XPSUN1          ;VALID, THEN
2531 014732  013737  002344  002334          MOV     UT11,UNIT       ;SETUP UNIT FOR PRINT
2532 014740  000207                  XPSUN1: RETURN                  ;RETURN
2533                                 ;-----------------------------------------------------------------
```

```
2536                                    .SBTTL  MOD 1.2.1 - CK DRIVE AVAILABLE
2537                                    ;-------------------------------------------------------------------
2538 014742  010437  015272            CKDVAV: MOV     R4,ITCSAD       ;SAVE C & S ADR
2539 014746  062704  000002                    ADD     #2,R4           ;SET DATA BUFFER ADR
2540 014752  010437  015274                    MOV     R4,ITDBAD       ;SAVE DB ADR
2541 014756  000240                    BDA121: NOP                     ;
2542 014760  033737  015302  002232    IFA121: BIT     SUTPOS,SUT      ;IF THIS UNIT SUT & SUT
2543 014766  001521                            BEQ     EIA121          ;EQUAL, THEN
2544 014770                                    BGNSEG                  ;BEGIN SEGMENT-TO LOOP ON ERROR
2545 014772  013701  015300                    MOV     UNTCD,R1        ;SAVE UNIT CODE #
2546 014776  006301                            ASL     R1              ;DOUBLE UNIT CD FOR ADR
2547 015000  062701  002336                    ADD     #UT00,R1        ;FIND ADR UNIT#
2548 015004  011137  002334                    MOV     (R1),UNIT       ;SET UNIT# FOR PRINT
2549 015010  032737  000001  015300    IFB121: BIT     #1,UNTCD        ;IF DRIVE #1 SET IN UNIT CODE
2550 015016  001407                            BEQ     ELB121          ;THEN
2551 015020  012737  000033  015266            MOV     #33,INTCMD      ;SET READ STATUS DRV #1
2552 015026  012737  000001  015270            MOV     #1,DRIVEN       ;SET PRINT FOR DRV #1
2553 015034  000405                            BR      EIB121          ;BR TO END IF 'B'
2554 015036  012737  000013  015266    ELB121: MOV     #13,INTCMD      ;SET READ STATUS DRV #0
2555 015044  005037  015270                    CLR     DRIVEN          ;SET PRINT FOR DRIVE #0
2556 015050  013777  015266  000214    EIB121: MOV     INTCMD,@ITCSAD  ;EXECUTE READ STATUS ON DRIVE AT TEMP #4
2557 015056  013737  015272  025332            MOV     ITCSAD,CSRADR   ;PASS DOWN ADRS
2558 015064  012737  000040  025330            MOV     #DNBIT,RDYWD    ;PASS DOWN "DONE" BIT TO TEST
2559 015072  004737  025230                    CALL    DELAY           ;CALL MOD - DELAY FOR DONE BIT
2560 015076  032777  000010  000170    IFH121: BIT     #10,@ITDBAD     ;IF AC LOW BIT
2561 015104  001404                            BEQ     IFC121          ;SET, THEN
2562 015106  012737  017200  016130            MOV     #ITER3,ITMSG    ;SET MSG# -  "AC LOW"
2563 015114  000436                            BR      EIC121          ;BR TO END IF 'C'
2564 015116  032777  000200  000150    IFC121: BIT     #200,@ITDBAD    ;IF DRV RDY BIT
2565 015124  001004                            BNE     IFI121          ;NOT SET, THEN
2566 015126  012737  016334  016130            MOV     #ITMSG1,ITMSG   ;SET MSG# - "NO DRIVE READY"
2567 015134  000426                            BR      EIC121          ;BR TO END IF 'C'
2568 015136  032777  004000  000126    IFI121: BIT     #RX2BIT,@ITCSAD ;IF CSR RX02 BIT
2569 015144  001004                            BNE     IFD121          ;NOT SET, THEN
2570 015146  012737  016521  016130            MOV     #ITMSG5,ITMSG   ;SET MSG # "NOT CAP. OF DOUBLE DENS. OPS."
2571 015154  000416                            BR      EIC121          ;BR TO END IF 'C'
2572 015156  005737  002172            IFD121: TST     RXXX            ;IF UNIT IS TO BE TESTED AS RXXX
2573 015162  001421                            BEQ     EID121          ;THEN
2574 015164  032737  000002  015300    IFE121: BIT     #2,UNTCD        ;IF SIDE #1
2575 015172  001415                            BEQ     EID121          ;SELECTED
2576 015174  032777  000002  000072    IFF121: BIT     #2,@ITDBAD      ;IF SIDE #1
2577 015202  001011                            BNE     EID121          ;NOT READY, THEN
2578 015204  012737  016357  016130            MOV     #ITMSG2,ITMSG   ;SET MSG# - "NO SIDE RDY"
2579 015212  004737  016016            EIC121: CALL    ITERR           ;CALL INITIALIZE ERROR
2580 015216                                    ENDSEG                  ;END SEGMENT-TO LOOP ON ERROR
2581 015220  004737  016064                    CALL    ITDROP          ;CALL DROP UNIT
2582 015224  000402                            BR      EIA121          ;BR TO ENDIF 'A'
2583 015226  004737  015306            EID121: CALL    REFDRV          ;CALL REFORMAT DRIVE DENSITY
2584 015232  006137  015302            EIA121: ROL     SUTPOS          ;MOVE SELECT BIT TO TEST SYS UNDER TEST
2585 015236  005337  015276                    DEC     UNTCNT          ;DECREMENT UNIT COUNT
2586 015242  005237  015300                    INC     UNTCD           ;INCREMENT UNIT UNDER TEST CODE
2587 015246  005737  015276            DUA121: TST     UNTCNT          ;DO
2588 015252  001402                            BEQ     END121          ;UNTIL
2589 015254  000137  014756                    JMP     BDA121          ;ALL UNITS DONE
2590 015260  000240                    END121: NOP                     ;
2591 015262  000207                            RTS     PC              ;RETURN
2592                                    ;-------------------------------------------------------------------
```

```
2595
2596 015264  000000                ;-------------------------------------------------------------------
2597 015266  000000                REFCMD: 0                       ;REFORMAT COMMAND
2598 015270  000000                INTCMD: 0                       ;INITIAL COMMAND WORD
2599 015272  000000                DRIVEN: 0                       ;DRIVE NUMBER
2600 015274  000000                ITCSAD: 0                       ;INITIAL C & S ADR
2601 015276  000000                ITDBAD: 0                       ;INITIAL DATA BUFFER ADR
2602 015300  000000                UNTCNT: 0                       ;UNIT COUNT
2603 015302  000000                UNTCD:  0                       ;UNIT CODE
2604 015304  000000                SUTPOS: 0                       ;SYS UNDER TST POSITION
2605                               FORMCK: 0                       ;FORMATT CK FLAG
                                   ;-------------------------------------------------------------------
```

```
2608                                        .SBTTL  MOD 1.2.1.1 - REFORMAT DRIVE DENSITY
2609                                        ;-------------------------------------------------------------------
2610
2611 015306  033737  015302  002232  REFDRV: BIT     SUTPOS,SUT      ;IF UNIT SELECTED IN
2612 015314  001003                          BNE     IA1211          ;SYS UNDER TEST
2613 015316  000137  016012                  JMP     X1211           ;THEN
2614 015322                                  BGNSEG                  ;BEGIN SEGMENT-FOR LOOP ON ERROR
2615 015324  032737  000001  002204  IA1211: BIT     #1,SWREG        ;IF DOUBLE DENSITY
2616 015332  001417                          BEQ     IC1211          ;SET, THEN
2617 015334  032777  000040  177732  IB1211: BIT     #40,@ITDBAD     ;IF DISKETTE IS NOT DOUBLE DENSITY
2618 015342  001011                          BNE     LB1211          ;THEN
2619 015344  012737  016401  016130          MOV     #ITMSG3,ITMSG   ;SET MSG# DSK SGL DEN
2620 015352  004737  016102                  CALL    ITPRNT          ;CALL PRINT -
2621 015356  012737  000400  015264          MOV     #BIT8,REFCMD    ;SET REFORMAT CMD TO DOUBLE DENSITY
2622 015364  000417                          BR      ID1211          ;BR TO IF 'D'
2623 015366  000137  016012          LB1211: JMP     X1211           ;ELSE BR TO END
2624 015372  032777  000040  177674  IC1211: BIT     #40,@ITDBAD     ;IF DISKETTE
2625 015400  001002                          BNE     1$              ;IS NOT SINGLE DENSITY, THEN
2626 015402  000137  016012                  JMP     X1211           ;-
2627 015406  012737  016576  016130  1$:     MOV     #ITMSG6,ITMSG   ;SET MSG# DSK DBL DEN
2628 015414  004737  016102                  CALL    ITPRNT          ;CALL PRINT -
2629 015420  005037  015264                  CLR     REFCMD          ;SET REFORMAT CMD TO SINGLE DENSITY
2630 015424                          ID1211: MANUAL                  ;IF MANUAL INTERVENTION
2631 015426                                  BNCOMPLETE      LD1211  ;IS ALLOWED,THEN
2632 015430                                  GMANIL  FCKMSG,FORMCK,1,YES
2633 015444  005737  015304          IE1211: TST     FORMCK          ;IF REFORMATT
2634 015450  001544                          BEQ     LE1211          ;OK, THEN
2635 015452  005037  015304                  CLR     FORMCK          ;CLEAR REFORMATT CK
2636 015456  052737  000011  015264          BIS     #11,REFCMD      ;SET REFORMAT CMD
2637 015464  032737  000001  015300  IF1211: BIT     #1,UNTCD        ;IF DRIVE #1
2638 015472  001403                          BEQ     IG1211          ;SELECTED
2639 015474  052737  000020  015264          BIS     #BIT4,REFCMD    ;SET DRIVE #1 ON REFORMAT CMD
2640 015502  005737  002172          IG1211: TST     RXXX            ;IF RXXX
2641 015506  001407                          BEQ     EG1211          ;DEVICE AND
2642 015510  032737  000002  015300          BIT     #2,UNTCD        ;SIDE #1
2643 015516  001403                          BEQ     EG1211          ;SELECTED, THEN
2644 015520  052737  001000  015264          BIS     #BIT9,REFCMD    ;SET SIDE #1 ON REFORMAT CMD
2645 015526  013777  015264  177536  EG1211: MOV     REFCMD,@ITCSAD  ;SEND REFORMAT CMD
2646 015534  013737  015272  025332          MOV     ITCSAD,CSRADR   ;PASS UNIT ADRS
2647 015542  012737  000200  025330          MOV     #TRBIT,RDYWD    ;PASS "TR" BIT TO TEST
2648 015550  004737  025230                  CALL    DELAY           ;CALL DELAY
2649 015554  005737  002274          IH1211: TST     ERRSY           ;IF
2650 015560  001070                          BNE     LH1211          ;T.O. ERR
2651 015562  012777  000111  177504          MOV     #111,@ITDBAD    ;SEND VARIFY WORD (ASCII "I")
2652 015570  013702  002334                  MOV     UNIT,R2         ;SETUP UNIT # PRT
2653 015574  012701  016753                  MOV     #ITMSG9,R1      ;SET MSG# WRG DEN REFORMAT
2654 015600  004737  004536                  CALL    PRTB1S          ;CALL PRINT BASIC-1 ARG
2655 015604  013737  015272  025332          MOV     ITCSAD,CSRADR   ;SET UNIT BUS ADR
2656 015612  012737  000040  025330          MOV     #DNBIT,RDYWD    ;SET DONE BIT TST
2657 015620  013737  025324  016014          MOV     RYDX,SAVDLY     ;SAVE NORMAL DELAY MULTIPLIER
2658 015626  012737  001000  025324          MOV     #1000,RYDX      ;SET DELAY MULT HIGH
2659 015634  004737  025230                  CALL    DELAY           ;DELAY UNTIL DONE OR T. O.
2660 015640  013737  016014  025324          MOV     SAVDLY,RYDX     ;RESET DELAY MULT
2661 015646  017737  177420  002246          MOV     @ITCSAD,CSRUUT  ;GET UUT CSR
2662 015654  017737  177414  002250          MOV     @ITDBAD,ESRUUT  ;GET UUT ESR
2663 015662  032777  000040  177402  II1211: BIT     #40,@ITCSAD     ;IF DONE BIT
2664 015670  001420                          BEQ     LI1211          ;SET ,THEN
```

```
2665 015672  032777  100000  177372  IJ1211: BIT     #100000,@ITCSAD ;IF ERR BIT NOT SET
2666 015700  001444                          BEQ     X1211           ;THEN BR TO EXIT
2667 015702  013737  015264  002332          MOV     REFCMD,CMD      ;SET COMMAND FOR PRINT
2668 015710  013737  015272  002236          MOV     ITCSAD,UUTADR   ;SET UUT ADR
2669 015716  004737  005026                  CALL    RDERCD          ;CALL DEVICE READ ERROR CODE
2670 015722  012737  017032  016130          MOV     #ITER1,ITMSG    ;ELSE, SET "ERROR ON REFORMATT" MSG
2671 015730  000407                          BR      EH1211          ;BR TO END IF 'H'
2672 015732  012737  017116  016130  LI1211: MOV     #ITER2,ITMSG    ;SET "NO DONE BIT AFTER REFORMATT" MSG
2673 015740  000403                          BR      EH1211          ;BR TO END IF 'H'
2674 015742  012737  016454  016130  LH1211: MOV     #ITMSG4,ITMSG   ;SET MSG# NO "TR" BIT TIME OUT ERR
2675 015750  004737  016016          EH1211: CALL    ITERR           ;CALL INITIALIZE ERROR
2676 015754  004737  002404                  CALL    PRTERR          ;CALL PRINT ERR
2677 015760  000411                          BR      EA1211          ;BR TO END IF 'A'
2678 015762  012737  016652  016130  LE1211: MOV     #ITMSG7,ITMSG   ;SET MSG# DISK WRG DEN
2679 015770  000403                          BR      ED1211          ;BR TO END IF 'D'
2680 015772  012737  016704  016130  LD1211: MOV     #ITMSG8,ITMSG   ;SET MSG# MAN INTERVENTION NOT ALL
2681 016000  004737  016016          ED1211: CALL    ITERR           ;CALL INITIALIZE ERROR
2682 016004                          EA1211: ENDSEG                  ;END SEGMENT-TO LOOP ON ERROR
2683 016006  004737  016064                  CALL    ITDROP          ;CALL DROP UNIT
2684 016012  000207                  X1211:  RTS     PC              ;RETURN
2685                                         ;-------------------------------------------------------------------------
2686 016014  000000                  SAVDLY: 0                       ;SAVE NORMAL DELAY MULTIPLIER
2687                                         ;-------------------------------------------------------------------------
```

```
2690                                    .SBTTL  -    MOD 1.2.U.3 - INITIALIZE ERROR
2691                                    ;-------------------------------------------------------------------
2692
2693 016016  012737  000310  002376  ITERR:  MOV     #200.,ERRNBR    ;SET ERR NBR = INIT ERR
2694 016024  012737  016132  002400          MOV     #ITERMG,ERRMSG  ;
2695 016032  012737  004506  002402          MOV     #NONE,ERRBLK    ;
2696 016040  012737  000001  002374          MOV     #1,ERRTYP       ;SET ERR TYP = DEV FTL
2697 016046  013737  002334  002074          MOV     UNIT,L$LUN      ;SETUP LUN FOR PRINT
2698 016054                                  ERROR                   ;CALL ERROR
2699 016056  004737  016102                  CALL    ITPRNT          ;CALL INITIALIZE PRINT
2700 016062  000207                          RETURN                  ;RETURN
2701                                    ;-------------------------------------------------------------------
2702
2703                                    .SBTTL  -    MOD 1.2.U.4 - INITIALIZE DROP
2704                                    ;-------------------------------------------------------------------
2705 016064  013737  015302  013440  ITDROP: MOV     SUTPOS,SUTDRP   ;SETUP SYS. UNDER TEST DROP BIT
2706 016072                                  DODU    UNIT            ;DROP THIS UNIT FROM TEST
2707 016100  000207                          RTS     PC              ;RETURN
2708                                    ;-------------------------------------------------------------------
2709
2710                                    .SBTTL  -    MOD 1.2.U.5 - INITIALIZE PRINT
2711                                    ;-------------------------------------------------------------------
2712
2713 016102  013702  002334          ITPRNT: MOV     UNIT,R2         ;SETUP TO PRINT UNIT #
2714 016106  012701  016153                  MOV     #ITERUT,R1      ;SETUP MSG
2715 016112  004737  004536                  CALL    PRTB1S          ;PRINT BASIC-1 ARG
2716 016116  013701  016130                  MOV     ITMSG,R1        ;SETUP TO PRINT MSG
2717 016122  004737  004516                  CALL    PRTB0S          ;PRINT BASIC-0 ARG
2718 016126  000207                          RTS     PC              ;RETURN
2719                                    ;-------------------------------------------------------------------
2720 016130  000000                  ITMSG:  0                       ;INITIALIZE MSG#
2721                                    ;-------------------------------------------------------------------
2722 016132     111     116     111  ITERMG: .ASCIZ  /INITIALIZE ERROR/
2723 016153     045     101     040  ITERUT: .ASCIZ  /%A UNIT#%D1/
2724 016167     045     101     055  INTER2: .ASCIZ  /%A---NO DONE BIT AFTER BUS INITIALIZE/
2725 016235     045     101     055  INTER3: .ASCIZ  /%A---NO DONE BIT AFTER PROG. INITIALIZE/
2726 016305     045     116     045  INTER4: .ASCIZ  /%N%A NO SYSTEM TO TEST/
2727 016334     045     101     055  ITMSG1: .ASCIZ  /%A- NO DRIVE READY/
2728 016357     045     101     055  ITMSG2: .ASCIZ  /%A- NO SIDE READY/
2729 016401     045     101     055  ITMSG3: .ASCIZ  /%A- WRONG DENSITY -SINGLE DENSITY DISKETTE/
2730 016454     045     101     055  ITMSG4: .ASCIZ  /%A- "TR" BIT AFTER SET DENSITY CMD%N/
2731 016521     045     101     055  ITMSG5: .ASCIZ  /%A- NOT CAPABLE OF DOUBLE DENSITY OPERATIONS/
2732 016576     045     101     055  ITMSG6: .ASCIZ  /%A- WRONG DENSITY - DOUBLE DENSITY DISKETTE/
2733 016652     045     101     040  ITMSG7: .ASCIZ  /%A DISKETTE WRONG DENSITY/
2734 016704     045     101     040  ITMSG8: .ASCIZ  /%A MAN. INTERVENTION REQ'D - REFORMATT/
2735 016753     045     101     040  ITMSG9: .ASCIZ  /%A UNIT#%D1%A-REFORMATTING, DO NOT INTERRUPT%N/
2736 017032     045     101     055  ITER1:  .ASCIZ  /%A- ERROR BIT SET AFTER REFORMAT COMMAND SEQUENCE%N/
2737 017116     045     101     055  ITER2:  .ASCIZ  /%A- NO DONE BIT AFTER REFORMAT COMMAND SEQUENCE%N/
2738 017200     045     101     055  ITER3:  .ASCIZ  /%A- AC LOW BIT SET/
2739 017223     040     040     040  FCKMSG: .ASCIZ  /          ->REFORMAT DISKETTE - ARE YOU SURE?/
2740                                          .EVEN
2741                                    ;-------------------------------------------------------------------
```

```
2744
2745                                    .SBTTL  MOD 1.3 - GET EXERCISE
2746                                    ;-------------------------------------------------------------------
2747
2748 017302  013737  002200  017750  GTEX:   MOV     TSTPAT,PAT      ;GET TEST PATTERN #
2749 017310  004737  017376          CALL    STSTPA          ;CALL MOD 1.3.1 SET TEST PATTERN
2750 017314  013737  002202  020654          MOV     TRKSEQ,SEQUEN   ;GET TRACK SEQ #
2751 017322  013737  002206  020650          MOV     OTDITK,OD       ;GET OUTSIDE DIA. TRK
2752 017330  013737  002210  020652          MOV     INDITK,ID       ;GET INSIDE DIA. TRK
2753 017336  004737  017752          CALL    STKSEQ          ;CALL MOD 1.3.2 SET TRACK SEQUENCE
2754 017342  005737  014074          IFB13:  TST     FIRST           ;IF A FIRST PASS
2755 017346  001007                  BNE     THC13           ;THEN
2756 017350  032737  000040  002204  IFC13:  BIT     #40,SWREG       ;IF CLEAR STATISTICAL TABLES
2757 017356  001406                  BEQ     END13           ;IS SELECTED THEN
2758 017360  042737  000040  002204          BIC     #40,SWREG       ;CLEAR SELECTED - CLR STAT TABLE
2759 017366  004737  020656          THC13:  CALL    CLRSTA          ;CALL MOD 1.3.3 - CLEAR STATISTICAL TABLES
2760 017372  000240                  NOP                     ;
2761 017374  000207                  END13:  RTS     PC              ;RETURN
2762                                    ;MOD 1.3 ----- END MODULE ----------------------------------------------
```

```
2765                                    .SBTTL  MOD 1.3.1 - SET DATA PATTERN
2766                                    ;-------------------------------------------------------------------------
2767                                    ;  PAT #          ROUTINE         DATA PATTERN
2768                                    ;  -----          -------         ------------
2769                                    ;    0            RANDAT          NO PATTERN SPECIFIED (FORCE RANDOM DATA)
2770                                    ;    1            DATA0           ALL ZEROS
2771                                    ;    2            DATA1           ALL ONES
2772                                    ;    3            FLOAT0          FLOAT ZERO THRU ONE'S
2773                                    ;    4            FLOAT1          FLOAT ONE THRU ZERO'S
2774                                    ;    5            PAT125          ALTERNATING BITS IN ONE BYTE COMP IN NEXT
2775                                    ;    6            PAT333          ALTERNATING 1'S PAIR & 0 IN ONE BYTE COMP IN NEXT
2776                                    ;    7            RANDAT          RANDOM
2777                                    ;
2778                                    ;NOTE:  DATA PATTERNS WILL BE MODIFIED SO BYTE #0 WILL CONTAIN TRACK ADDRESS
2779                                    ;       AND  BYTE #1 THE SECTOR ADDRESS IN WHICH THE DATA IS WRITTEN.
2780                                    ;       THE LAST TWO BYTES CONTAIN THE CHECK SUM NUMBERS.
2781                                    ;-------------------------------------------------------------------------
2782 017376  042737  000377  017462   STSTPA: BIC     #377,@#BRONPT   ;CLEAR BRANCH OFFSET
2783 017404  005037  017744             CLR     SUM             ;SET UP FOR ACCUMULATION OF CHECK SUM
2784 017410  005737  017750             TST     PAT             ;IF NO PATTERN SPECIFIED FORCE PATTERN 7
2785 017414  001003                     BNE     1$
2786 017416  012737  000007  017750             MOV     #7,PAT
2787 017424  013704  017750     1$:     MOV     PAT,R4          ;GET PATTERN BITS
2788 017430  005304                     DEC     R4              ;ADJUST FOR CORRECT OFFSET
2789 017432  006304                     ASL     R4
2790 017434  150437  017462             BISB    R4,@#BRONPT     ;INSERT OFFSET
2791 017440  012704  034010             MOV     #DATPAT+2,R4    ;SET UP ADDRESS OF FIRST BYTE
2792 017444  013705  002252             MOV     WDCNT,R5        ;SETUP WORD COUNT
2793 017450  006305                     ASL     R5              ;DOUBLE  WORD COUNT FOR ADR
2794 017452  062705  034006             ADD     #DATPAT,R5      ;ADD DATA PATTERN ADR
2795 017456  162705  000004             SUB     #4,R5           ;ADJ. FOR CHECKSUM
2796 017462  000777             BRONPT: BR      .               ;BRANCH BY OFFSET SELECTED
2797 017464  000137  017520             JMP     DATA0           ;000 DATA BYTE
2798 017470  000137  017536             JMP     DATA1           ;377 DATA BYTE
2799 017474  000137  017546             JMP     FLOAT0          ;FLOAT A 0 THROUGH ALL 1'S
2800 017500  000137  017614             JMP     FLOAT1          ;FLOAT A 1 THROUGH ALL 0'S
2801 017504  000137  017622             JMP     PAT125          ;125/052 DATA WORD
2802 017510  000137  017646             JMP     PAT333          ;314/063 DATA WORD
2803 017514  000137  017656             JMP     RANDAT          ;RANDOM DATA BYTE
2804                                    ;-------------------------------------------------------------------------
2805 017520  005037  017746     DATA0:  CLR     DATBYT
2806 017524  004737  017704     PG:     JSR     PC,LOAD         ;GO LOAD THE DATA BUFFER
2807 017530  005705                     TST     R5              ;IF R5
2808 017532  001463                     BEQ     END131          ;NOT =0 ,THEN
2809 017534  000773                     BR      PG
2810                                    ;-------------------------------------------------------------------------
2811 017536  112737  000377  017746     DATA1:  MOVB    #377,DATBYT
2812 017544  000767                     BR      PG
2813                                    ;-------------------------------------------------------------------------
2814 017546  112737  000376  017746     FLOAT0: MOVB    #376,DATBYT     ;SET UP A ONES FIELD
2815 017554  000261             XPG:    SEC                     ;SET THE C BIT TO ROTATE THROUGH THE DATA
2816 017556  012702  000000     1$:     MOV     #0,R2           ;CLR R2 (CAN'T USE "CLR" AS IT CLEARS "C" BIT)
2817 017562  103001                     BCC     2$              ;BR IF THE "C" BIT IS CLEARED
2818 017564  005202                     INC     R2              ;SET R2 IF NOT
2819 017566  004737  017704     2$:     JSR     PC,LOAD         ;GO LOAD THE DATA BUFFER
2820 017572  005705                     TST     R5              ;IF R5
2821 017574  001442                     BEQ     END131          ;NOT ZERO THEN
```

```
2822 017576  000241                          CLC
2823 017600  005702                          TST     R2              ;IS R2 NONZERO
2824 017602  001401                          BEQ     3$
2825 017604  000261                          SEC                     ;YES, SET THE "C" BIT
2826 017606  106137  017746          3$:     ROLB    DATBYT
2827 017612  000761                          BR      1$
2828                                 ;-------------------------------------------------------------------
2829 017614  005037  017746          FLOAT1: CLR     DATBYT
2830 017620  000755                          BR      XPG
2831                                 ;-------------------------------------------------------------------
2832 017622  112737  000125  017746  PAT125: MOVB    #125,DATBYT
2833 017630  004737  017704          XXPG:   JSR     PC,LOAD
2834 017634  005705                          TST     R5              ;IF R5
2835 017636  001421                          BEQ     END131          ;NOT ZERO THEN
2836 017640  105137  017746                  COMB    DATBYT
2837 017644  000771                          BR      XXPG
2838                                 ;-------------------------------------------------------------------
2839 017646  112737  000333  017746  PAT333: MOVB    #333,DATBYT
2840 017654  000765                          BR      XXPG
2841                                 ;-------------------------------------------------------------------
2842 017656  004737  004560          RANDAT: JSR     PC,RANGEN       ;GET RANDOM NUMBER
2843 017662  113737  004652  017746          MOVB    RANUM,DATBYT
2844 017670  004737  017704                  JSR     PC,LOAD
2845 017674  005705                          TST     R5              ;IF R5
2846 017676  001401                          BEQ     END131          ;NOT ZERO THEN
2847 017700  000766                          BR      RANDAT
2848                                 ;-------------------------------------------------------------------
2849 017702  000207                  END131: RTS     PC              ;RETURN.
2850                                 ;-------------------------------------------------------------------
2851
2852                                 ;-------------------------------------------------------------------
2853 017704  063737  017746  017744  LOAD:   ADD     DATBYT,SUM      ;ACCUMULATE THE PATTERN CHECK SUM
2854 017712  113724  017746                  MOVB    DATBYT,(R4)+    ;LOAD THE DATA BUFFER
2855 017716  020504                          CMP     R5,R4           ;HAVE 124 BYTES BEEN GENERATED
2856 017720  001401                          BEQ     1$              ;IF YES, RETURN
2857 017722  000407                          BR      ENDLD           ;IF NO, RETURN TO PATTERN GENERATOR
2858 017724  113724  017744          1$:     MOVB    SUM,(R4)+       ;PUT CHECKSUM INTO TABLE
2859 017730  005137  017744                  COM     SUM             ;COMPLIMENT CHECKSUM
2860 017734  113714  017744                  MOVB    SUM,(R4)        ;PUT COMP CHECK SUM INTO TABLE
2861 017740  005005                          CLR     R5              ;CLEAR TEMP #5 - FLAG DONE MODULE
2862 017742  000207                  ENDLD:  RTS     PC              ;RETURN
2863                                 ;-------------------------------------------------------------------
2864 017744  000000                  SUM:    0
2865 017746  000000                  DATBYT: 0
2866 017750  000000                  PAT:    0
2867                                 ;MOD 1.3.1 ----- END MODULE ----------------------------------------
```

```
2870
2871                                    .SBTTL  MOD 1.3.2 - SET TRACK SEQUENCE
2872                                    ;-------------------------------------------------------------------
2873                                    ;   SEQ #      SEQUENCE
2874                                    ;   -----      --------
2875                                    ;     0        NO SEQUENCE SPECIFIED (DEFAULT TO SEQ 1)
2876                                    ;     1        INCREMENT FROM OD TO ID
2877                                    ;     2        DECREMENT FROM ID TO OD
2878                                    ;     3        INCREMENT THEN DECREMENT TRACKS
2879                                    ;     4        BOUNCE BETWEEN ID AND OD
2880                                    ;     5        BOUNCE BETWEEN DECREASING ID & INCREASING OD
2881                                    ;     6        STROBE BETWEEN OD AND DECREMENTING ID
2882                                    ;     7        RANDOM TRACK SELECTION
2883                                    ;-------------------------------------------------------------------
2884 017752  005037  020634            STKSEQ: CLR     TKTBPT          ;CLEAR TRK TBL PTR
2885 017756  005037  020642                    CLR     PRESTK          ;CLEAR PRESENT TRK
2886 017762  005037  020640                    CLR     TARGET          ;CLEAR TARGET TRK
2887 017766  112737  000177  020642            MOVB    #177,PRESTK     ;INIT PRESENT TRK TO HANDLE TRK #0
2888 017774  113737  020650  020640            MOVB    OD,TARGET       ;INIT OD AS TARGET TRACK
2889 020002  005037  020646                    CLR     XID             ;INIT WORDING ID AND OD LOCATIONS
2890 020006  113737  020652  020646            MOVB    ID,XID          ;SAVE INSIDE DIA. IN TEMP INSIDE DIA.
2891 020014  005037  020644                    CLR     XOD             ;CLEAR TEMP OUTSIDE DIA
2892 020020  113737  020650  020644            MOVB    OD,XOD          ;SAVE OUTSIDE DIA. IN TEMP OUTSIDE DIA.
2893 020026  013737  020646  020636            MOV     XID,TRKCNT      ;SET UP NUMBER OF TRACK MOVEMENTS
2894 020034  163737  020644  020636            SUB     XOD,TRKCNT      ;
2895 020042  005237  020636                    INC     TRKCNT          ;INCREMENT # OF TRACKS
2896 020046  002005                            BGE     GTTK            ;IF # OF TRACKS IS NEGATIVE, THEN
2897 020050  012737  100000  002274            MOV     #100000,ERRSY   ;SET SYSTEM ERROR
2898 020056  000137  020632                    JMP     ENDTKS          ;EXIT
2899 020062  013737  002202  020654  GTTK:     MOV     TRKSEQ,SEQUEN   ;GET TRACK SEQUENCE #
2900 020070  142737  000377  020126            BICB    #377,@#BRONTK   ;CLEAR OUT BRANCH OFFSET
2901 020076  005737  020654                    TST     SEQUEN          ;IF TRACK SEQUENCE
2902 020102  001003                            BNE     1$              ;EQUALS ZERO, THEN
2903 020104  012737  000007  020654            MOV     #7,SEQUEN       ;FORCE SEQ #7-RANDOM
2904 020112  013704  020654            1$:     MOV     SEQUEN,R4       ;GET SEQUENCE BITS
2905 020116  005304                            DEC     R4              ;ADJUST FOR CORRECT OFFSET
2906 020120  006304                            ASL     R4              ;
2907 020122  150437  020126                    BISB    R4,@#BRONTK     ;THIS BR INST. IS MODIFIED SELECTED TRACK SEQUENCE
2908 020126  000777            BRONTK: BR      .               ;BRANCH TO SELECTED TRACK SEQUENCE
2909 020130  000137  020164                    JMP     SEQ1            ;
2910 020134  000137  020220                    JMP     SEQ2            ;
2911 020140  000137  020254                    JMP     SEQ3            ;
2912 020144  000137  020272                    JMP     SEQ4            ;BOUNCE ID TO OD
2913 020150  000137  020340                    JMP     SEQ5            ;DECREASING BOUNCE
2914 020154  000137  020422                    JMP     SEQ6            ;STROBE
2915 020160  000137  020476                    JMP     SEQ7            ;RANDOM
2916                                    ;-------------------------------------------------------------------
2917 020164  123737  020646  020642  SEQ1:     CMPB    XID,PRESTK      ;IF PRESENT TRACK=ID
2918 020172  001004                            BNE     1$              ;THEN
2919 020174  012737  177777  020640            MOV     #-1,TARGET      ;TERMINATE TABLE
2920 020202  000405                            BR      2$              ;END SEQ1
2921 020204  113737  020644  020640  1$:       MOVB    XOD,TARGET      ;ELSE SET NEW TRACK-OUTSIDE DIA
2922 020212  005237  020644                    INC     XOD             ;INCREMENT OUTSIDE DIA
2923 020216  000565                    2$:     BR      NEWTRK          ;END SEQ1
2924                                    ;-------------------------------------------------------------------
2925 020220  123737  020644  020642  SEQ2:     CMPB    XOD,PRESTK      ;
2926 020226  001004                            BNE     1$
```

```
2927 020230  012737  177777  020640          MOV     #-1,TARGET      ;TERMINATE TABLE
2928 020236  000405                          BR      2$              ;END SEQ2
2929 020240  013737  020646  020640  1$:     MOV     XID,TARGET      ;SET NEXT TRACK=INSIDIA
2930 020246  005337  020646                  DEC     XID             ;DECREMENT INSIDE DIA
2931 020252  000547                  2$:     BR      NEWTRK
2932                                         ;-----------------------------------------------------------------------
2933 020254  005701                  SEQ3:   TST     R1              ;IF MODE
2934 020256  001402                          BEQ     1$              ;NOT EQUAL TO ZERO
2935 020260  005001                          CLR     R1              ;THEN CHANGE MODE
2936 020262  000756                          BR      SEQ2            ;DO SEQ2
2937 020264  012701  000001          1$:     MOV     #1,R1           ;ELSE CHANGE MODE
2938 020270  000735                          BR      SEQ1            ;DO SEQ1
2939                                         ;-----------------------------------------------------------------------
2940 020272  005701                  SEQ4:   TST     R1              ;IF MODE
2941 020274  001405                          BEQ     1$              ;NOT EQUAL TO ZERO
2942 020276  113737  020644  020640          MOVB    XOD,TARGET      ;THEN SET NEXT TRACK=OUTSIDE DIA
2943 020304  005001                          CLR     R1              ;CHANGE MODE
2944 020306  000405                          BR      2$              ;BR
2945 020310  113737  020646  020640  1$:     MOVB    XID,TARGET      ;ELSE SET NEXT TRACK=INSIDE DIA
2946 020316  012701  000001                  MOV     #1,R1           ;TERMINATE TABLE
2947 020322  005337  020636          2$:     DEC     TRKCNT          ;
2948 020326  001003                          BNE     3$              ;
2949 020330  012737  177777  020640          MOV     #-1,TARGET      ;TERMINATE TABLE
2950 020336  000515                  3$:     BR      NEWTRK          ;
2951                                         ;-----------------------------------------------------------------------
2952 020340  123737  020646  020644  SEQ5:   CMPB    XID,XOD         ;IF INSIDE & OUTSIDE DIA
2953 020346  001421                          BEQ     2$              ;NOT EQUAL
2954 020350  005701                          TST     R1              ;THEN, IF MODE
2955 020352  001407                          BEQ     1$              ;
2956 020354  005001                          CLR     R1              ;CHANGE MODE
2957 020356  013737  020644  020640          MOV     XOD,TARGET      ;SET NEXT TRACK=OUTSIDE DIA
2958 020364  005237  020644                  INC     XOD             ;INCREMENT OUTSIDE DIA
2959 020370  000413                          BR      3$              ;END SEQ5
2960 020372  012701  000001          1$:     MOV     #1,R1           ;CHANGE MODE
2961 020376  013737  020646  020640          MOV     XID,TARGET      ;SET NEXT TRACK=INSIDE DIA
2962 020404  005337  020646                  DEC     XID             ;DECREMENT INSIDE DIA
2963 020410  000403                          BR      3$              ;END SET5
2964 020412  012737  177777  020640  2$:     MOV     #-1,TARGET      ;TERMINATE TABLE
2965 020420  000464                  3$:     BR      NEWTRK          ;
2966                                         ;-----------------------------------------------------------------------
2967 020422  123737  020646  020644  SEQ6:   CMPB    XID,XOD
2968 020430  001416                          BEQ     1$
2969 020432  123737  020642  020644          CMPB    PRESTK,XOD      ;IF O.D. JUST DONE
2970 020440  001006                          BNE     3$              ;THEN
2971 020442  113737  020646  020640          MOVB    XID,TARGET      ;SET TO DO I.D.
2972 020450  005337  020646                  DEC     XID             ;DECREMENT I.D. FOR NEXT
2973 020454  000407                          BR      2$              ;
2974 020456  113737  020644  020640  3$:     MOVB    XOD,TARGET      ;ELSE SET TO DO O.D.
2975 020464  000403                          BR      2$
2976 020466  012737  177777  020640  1$:     MOV     #-1,TARGET
2977 020474  000436                  2$:     BR      NEWTRK
2978                                         ;-----------------------------------------------------------------------
2979 020476  000240                  SEQ7:   NOP
2980 020500  004737  004560                  JSR     PC,RANGEN       ;GET A RANDOM NUMBER
2981 020504  042737  177600  004652          BIC     #177600,RANUM   ;CLEAR ALL BUT LOW 7 BITS
2982 020512  123737  004652  020646  IDCOMP: CMPB    RANUM,XID       ;IF RANUM LARGER THAN ID ADDRESS
2983 020520  003401                          BLE     ODCOMP          ;THEN
```

```
                                                BR      SEQ7            ;BR TO GET ANOTHER RANDOM NUMBER
                                ODCOMP: CMPB    RANUM,XOD       ;IF RANUM SMALLER THAN OD ADDRESS
                                        BGE     PRESCK          ;THEN
                                        BR      SEQ7            ;BR TO GET ANOTHER RANDOM NUMBER
                                PRESCK: CMPB    RANUM,PRESTK    ;IF RANUM EQUALS PRESENT TRACK
                                        BEQ     SEQ7            ;GET ANOTHER RANDOM NUMBER
                                        MOV     RANUM,TARGET    ;RANUM OK PUT IT IN TARGET TRACK
                                        DEC     TRKCNT
                                        BNE     1$
                                        MOV     #-1,TARGET      ;TERMINATE TABLE
                                1$:     BR      NEWTRK
                                ;-------------------------------------------------------------------------
                                NEWTRK: MOV     #TRKTBL-1,R2
                                        INC     TKTBPT
                                        ADD     TKTBPT,R2
                                        MOVB    TARGET,(R2)
                                        TST     TARGET
                                        BMI     ENDTKS
                                        MOVB    TARGET,PRESTK
                                        JMP     BRONTK
                                ENDTKS: RTS     PC
                                ;-------------------------------------------------------------------------
                                TKTBPT: 0                       ;TRACK TABLE POINTER
                                TRKCNT: 0                       ;TRACK COUNT
                                TARGET: 0                       ;TARGET TRACK
                                PRESTK: 0                       ;PRESENT TRACK
                                XOD:    0                       ;X OUTSIDE DIA.
                                XID:    0                       ;X INSIDE DIA.
                                OD:     0                       ;OUTSIDE DIA.
                                ID:     0                       ;INSIDE DIA.
                                SEQUEN: 0                       ;SEQUENCE #
                                ;MOD 1.3.2 ----- END MODULE ----------------------------------------
```

```
                                .SBTTL  MOD 1.3.3 - CLEAR STATISTICAL TABLES
                                ;-------------------------------------------------------------------------
                                ;
                                CLRSTA: MOV     #READSC,R1      ;SET UP BEGINNING ADDRESS
                                        MOV     #ENDST,R2       ;SET UP TABLE LENGTH
                                BDA133: CLR     (R1)+           ;CLEAR ADDRESSED LOCATION
                                        CMP     R1,R2           ;
                                        BNE     BDA133          ;DO UNTIL LAST ADDRESS DONE
                                END133: RTS     PC              ;RETURN
                                ;MOD 1.3.3 ----- END MODULE ----------------------------------------
```

```
3032
3033
3034                                    .SBTTL  MOD 2.0 - SCHEDULE SYSTEM EXERCISE
3035                                    ;-----------------------------------------------------------------------
3036
3037 020676  000240                    SCSYEX: NOP                     ;
3038 020700  005737  014016            IFK20:  TST     INITL           ;IF INITIALIZE
3039 020704  001417                            BEQ     ELK20           ;THEN
3040 020706  012737  000001  024252            MOV     #1,INITTK       ;SET INITIALIZE TRK FLG
3041 020714  005037  021430                    CLR     EXHCP           ;CLEAR EX HALF COMPL
3042 020720  005037  021432                    CLR     BTHDRV          ;CLEAR BOTH DRV DONE FLG
3043 020724  005037  021434                    CLR     BDVSCD          ;CLEAR BOTH DRV SEC DONE FLG
3044 020730  005037  021442                    CLR     DVDNCK          ;CLEAR DRV DONE CK FLG
3045 020734  005037  021444                    CLR     DRVDN           ;CLEAR DRV DONE
3046 020740  005037  021452                    CLR     ERTSAV          ;CLEAR ERR TYP SAVE
3047 020744  005037  021446            ELK20:  CLR     SFERR           ;CLEAR SFT ERR
3048 020750  033737  021426  002232    IFA20:  BIT     SUTPTR,SUT      ;IF SYSTEM UNDER TEST BIT
3049 020756  001406                            BEQ     ELA20           ;IS SET
3050 020760  004737  004756                    CALL    CVSTUT          ;CALL MOD U.A.2 - CONVERT SUTPTR-->UUT
3051 020764  013737  005024  002234            MOV     UNITST,UUT      ;SET UNIT UNDER TEST
3052 020772  000410                            BR      BDB20           ;BR TO BEGIN 'B'
3053 020774  006337  021426            ELA20:  ASL     SUTPTR          ;SHIFT SUT POINTER TO TEST
3054 021000  022737  000020  021426    DUC20:  CMP     #20,SUTPTR      ;DO UNTIL SUT POINTER
3055 021006  003360                            BGT     IFA20           ;EQUALS 10000 BIN
3056 021010  000137  021404                    JMP     EDC20           ;BR TO END DO 'C'
3057 021014                            BDB20:  BGNSEG                  ;BEGIN SEGMENT FOR ERROR LOOPS
3058 021016  013737  002176  021424            MOV     TSTN,EXN        ;GET TEST # = EXERCISE #
3059 021024  004737  021454                    CALL    GETTST          ;CALL MOD 2.1 - GET A TEST
3060 021030  013737  022156  021422            MOV     TSTWD,TST       ;SAVE TEST WORD
3061 021036  032737  000400  021422    IFB20:  BIT     #400,TST        ;IF NEXT UNIT BIT
3062 021044  001514                            BEQ     ELB20           ;IS SET THEN
3063 021046  004737  032352                    CALL    STDVDN          ;CALL MOD 2.6 -SET DRIVES DONE
3064 021052  032737  004000  021422    IFC20:  BIT     #4000,TST       ;IF ADV TRK BIT
3065 021060  001001                            BNE     IFI20           ;IS NOT SET THEN
3066 021062  000411                            BR      EIC20           ;BR TO END IF 'C'
3067 021064  023727  021432  000003    IFI20:  CMP     BTHDRV,#3       ;IF BOTH DRIVES DONE
3068 021072  001065                            BNE     IFL20           ;THEN
3069 021074  013737  021432  021444            MOV     BTHDRV,DRVDN    ;SET BOTH DRVS DONE TEST
3070 021102  005037  021432                    CLR     BTHDRV          ;CLEAR BOTH DRIVES DONE FLAG & THEN
3071 021106  013737  002234  021450    EIC20:  MOV     UUT,RESTK       ;SET UUT TO RESET TRK
3072 021114  052737  002000  021450            BIS     #2000,RESTK     ;SET INC TRK ONTO RESET TRK
3073 021122  032737  001000  021422    IFF20:  BIT     #1000,TST       ;IF DEL DATA CK BIT
3074 021130  001001                            BNE     ELF20           ;IS SET THEN
3075 021132  000410                            BR      EIF20           ;BR TO IF 'F'
3076 021134  012737  002000  021440    ELF20:  MOV     #2000,ADVTRK    ;SET ADV TRK = INCR TRK
3077 021142  005737  021430            IFG20:  TST     EXHCP           ;IF EXERCISE 1/2 COMPLETE
3078 021146  001420                            BEQ     IFH20           ;IS SET, THEN
3079 021150  005037  021430                    CLR     EXHCP           ;CLEAR EX HALF COMPLETE
3080 021154  053737  021444  002230    EIF20:  BIS     DRVDN,SDD       ;SET THIS DRV DONE
3081 021162  006337  021426                    ASL     SUTPTR          ;SETUP PTR TO CK NXT UNIT
3082 021166  013737  002234  021450            MOV     UUT,RESTK       ;GET UUT
3083 021174  052737  002000  021450            BIS     #2000,RESTK     ;SET INCTRK ON RESET TRK FLAG
3084 021202  005037  021432                    CLR     BTHDRV          ;CLEAR BOTH DRV DN FLAG
3085 021206  000504                            BR      END20           ;BR TO END
3086 021210  005737  002244            IFH20:  TST     DELDAT          ;IF DEL DATA MODE
3087 021214  001403                            BEQ     ELH20           ;IS SET
3088 021216  005037  002244                    CLR     DELDAT          ;CLEAR DEL DATA MODE
```

```
3089 021222  000403                        BR      EIH20           ;BR TO END IF 'H'
3090 021224  012737  000010  002244  ELH20: MOV     #10,DELDAT      ;SET DEC DATA MODE
3091 021232  005037  021444        EIH20: CLR     DRVDN           ;CLEAR DRV DON.
3092 021236  012737  000001  021430        MOV     #1,EXHCP        ;SET EX 1/2 COMPLETE
3093 021244  000443                        BR      EIB20           ;BR TO END IF 'B'
3094 021246  032737  000003  021434  IFL20: BIT     #3,BDVSCD       ;IF BOTH DRV SEC DONE
3095 021254  001405                        BEQ     ELL20           ;THEN
3096 021256  005037  021434                CLR     BDVSCD          ;CLEAR DRV SEC DONE FLAGS
3097 021262  012737  004000  021440        MOV     #4000,ADVTRK    ;ALLOW TRACK ADVANCE
3098 021270  004737  022320        ELL20: CALL    GTDRV           ;CALL MOD 2.2 - GET A DRIVE
3099 021274  000427                        BR      EIB20           ;BR TO END IF 'B'
3100 021276  053737  021440  021436  ELB20: BIS     ADVTRK,INCTRK   ;SET ADV TRK  (IF SET BY PREV OP)
3101 021304  013737  021422  023324        MOV     TST,DRVTST      ;PASS DRIVE TEST
3102 021312  004737  022504                CALL    XDVTST          ;CALL MOD 2.3. - EXECUTE DRIVE TEST
3103 021316  013737  023324  025410        MOV     DRVTST,TSTEV    ;PASS DRIVE TEST FOR EVAL
3104 021324  004737  025334                CALL    EVTSTR          ;CALL MOD 2.4 - EVAL. TEST RESULTS
3105 021330  013701  021422                MOV     TST,R1          ;GET DRV TST
3106 021334  042701  171777                BIC     #171777,R1      ;SAVE TRK BITS
3107 021340  010137  021436                MOV     R1,INCTRK       ;SET TRK BITS
3108 021344  005037  021440                CLR     ADVTRK          ;CLEAR ADV TRK FLAG
3109 021350  005037  014016                CLR     INITL           ;CLEAR INITIALIZE FLAG
3110 021354  000240                EIB20: NOP                     ;
3111 021356  005737  002276        IFM20: TST     ERRTY           ;IF ERR TYPE
3112 021362  001402                        BEQ     DUB20           ;NOT=0
3113 021364  004737  030702                CALL    OTERTP          ;CALL MOD 2.5 - O/P ERR TYPE
3114 021370  005737  002274        DUB20: TST     ERRSY           ;DO UNLESS SYSTEM ERROR
3115 021374  001011                        BNE     END20           ;NOT=0 THEN
3116 021376                                ENDSEG                  ;END SEGMENT FOR ERROR LOOPS
3117 021400  000137  021014                JMP     BDB20           ;BR TO END MOD
3118 021404  012737  000001  021426  EDC20: MOV     #1,SUTPTR       ;SET SYS UNDER TEST PTR
3119 021412  052737  000001  021446        BIS     #1,SFERR        ;SET SFT ERR
3120 021420  000207                END20: RTS     PC              ;END MODULE
3121                                       ;-------------------------------------------------------------------
3122 021422  000000                TST:    0                       ;TEST FOR EXECUTION
3123 021424  000000                EXN:    0                       ;EXERCISE #
3124 021426  000001                SUTPTR: 1                       ;SYSTEM UNDER TEST POINTER
3125 021430  000000                EXHCP:  0                       ;EXERCISE HALF COMPLETE (EX#7) DEL DATA PASS
3126 021432  000000                BTHDRV: 0                       ;BOTH DRIVES DONE FLAG
3127 021434  000000                BDVSCD: 0                       ;BOTH DRIVE SECTORS DONE FLAG
3128 021436  000000                INCTRK: 0                       ;INCREMENT TRACK FLAGS
3129 021440  000000                ADVTRK: 0                       ;ADVANCE TRACK FLAG
3130 021442  000000                DVDNCK: 0                       ;DRV DONE CK FLAG
3131 021444  000000                DRVDN:  0                       ;DRIVE DONE
3132 021446  000000                SFERR:  0                       ;SOFTWARE ERR
3133 021450  000000                RESTK:  0                       ;RESET TRK FLAG
3134 021452  000000                ERTSAV: 0                       ;ERR TYP SAVE REG
3135                                       ;MOD 2.0 ----- END MODULE ----------------------------------------------
```

```
3138                                    .SBTTL  MOD 2.1 - GET A TEST
3139                                    ;-------------------------------------------------------------------------
3140
3141 021454  000240                     GETTST: NOP                     ;
3142 021456  013701  021424                     MOV     EXN,R1          ;GET EXERCISE NUMBER
3143 021462  006301                             ASL     R1              ;DOUBLE EXERCISE NUMBER
3144 021464  012702  022164                     MOV     #EXADTB,R2      ;GET EXERCISE ADDRESS TABLE
3145 021470  060102                             ADD     R1,R2           ;CAL EXERCISE TO BE USED
3146 021472  011237  022154                     MOV     (R2),EXADR      ;GET BEGIN ADR EXERCISE
3147 021476  005737  014016             IFL21:  TST     INITL           ;IF INITIALIZE
3148 021502  001406                             BEQ     IFA21           ;IS SET, THEN
3149 021504  005037  022152                     CLR     TSTPTR          ;CLEAR TST PTR
3150 021510                             IFF21:  INLOOP                  ;IF IN LOOP
3151 021512                                     BNCOMPLETE IFA21        ;SET, THEN
3152 021514  000137  022122                     JMP     EIF21           ;BR TO END IF 'F'
3153 021520  005737  002304             IFA21:  TST     RETRY           ;IF RETRY
3154 021524  001410                             BEQ     IFB21           ;NOT=0, AND
3155 021526  032737  000004  002204             BIT     #BIT02,SWREG    ;IF RETRY ON ERROR
3156 021534  001106                             BNE     IFH21           ;IS NOT SET, THEN
3157 021536  032737  000004  002264             BIT     #EVL,FLGDRS     ;IF DRS "EVL" FLAG
3158 021544  001102                             BNE     IFH21           ;IS NOT SET, THEN
3159 021546  005737  022152             IFB21:  TST     TSTPTR          ;IF TST PTR
3160 021552  001006                             BNE     IFC21           ;EQUALS ZERO
3161 021554  012737  000002  022152             MOV     #2,TSTPTR       ;ADV. TST PTR I CMD
3162 021562  005037  022160                     CLR     TBPRCT          ;CLEAR TABLE PAIR COUNT
3163 021566  000555                             BR      EIF21           ;BR TO END IF 'F'
3164 021570  005737  002262             IFC21:  TST     SECDN           ;IF SECTOR DONE IS
3165 021574  001447                             BEQ     IFG21           ;SET THEN
3166 021576  005737  022160             IFK21:  TST     TBPRCT          ;IF TABLE PAIR CN1=1,
3167 021602  001444                             BEQ     IFG21           ;THEN
3168 021604  062737  000002  022152             ADD     #2,TSTPTR       ;ADVANCE ONE TEST CMD
3169 021612  005037  022160                     CLR     TBPRCT          ;CLEAR TABLE PAIR  COUNT
3170 021616  005037  021442                     CLR     DVDNCK          ;CLEAR DRV DONE CK FLAG
3171 021622  032737  040000  022156 IFD21:  BIT     #40000,TSTWD    ;IF DONE CK
3172 021630  001411                             BEQ     IFM21           ;IS SET, THEN
3173 021632  005737  002260                     TST     TRKDN           ;IF TRACK DONE IS
3174 021636  001406                             BEQ     IFM21           ;SET, THEN
3175 021640  005037  002260                     CLR     TRKDN           ;CLEAR TRK DONE
3176 021644  012737  000001  021442             MOV     #1,DVDNCK       ;SET DRV DONE CK
3177 021652  000523                             BR      EIF21           ;BR TO END IF 'F'
3178 021654  032737  006000  022156 IFM21:  BIT     #6000,TSTWD     ;IF ADV OR INCR TRK
3179 021662  001517                             BEQ     EIF21           ;IS SET, THEN
3180 021664  032737  100000  022156 IFN21:  BIT     #100000,TSTWD   ;IF '4 CMD SEQ'
3181 021672  001404                             BEQ     ELN21           ;IS SET, THEN
3182 021674  162737  000010  022152             SUB     #10,TSTPTR      ;BACK UP 4 CMDS
3183 021702  000507                             BR      EIF21           ;BR TO END IF 'F'
3184 021704  162737  000004  022152 ELN21:  SUB     #4,TSTPTR       ;BACK UP TWO TEST CMDS
3185 021712  000503                             BR      EIF21           ;BR TO END IF 'F'
3186 021714  005737  022160             IFG21:  TST     TBPRCT          ;IF TABLE PAIR COUNT
3187 021720  001406                             BEQ     ELG21           ;EQUALS 1 THEN
3188 021722  005037  022160                     CLR     TBPRCT          ;CLEAR TABLE PAIR COUNT
3189 021726  162737  000002  022152             SUB     #2,TSTPTR       ;BACK UP ONE CMD
3190 021734  000472                             BR      EIF21           ;BR END IF 'F'
3191 021736  005237  022160             ELG21:  INC     TBPRCT          ;INCREMENT TABLE PAIR COUNT
3192 021742  062737  000002  022152             ADD     #2,TSTPTR       ;ADVANCE ONE CMD
3193 021750  000464                             BR      EIF21           ;BR END IF 'F'
3194 021752  032737  000010  002304 IFH21:  BIT     #10,RETRY       ;IF NO DATA RETRY IS
```

```
3195 021760  001005                          BNE     IF121           ;SET, CR
3196 021762  032737  000020  002304          BIT     #20,RETRY       ;IF NO CRC RETRY IS
3197 021770  001001                          BNE     IF121           ;SET, THEN
3198 021772  000453                          BR      EIF21           ;BR END IF 'F'
3199 021774  032737  000002  002304  IF121:  BIT     #2,RETRY        ;IF WRITE RETRY IS
3200 022002  001412                          BEQ     IFJ21           ;SET, THEN
3201 022004  162737  000006  022152          SUB     #6,TSTPTR       ;BACK UP 3 CMDS
3202 022012  042737  000002  002304          BIC     #2,RETRY        ;CLEAR WRITE RETRY
3203 022020  012737  000003  022162          MOV     #3,TSAVCT       ;SET TEST ADV COUNT=3
3204 022026  000433                          BR      EII21           ;BR TO END IF 'I'
3205 022030  032737  000004  002304  IFJ21:  BIT     #4,RETRY        ;IF READ RETRY IS
3206 022036  001412                          BEQ     ELJ21           ;SET THEN
3207 022040  162737  000002  022152          SUB     #2,TSTPTR       ;BACK UP 1 CMD
3208 022046  042737  000004  002304          BIC     #4,RETRY        ;CLEAR READ RETRY
3209 022054  012737  000001  022162          MOV     #1,TSAVCT       ;SET TEST ADV COUNT=1
3210 022062  000415                          BR      EII21           ;BR TO END IF 'I'
3211 022064  005337  022162          ELJ21:  DEC     TSAVCT          ;DECREMENT TEST ADV COUNT
3212 022070  062737  000002  022152          ADD     #2,TSTPTR       ;ADV TEST POINTER 1 CMD
3213 022076  005737  022162          IF021:  TST     TSAVCT          ;IF TEST ADV COUNTER
3214 022102  001007                          BNE     EIF21           ;EQUALS ZERO, THEN
3215 022104  005037  002304                  CLR     RETRY           ;CLEAR RETRY
3216 022110  005237  022160                  INC     TBPRCT          ;SET TABLE PAIR COUNT
3217 022114  000402                          BR      EIF21           ;BR TO END IF 'F'
3218 022116  005037  022160          EII21:  CLR     TBPRCT          ;CLEAR TABLE PAIR CNT
3219 022122  013703  022152          EIF21:  MOV     TSTPTR,R3       ;GET TEST POINTER
3220 022126  063703  022154                  ADD     EXADR,R3        ;CAL. CUR. TEST OF THIS EXERCISE
3221 022132  011337  022156                  MOV     (R3),TSTWD      ;PASS UP TEST WORD
3222 022136  105713                  IFE21:  TSTB    (R3)            ;IF CMD LOWER BYTE
3223 022140  002002                          BGE     EIE21           ;EQUALS -1, THEN
3224 022142  005037  022152                  CLR     TSTPTR          ;RESET TEST PTR
3225 022146  000240                  EIE21:  NOP                     ;
3226 022150  000207                          RTS     PC              ;RETURN
3227                                 ;-------------------------------------------------------------------------
3228 022152  000000                  TSTPTR: .WORD   0               ;TEST POINTER
3229 022154  000000                  EXADR:  .WORD   0               ;CURRENT EXERCISE TABLE BASE ADDRESS
3230 022156  000000                  TSTWD:  .WORD   0               ;TEST WORD TO PASS UP
3231 022160  000000                  TBPRCT: .WORD   0               ;TABLE PAIR COUNT
3232 022162  000000                  TSAVCT: .WORD   0               ;TEST ADVANCE COUNTER
3233
3234 022164  022300                  EXADTB: .WORD   EX7             ;EXERCISE ADDRESS TABLE
3235 022166  022204                          .WORD   EX1
3236 022170  022214                          .WORD   EX2
3237 022172  022230                          .WORD   EX3
3238 022174  022244                          .WORD   EX4
3239 022176  022254                          .WORD   EX5
3240 022200  022264                          .WORD   EX6
3241 022202  022300                          .WORD   EX7
3242                                 ;-------------------------------------------------------------------------
```

```
                                .SBTTL  -    EXERCISE/TEST TABLE
                                ;----------------------------------------------------------------------
022204  177777                  EX1:    .WORD   -1
022206  000000                          .WORD   0               ;-,                             / FILL BUFFER
022210  044002                          .WORD   44002           ;DCK,ADVTRK                     / WRITE SECTOR
022212  000777                          .WORD   777             ;NXTUNT,                        / -1
022214  177777                  EX2:    .WORD   -1
022216  000000                          .WORD   0               ;-,                             / FILL BUFFER
022220  000002                          .WORD   2               ;-,                             / WRITE SECTOR
022222  000003                          .WORD   3               ;-,                             / READ SECTOR
022224  154001                          .WORD   154001          ;4CMD,DCK,ADVTRK,RAW,           / EMPTY BUFFER
022226  000777                          .WORD   777             ;NXTUNT,                        / -1
022230  177777                  EX3:    .WORD   -1
022232  000000                          .WORD   0               ;-,                             / FILL BUFFER
022234  000002                          .WORD   2               ;-,                             / WRITE SECTOR
022236  000003                          .WORD   3               ;-,                             / READ SECTOR
022240  174001                          .WORD   174001          ;4CMD,DCK,ADVTK,DACK,RAW/ EMPTY BUFFER
022242  000777                          .WORD   777             ;NXTUNT,                        / -1
022244  177777                  EX4:    .WORD   -1
022246  000003                          .WORD   3               ;-,                             / READ SECTOR
022250  064001                          .WORD   64001           ;DCK,ADVTRK,DATACK,             / EMPTY BUFFER
022252  000777                          .WORD   777             ;NXTUNT,                        / -1
022254  177777                  EX5:    .WORD   -1
022256  000003                          .WORD   3               ;-,                             / READ SECTOR
022260  044001                          .WORD   44001           ;DCK,ADVTRK,                    / EMPTY BUFFER
022262  000777                          .WORD   777             ;NXTUNT,                        / -1
022264  177777                  EX6:    .WORD   -1
022266  000000                          .WORD   0               ;-,                             / FILL BUFFER
022270  000002                          .WORD   2               ;-,                             / WRITE SECTOR
022272  000003                          .WORD   3               ;-,                             / READ SECTOR
022274  170001                          .WORD   170001          ;4CMD,DCK,DATACK, RAW,          / EMPTY BUFFER
022276  004777                          .WORD   4777            ;ADVTRK, NXTUNT,                / -1
022300  177777                  EX7:    .WORD   -1
022302  000000                          .WORD   0               ;-,                             / FILL BUFFER
022304  000002                          .WORD   2               ;-,                             / WRITE SECTOR
022306  000003                          .WORD   3               ;-,                             / READ SECTOR
022310  172001                          .WORD   172001          ;4CMD,DCK,DACK,RAW,INCTK/ EMPTY BUFFER
022312  000003                          .WORD   3               ;-,                             / READ SECTOR
022314  064001                          .WORD   64001           ;DCK,DATACK,ADVTRK,             / EMPTY BUFFER
022316  001777                          .WORD   1777            ;DDCHK, NXTUNT,                 / -1
                                ;----------------------------------------------------------------------
                                ;       BIT#            NUMONIC         FUNCTION
                                ;       ----            -------         --------
                                ;
                                ;
                                ;        15             4CMD            4 COMMAND SEQUENCE
                                ;        14             DCK             DONE CHECK
                                ;        13             DATACK          DO DATA CHECK
                                ;        12             RAW             READ AFTER WRITE FLAG
                                ;        11             ADVTRK          ADVANCE TRACK MODE
                                ;        10             INCTK           INCREMENT TRACK MODE
                                ;        09             DDCHK           DEL. DATA CHECK
                                ;        08             NXTUNT          GET NEXT UNIT, IF DONE LAST UNIT
                                ;
                                ;MOD 2.1 ----- END MODULE ---------------------------------------------
```

```
3301
3302
3303                                    .SBTTL  MOD 2.2 - GET A DRIVE
3304                                    ;-------------------------------------------------------------------------
3305
3306 022320  000240                    GTDRV:  NOP                     ;
3307 022322  032737  000001  002234     IFA22:  BIT     #1,UUT          ;IF UUT=DRIVE 0
3308 022330  001024                            BNE     IFD22           ;THEN
3309 022332  032737  000002  002234     IFB22:  BIT     #2,UUT          ;IF UNIT/SIDE UNDER TEST (UUT)
3310 022340  001404                            BEQ     ELB22           ;EQUALS 1
3311 022342  012737  000010  022502             MOV     #10,TSTSUT      ;SET TEST OF SYS. UNDER TEST UNIT/SIDE=1
3312 022350  000403                            BR      IFC22           ;BR TO IF 'C'
3313 022352  012737  000002  022502     ELB22:  MOV     #2,TSTSUT       ;SET TEST OF SYS. UNDER TEST UNIT/SIDE=0
3314 022360  033737  022502  002232     IFC22:  BIT     TSTSUT,SUT      ;IF DRIVE 1 SELECTED FOR TEST
3315 022366  001404                            BEQ     ELC22           ;THEN
3316 022370  052737  000001  002234             BIS     #1,UUT          ;SET UNIT UNDER TEST TO DRV #1
3317 022376  000427                            BR      EIE22           ;BR TO END IF 'E'
3318 022400  000417                    ELC22:  BR      THE22           ;BR TO THEN 'E'
3319 022402  032737  000002  002234     IFD22:  BIT     #2,UUT          ;IF UNIT/SIDE UNDER TEST (UUT)
3320 022410  001404                            BEQ     ELD22           ;EQUALS 1
3321 022412  012737  000004  022502             MOV     #4,TSTSUT       ;SET TEST OF SYS. UNDER TEST UNIT/SIDE 1
3322 022420  000403                            BR      IFE22           ;BR TO IF 'E'
3323 022422  012737  000001  022502     ELD22:  MOV     #1,TSTSUT       ;SET TEST OF SYS. UNDER TEST UNIT/SIDE 0
3324 022430  033737  022502  002232     IFE22:  BIT     TSTSUT,SUT      ;IF DRIVE 0 SELECTED FOR TEST
3325 022436  001404                            BEQ     ELE22           ;THEN
3326 022440  042737  000001  002234     THE22:  BIC     #1,UUT          ;SET UNIT UNDER TEST TO DRV#0
3327 022446  000403                            BR      EIE22           ;BR TO END IF 'E'
3328 022450  052737  000001  002234     ELE22:  BIS     #1,UUT          ;SET UNIT UNDER TEST TO DRV#1
3329 022456  013704  002234             EIE22:  MOV     UUT,R4          ;GET UNIT UNDER TEST
3330 022462  006304                            ASL     R4              ;DOUBLE IT
3331 022464  010437  002240                    MOV     R4,UUTOFF       ;SET UUT OFFSET
3332 022470  062704  002336                    ADD     #UTOO,R4        ;GET UUT UNIT # FOR PRINT
3333 022474  011437  002334                    MOV     (R4),UNIT       ;SET UNIT=PRINT UNIT #
3334 022500  000207                    END22:  RTS     PC              ;RETURN
3335                                    ;-------------------------------------------------------------------------
3336 022502  000000                    TSTSUT: 0
3337                                    ;MOD 2.2 ----- END MODULE ----------------------------------------------
```

```
3340
3341
3342                                    .SBTTL  MOD 2.3 - EXECUTE DRIVE TEST
3343                                    ;-----------------------------------------------------------------------
3344
3345 022504  013737  002252  023326  XDVTST: MOV     WDCNT,WDCT      ;SET DRIVE WORD CNT
3346 022512  013702  002240                  MOV     UUTOFF,R2       ;GET UUT OFFSET
3347 022516  005737  002172          IFA23:  TST     RXXX            ;IF DEVICE IS AN
3348 022522  001010                          BNE     1$              ;RX02 THEN
3349 022524  032737  000002  002234          BIT     #2,UUT          ;IF UNIT UNDER TEST IS
3350 022532  001404                          BEQ     1$              ;#1 THEN
3351 022534  013737  002222  002236          MOV     U1ADR,UUTADR    ;GET UNIT #1 UNIBUS ADR
3352 022542  000403                          BR      IFI23           ;BR TO END IF 'A'
3353 022544  013737  002220  002236  1$:     MOV     U0ADR,UUTADR    ;GET UNIT #0 UNIBUS ADR
3354 022552  005737  021450          IFI23:  TST     RESTK           ;IF RESET TRK
3355 022556  001413                          BEQ     IFB23           ;IF SET, THEN
3356 022560  113705  021450                  MOVB    RESTK,R5        ;GET UUT OFFSET
3357 022564  006305                          ASL     R5              ;DOUBLE OFFSET
3358 022566  062705  023306                  ADD     #CTRK,R5        ;ADD TRK TABLE ADR
3359 022572  013715  002206                  MOV     OTDITK,(R5)     ;RESET TO MIN TRK
3360 022576  005037  002262                  CLR     SECDN           ;CLEAR SEC DONE FLAG
3361 022602  005037  021450                  CLR     RESTK           ;CLEAR RESET TRK FLAG
3362 022606  005737  014016          IFB23:  TST     INITL           ;IF INITIALIZE IS
3363 022612  001415                          BEQ     EIB23           ;SET, THEN
3364 022614  012705  023276                  MOV     #CSEC,R5        ;GET START OF CUR TRK &SEC TBL
3365 022620  012704  000004                  MOV     #4,R4           ;SET TBL LENGTH
3366 022624  005025                  1$:     CLR     (R5)+           ;CLEAR TABLES
3367 022626  005304                          DEC     R4              ;DECR TBL LENTGH
3368 022630  001375                          BNE     1$              ;DO UNTIL LENGHT=0
3369 022632  012704  000004                  MOV     #4,R4           ;SET TBL LENGTH
3370 022636  013725  002206          2$:     MOV     OTDITK,(R5)+    ;SET STARTING TRACKS
3371 022642  005304                          DEC     R4              ;DECREMENT TBL LENGTH
3372 022644  001374                          BNE     2$              ;DO UNTIL LENGTH=0
3373 022646  012701  023306          EIB23:  MOV     #CTRK,R1        ;GET BEGIN ADR DRIVE CURRENT TRK.
3374 022652  060201                          ADD     R2,R1           ;CAL. DRIVE CUR. TRK. LOCATOR
3375 022654  010137  023320                  MOV     R1,CNTKLC       ;SAVE DRV. CUR. TRK.
3376 022660  017737  000434  024240          MOV     @CNTKLC,CURTRK  ;GET DRIVE CUR. TRK.
3377 022666  012701  023276                  MOV     #CSEC,R1        ;GET BEGIN ADR DRIVE CUR. SEC.
3378 022672  060201                          ADD     R2,R1           ;CAL. DRIVE CUR. SEC. LOCATOR
3379 022674  010137  023316                  MOV     R1,CNSCLC       ;SAVE DRV CUR SEC LOC.
3380 022700  017737  000412  023710          MOV     @CNSCLC,CURSEC  ;GET DRIVE CUR SEC.
3381 022706                          IFJ23:  INLOOP                  ;IF IN LOOP
3382 022710                                  BNCOMPLETE IFC23        ;THEN
3383 022712  000532                          BR      EIJ23           ;BR TO END IF 'I'
3384 022714  005737  002304          IFC23:  TST     RETRY           ;IF RETRY IS
3385 022720  001447                          BEQ     IFG23           ;NOT=0, AND
3386 022722  032737  000004  002204          BIT     #BIT02,SWREG    ;IF RETRY ON ERR
3387 022730  001004                          BNE     IFD23           ;SET OR
3388 022732  032737  000004  002264          BIT     #EVL,FLGDRS     ;DRS "EVL" FLAG
3389 022740  001437                          BEQ     IFG23           ;IS SET, THEN
3390 022742  032737  000001  002304  IFD23:  BIT     #1,RETRY        ;IF SEEK RETRY
3391 022750  001001                          BNE     1$              ;IS = 0
3392 022752  000404                          BR      2$              ;THEN BR TO 2$
3393 022754  032737  000010  002204  1$:     BIT     #BIT03,SWREG    ;ELSE IF RECAL SWITCH
3394 022762  001003                          BNE     THD23           ;IS NOT SET
3395 022764  005037  023322          2$:     CLR     SEEK            ;THEN CLEAR SEEK FUNCTION FLAG
3396 022770  000420                          BR      EID23           ;BR TO END IF 'D'
```

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HARDWARE TESTS  MACRO M1200  15-DEC-82 13:50  PAGE 95-1
MOD 2.3 - EXECUTE DRIVE TEST

 3397 022772  012737  040000  024404  THD23:  MOV     #40000,DVTST    ;PASS PROGRAM INITIALIZE TO DRIVE TEST
 3398 023000  004737  024254          CALL    GTDVFN          ;CALL MOD 2.3.3 GET DRIVE FUNCTION
 3399 023004  013737  023332  023330  MOV     DRVFN,WDOT      ;PASS DRIVE FUNCTION
 3400 023012  013737  002236  025034  MOV     UUTADR,CSADR    ;SET ADR FOR DRIVE FUNCTION
 3401 023020  004737  024406          CALL    OTDVFN          ;CALL MOD 2.3.4 O/P DRIVE FUNCTION
 3402 023024  012737  000001  023322  MOV     #1,SEEK         ;SET SEEK FLAG
 3403 023032  005037  002304  EID23:  CLR     RETRY           ;CLEAR RETRY FLAGS
 3404 023036  000460          BR      EIJ23           ;BR TO END IF 'C'
 3405 023040  013705  023324  IFG23:  MOV     DRVTST,R5       ;SETUP DRIVE TST
 3406 023044  042705  177770          BIC     #177770,R5      ;FOR TYPE CK
 3407 023050  005705          TST     R5              ;IF DRIVE TST
 3408 023052  001404          BEQ     IFE23           ;IS NOT 'FILL BUFF'
 3409 023054  022705  000003          CMP     #3,R5           ;OR
 3410 023060  001401          BEQ     IFE23           ;NOT 'READ SEC' , THEN
 3411 023062  000434          BR      IFH23           ;BR TO IF 'H'
 3412 023064  005737  002262  IFE23:  TST     SECDN           ;IF SEC DONE
 3413 023070  001417          BEQ     ELE23           ;IS = 1
 3414 023072  005737  021436  IFF23:  TST     INCTRK          ;IF INCR TRK FLAGS
 3415 023076  001414          BEQ     ELE23           ;ARE SET ,THEN
 3416 023100  013737  021436  024236  MOV     INCTRK,TRKINC   ;PASS TRK FLAGS
 3417 023106  004737  023742          CALL    GETTRK          ;CALL MOD 2.3.2 GET TRACK
 3418 023112  013777  024240  000200  MOV     CURTRK,@CNTKLC  ;SAVE CURRENT TRACK
 3419 023120  012737  000001  023322  MOV     #1,SEEK         ;SET SEEK FLAG
 3420 023126  000402          BR      EIE23           ;BR TO END IF 'E'
 3421 023130  005037  023322  ELE23:  CLR     SEEK            ;RESET SEEK
 3422 023134  017737  000156  023710  EIE23:  MOV     @CNSCLC,CURSEC  ;PASS CURRENT SECTOR
 3423 023142  004737  023334          CALL    GETSEC          ;CALL MOD 2.3.1 GET A SECTOR
 3424 023146  013777  023710  000142  MOV     CURSEC,@CNSCLC  ;SAVE UPDATED CURRENT SECTOR
 3425 023154  032737  000006  023324  IFH23:  BIT     #6,DRVTST       ;IF DRIVE TST
 3426 023162  001006          BNE     EIJ23           ;IS 'FILL BUFF' ,THEN
 3427 023164  012701  034006          MOV     #DATPAT,R1      ;SET UP DATA PATTERN ADR
 3428 023170  117721  000124          MOVB    @CNTKLC,(R1)+   ;SET TRK ADR IN DATA BUF BYTE #0
 3429 023174  117711  000116          MOVB    @CNSCLC,(R1)    ;SET SEC ADR IN DATA BUF BYTE#1
 3430 023200  005037  024404  EIJ23:  CLR     DVTST           ;CLEAR DRIVE TEST
 3431 023204  113737  023324  024404  MOVB    DRVTST,DVTST    ;PASS DRIVE TEST
 3432 023212  004737  024254          CALL    GTDVFN          ;CALL MOD 2.3.3 GET DRIVE FUNCTION
 3433 023216  013737  023332  002332  MOV     DRVFN,CMD       ;SET COMMAND FOR PRINT
 3434 023224  013737  023332  023330  MOV     DRVFN,WDOT      ;PASS FUNCTION WORD     (PASS TO 2.3.4)
 3435 023232  017737  000062  025036  MOV     @CNTKLC,TRKADR  ;PASS CURRENT TRACK     (PASS TO 2.3.4)
 3436 023240  017737  000052  025040  MOV     @CNSCLC,SECADR  ;PASS CURRENT SECTOR    (PASS TO 2.3.4)
 3437 023246  013737  002236  025034  MOV     UUTADR,CSADR    ;PASS UUT C&S ADR       (PASS TO 2.3.4)
 3438 023254  004737  024406          CALL    OTDVFN          ;CALL MOD 2.3.4 O/P DRIVE FUNCTION
 3439 023260  013737  025036  002254  MOV     TRKADR,TRACK    ;SAVE TRACK ADDR IN GLOBAL
 3440 023266  013737  025040  002256  MOV     SECADR,SECTOR   ;SAVE SECTOR ADDR IN GLOBAL
 3441 023274  000207          RTS     PC              ;RETURN
 3442                         ;-------------------------------------------------------------------
```

```
3445
3446                                    ;-------------------------------------------------------------------
3447 023276  000000                    CSEC:   .WORD   0               ;CURRENT DRV SECTOR TABLE
3448 023300  000000                            .WORD   0
3449 023302  000000                            .WORD   0
3450 023304  000000                            .WORD   0
3451 023306  000000                    CTRK:   .WORD   0               ;CURRENT DRV TRK TABLE
3452 023310  000000                            .WORD   0
3453 023312  000000                            .WORD   0
3454 023314  000000                            .WORD   0
3455
3456 023316  000000                    CNSCLC: .WORD   0               ;CURRENT SECTOR LOCATOR
3457 023320  000000                    CNTKLC: .WORD   0               ;CURRENT TRACK LOCATOR
3458 023322  000000                    SEEK:   .WORD   0               ;SEEK FLAG
3459 023324  000000                    DRVTST: .WORD   0               ;DRIVE TEST
3460 023326  000000                    WDCT:   .WORD   0               ;WORD COUNT
3461 023330  000000                    WDOT:   .WORD   0               ;FUNCTION WORD TO SEND OUT
3462 023332  000000                    DRVFN:  .WORD   0               ;DRIVE FUNCTION WORD
3463                                    ;MOD 2.3 ----- END MODULE ----------------------------------------
```

```
3466                                    .SBTTL  MOD 2.3.1 - GET A SECTOR
3467                                    ;-------------------------------------------------------------------------
3468
3469 023334  005037  023704      GETSEC: CLR     UTSCDN          ;CLEAR UUT SECTOR DONE
3470 023340  013705  002234              MOV     UUT,R5          ;GET UNIT UNDER TST
3471 023344  006305                      ASL     R5              ;DOUBLE FOR WRD ADR
3472 023346  005737  014016      IFI231: TST     INITL           ;IF INITIALIZE IS
3473 023352  001406                      BEQ     EII231          ;SET, THEN
3474 023354  012701  023664              MOV     #SSEC,R1        ;GET STARTING SEC ADR
3475 023360  005021                      CLR     (R1)+           ;CLEAR UNT00 SSEC
3476 023362  005021                      CLR     (R1)+           ;CLEAR UNT01 SSEC
3477 023364  005021                      CLR     (R1)+           ;CLEAR UNT10 SSEC
3478 023366  005011                      CLR     (R1)            ;CLEAR UNT11 SSEC
3479 023370  012701  023664      EII231: MOV     #SSEC,R1        ;GET START SECTOR BASE ADR
3480 023374  060501                      ADD     R5,R1           ;FIND ADR UUT START SECTOR (TEMP 1)
3481 023376  011102                      MOV     (R1),R2         ;SAVE UUT STARTING SECTOR (TEMP 2)
3482 023400  012703  023674              MOV     #NSEC,R3        ;GET NEXT SECTOR BASE ADR
3483 023404  060503                      ADD     R5,R3           ;FIND ADR UUT NEXT SECTOR (TEMP 3)
3484 023406  011304                      MOV     (R3),R4         ;SAVE UUT NEXT SECTOR (TEMP 4)
3485 023410  020237  002212      IFA231: CMP     R2,MINSEC       ;IF STARTING SECTOR < MIN. SECTOR
3486 023414  103422                      BLO     ELA231          ;THEN
3487 023416  010437  023710              MOV     R4,CURSEC       ;SET CURRENT SECTOR=UUT NEXT SECTOR
3488 023422  023737  023660  023706 IFG231: CMP     SCPSCT,INTLV    ;IF SECTOR PASS CNT< INTERLV
3489 023430  103053                      BHIS    THF231          ;THEN BR TO THEN 'F',ELSE
3490 023432  005737  023662      IFH231: TST     STSCFG          ;IF START SEC FLAG
3491 023436  001405                      BEQ     ELH231          ;IS SET, THEN
3492 023440  005037  023662              CLR     STSCFG          ;CLEAR FLAG
3493 023444  010204                      MOV     R2,R4           ;SET DRV NXT SEC= DRV START SEC
3494 023446  010213                      MOV     R2,(R3)         ;SAVE DRV NXT SEC
3495 023450  000426                      BR      IFC231          ;BR TO IF 'C'
3496 023452  063704  023706      ELH231: ADD     INTLV,R4        ;NSEC=NSEC+INTERLV
3497 023456  010413                      MOV     R4,(R3)         ;SAVE NEXT SEC
3498 023460  000422                      BR      IFC231          ;BR TO IF 'C'
3499 023462  013737  002212  023710 ELA231: MOV     MINSEC,CURSEC   ;SET CURRENT SECTOR = MIN. SECTOR
3500 023470  013711  002212              MOV     MINSEC,(R1)     ;SET UUT START SECTOR = MIN. SECTOR
3501 023474  013702  002212              MOV     MINSEC,R2       ;SET R2=MINSEC
3502 023500  005037  023660              CLR     SCPSCT          ;CLEAR SECTOR PASS COUNT
3503 023504  023737  002212  002214 IFB231: CMP     MINSEC,MAXSEC   ;IF MAX. SECTOR NOT=MIN. SECTOR
3504 023512  001443                      BEQ     ELB231          ;THEN
3505 023514  010205              THB231: MOV     R2,R5           ;GET UUT STARTING SECTOR
3506 023516  063705  023706              ADD     INTLV,R5        ;ADD SECTOR INTERLEAVE
3507 023522  010513                      MOV     R5,(R3)         ;SAVE NEXT UUT NEXT SEC (TEMP 5)
3508 023524  010504                      MOV     R5,R4           ;SAVE NEXT UUT NEXT SEC (TEMP 4)
3509 023526  020437  002214      IFC231: CMP     R4,MAXSEC       ;IF NEXT SECTOR > MAX. SECTOR
3510 023532  103432                      BLO     ELC231          ;THEN
3511 023534  005211                      INC     (R1)            ;INCREMENT UUT STARTING SECTOR
3512 023536  011102                      MOV     (R1),R2         ;SET UP NEW START SEC
3513 023540  005237  023660              INC     SCPSCT          ;INCR SECTOR PASS CNT
3514 023544  020437  002214      IFD231: CMP     R4,MAXSEC       ;IF NXT SEC NOT = MAX SEC
3515 023550  001417                      BEQ     ELD231          ;THEN
3516 023552  020237  002214      IFF231: CMP     R2,MAXSEC       ;IF DRV START SEC > MAX SEC
3517 023556  101411                      BLOS    ELF231          ;THEN
3518 023560  012737  000001  023704 THF231: MOV     #1,UTSCDN       ;SET UUT SECTOR DONE
3519 023566  004737  023712              CALL    STSCDN          ;CALL MOD 2.3.1.A - SET DRIVE SECTOR DONE FLAG
3520 023572  005011                      CLR     (R1)            ;CLEAR UUT STARTING SECTOR
3521 023574  005037  023660              CLR     SCPSCT          ;CLEAR SEC PASS CNT
3522 023600  000420                      BR      END231          ;BRANCH TO END GET SECTOR
```

```
3523 023602  010213                  ELF231: MOV     R2,(R3)          ;SET DRV NXT SEC = DRV START SEC
3524 023604  010204                          MOV     R2,R4            ;SAVE  DRV NXT SEC
3525 023606  000415                          BR      END231           ;BR TO END
3526 023610  012737  000001  023662  ELD231: MOV     #1,STSCFG        ;SET START SEC FLAG
3527 023616  000411                          BR      END231           ;BR TO END
3528 023620  000410                  ELC231: BR      END231           ;BRANCH TO END GET SECTOR
3529 023622  012737  000001  023704  ELB231: MOV     #1,UTSCDN        ;SET DRIVE SECTOR DONE FLAG
3530 023630  004737  023712                  CALL    STSCDN           ;CALL MOD 2.3.1.A - SET DRIVE SECTOR DONE FLAG
3531 023634  005037  023660                  CLR     SCPSCT           ;CLEAR SEC PASS CNT
3532 023640  005011                          CLR     (R1)             ;CLEAR UUT STARTING SECTOR
3533 023642  013737  023704  002262  END231: MOV     UTSCDN,SECDN     ;PASSUP UNIT SECTOR DONE
3534 023650  010437  023656                  MOV     R4,NXSCSA        ;
3535 023654  000207                          RTS     PC               ;RETURN TO MOD 2.3
3536                                 ;MOD 2.3.1 ----- REGISTERS & TABLES ----------------------------------
3537 023656  000000                  NXSCSA: 0
3538 023660  000000                  SCPSCT: 0                        ;SEC PASS COUNT
3539 023662  000000                  STSCFG: 0                        ;CET NEW STARTING SEC FLAG
3540 023664  000000                  SSEC:   0                        ;UUT STARTING SECTOR
3541 023666  000000                          0                        ;
3542 023670  000000                          0                        ;
3543 023672  000000                          0                        ;
3544 023674  000000                  NSEC:   0                        ;UUT NEXT SECTOR
3545 023676  000000                          0                        ;
3546 023700  000000                          0                        ;
3547 023702  000000                          0                        ;
3548 023704  000000                  UTSCDN: 0                        ;UUT SECTOR DONE FLAG
3549 023706  000003                  INTLV:  3                        ;SECTOR INTERLEAVE
3550 023710  000000                  CURSEC: 0                        ;CURRENT SECTOR UUT
3551                                 ;MOD 2.3.1 ----- END MODULE -----------------------------------------
3552
3553
3554
3555                                 .SBTTL  MOD 2.3.1.A - SET SECTOR DONE
3556                                 ;-------------------------------------------------------------------
3557
3558 023712  032737  000001  002234  STSCDN: BIT     #1,UUT           ;IF DRIVE #1 DONE
3559 023720  001404                          BEQ     1$               ;THEN
3560 023722  052737  000002  021434          BIS     #2,BDVSCD        ;SET DRIVE #1 SEC DONE FLAG
3561 023730  000403                          BR      2$               ;BR TO END
3562 023732  052737  000001  021434  1$:     BIS     #1,BDVSCD        ;SET DRIVE #0 SEC DONE FLAG
3563 023740  000207                  2$:     RTS     PC               ;RETURN
3564                                 ;MOD 2.3.1.A ----- END MODULE ---------------------------------------
```

```
3567                                    .SBTTL  MOD 2.3.2 - GET A TRACK
3568                                    ;-------------------------------------------------------------------
3569
3570 023742  013737  002210  024234  GETTRK: MOV     INDITK,MAXTRK   ;GET INSIDE DIA AS SET BY OP
3571 023750  013737  002206  024232          MOV     OTDITK,MINTRK   ;GET OUTSIDE DIA AS SET BY OP
3572 023756  005737  024252          IFH232: TST     INITTK          ;IF INITIALIZE TRK IS
3573 023762  001413                          BEQ     EIH232          ;SET, THEN
3574 023764  005037  024252                  CLR     INITTK          ;RESET INITIALIZE TRK FLG
3575 023770  012701  024242                  MOV     #TKTL,R1        ;GET START OF TRK TBL
3576 023774  005021                          CLR     (R1)+           ;SET  UNT00
3577 023776  005021                          CLR     (R1)+           ;SET  UNT01
3578 024000  005021                          CLR     (R1)+           ;SET  UNT10
3579 024002  005011                          CLR     (R1)            ;SET  UNT11
3580 024004  013737  024232  024240          MOV     MINTRK,CURTRK   ;SET MIN CURRENT TRK
3581 024012  013702  002234          EIH232: MOV     UUT,R2          ;GET UNIT UNDER TEST INDICATOR
3582 024016  006302                          ASL     R2              ;DOUBLE FOR ADDRESSING WORDS
3583 024020  005037  024230                  CLR     TRKDNF          ;CLEAR TRACK DONE FLAG
3584 024024  032737  002000  024236  IFA232: BIT     #2000,TRKINC    ;IF INCREMENT TRACK FLAG
3585 024032  001023                          BNE     IFG232          ;NOT SET, THEN (USE SELECTED TRK SEQ)
3586 024034  012701  024242                  MOV     #TKTL,R1        ;GET DRIVE TRACK TABLE LOCATOR BASE ADR
3587 024040  060201                          ADD     R2,R1           ;CAL. DRV. TRK. TAB. LOCATOR ADR
3588 024042  011102                          MOV     (R1),R2         ;GET DRV.TRK. TAB. LOCATOR
3589 024044  012703  033554                  MOV     #TRKTBL,R3      ;GET BEGIN TRACK TABLE ADR
3590 024050  060203                          ADD     R2,R3           ;CAL. TRACK TAB. ADR. THIS DRIVE
3591 024052  005202                          INC     R2              ;INCREMENT DRV. TRK. TAB. LOCATOR
3592 024054  010211                          MOV     R2,(R1)         ;SAVE DRV. TRK. TAB. LOCATOR
3593 024056  111337  024240                  MOVB    (R3),CURTRK     ;SAVE CURRENT TRACK
3594 024062  005203                          INC     R3              ;INCREMENT TRACK TAB. POINTER
3595 024064  105713          IFF232: TSTB    (R3)            ;IF NEXT TRACK
3596 024066  002004                          BGE     ELF232          ;EQUALS -1
3597 024070  012737  000001  024230          MOV     #1,TRKDNF       ;THEN SET TRACK DONE FLAG
3598 024076  005011                          CLR     (R1)            ;RESET DRV. TRK. TAB. LOCATOR ADR.
3599 024100  000445          ELF232: BR      END232          ;BR TO END MOD.
3600 024102  123737  024240  024234  IFG232: CMPB    CURTRK,MAXTRK   ;IF CURRENT TRK > OR = MAX TRK (O. D.)
3601 024110  103403                          BLO     IFB232          ;THEN
3602 024112  013737  024232  024240          MOV     MINTRK,CURTRK   ;SET CURRENT TRK = MIN TRK
3603 024120  123737  024240  024232  IFB232: CMPB    CURTRK,MINTRK   ;IF CURRENT TRK > OR = MIN TRK (O.D.)
3604 024126  103427                          BLO     ELB232          ;THEN
3605 024130  013701  024240                  MOV     CURTRK,R1       ;GET CURRENT TRACK
3606 024134  005201                          INC     R1              ;INCREMENT CURRENT TRACK
3607 024136  120137  024234          IFC232: CMPB    R1,MAXTRK       ;IF CURRENT TRK +1 < MAX TRK (I.D.)
3608 024142  103001                          BHIS    IFD232          ;THEN
3609 024144  000406                          BR      EID232          ;BRANCH TO END IF 'D'
3610 024146  120137  024234          IFD232: CMPB    R1,MAXTRK       ;IF CURRENT TRK +1 = MAX TRK
3611 024152  001006                          BNE     IFE232          ;THEN
3612 024154  012737  000001  024230          MOV     #1,TRKDNF       ;SET TRK DONE FLAG
3613 024162  010137  024240          EID232: MOV     R1,CURTRK       ;SAVE CURRENT TRK +1 = CURRENT TRK
3614 024166  000412                          BR      END232          ;BR END OF MOD.
3615 024170  123737  024234  024232  IFE232: CMPB    MAXTRK,MINTRK   ;IF TRK MAX = TRK MIN
3616 024176  001003                          BNE     ELB232          ;THEN
3617 024200  012737  000001  024230          MOV     #1,TRKDNF       ;SET TRK DONE FLAG
3618 024206  013737  024232  024240  ELB232: MOV     MINTRK,CURTRK   ;SET CURRENT TRK = MIN. TRK (O.D.)
36 ? 024214  013737  024230  002260  END232: MOV     TRKDNF,TRKDN    ;SAVE TRACK DONE FLAG
3620 024222  005037  024236                  CLR     TRKINC          ;CLEAR TRK INCR FLAG
3621 024226  000207                          RTS     PC              ;
3622                                    ;-------------------------------------------------------------------
```

```
                          ;--------------------------------------------------------------------------
024230  000000            TRKDNF: .WORD   0               ;TRACK DONE FLAG
024232  000000            MINTRK: .WORD   0               ;MINIMUM TRACK - O.D.
024234  000000            MAXTRK: .WORD   0               ;MAXIMUM TRACK - I.D.
024236  000000            TRKINC: .WORD   0               ;INCREMENT TRK FLAG
024240  000000            CURTRK: .WORD   0               ;CURRENT TRACK
024242  000000            TKTL:   .WORD   0               ;DRV TRK TABLE LOCATOR
024244  000000                    .WORD   0
024246  000000                    .WORD   0
024250  000000                    .WORD   0
024252  000000            INITTK: .WORD   0               ;INITIALIZE TRK FLAG
                          ;MOD 2.3.2 ----- END MODULE -------------------------------------------
```

```
                                        .SBTTL  MOD 2.3.3 - GET A DRIVE FUNCTION
                                        ;-------------------------------------------------------------------
                                        ;
024254  005001                  GTDVFN: CLR     R1              ;CLEAR REG #1
024256  013701  024404                  MOV     DVTST,R1        ;GET DRIVE TEST
024262  032701  040000          IFA233: BIT     #40000,R1       ;IF NOT INITIALIZE
024266  001012                          BNE     IFB233          ;THEN
024270  042701  177700                  BIC     #177700,R1      ;CLEAR TOP BYTE OF R1
024274  006301                          ASL     R1              ;FORMAT FUNCTION
024276  052701  000001                  BIS     #1,R1           ;SET GO BIT
024302  020127  000005          IFE233: CMP     R1,#5           ;IF WRT FUNCT
024306  001002                          BNE     IFB233          ;THEN
024310  053701  002244                  BIS     DELDAT,R1       ;SET DEL DAT WRT (IF SET)
024314  005737  002172          IFB233: TST     RXXX            ;IF DRIVE IS RXXX
024320  001411                          BEQ     IFD233          ;THEN
024322  032737  000002  002234  IFC233: BIT     #2,UUT          ;IF SIDE #1 IS SELECTED
024330  001403                          BEQ     ELC233          ;THEN
024332  052701  001000                  BIS     #1000,R1        ;SET SIDE #1 BIT
024336  000402                          BR      IFD233          ;BRANCH TO IF 'D'
024340  042701  001000          ELC233: BIC     #1000,R1        ;SET FOR SIDE #0
024344  032737  000001  002234  IFD233: BIT     #1,UUT          ;IF UNIT UNDER TEST IS
024352  001403                          BEQ     ELD233          ;DRIVE #1
024354  052701  000020                  BIS     #20,R1          ;THEN SET DRIVE #1 SELECT BIT
024360  000402                          BR      EID233          ;BRANCH TO IF 'D'
024362  042701  000020          ELD233: BIC     #20,R1          ;ELSE CLEAR DRIVE #1 SELECT BIT
024366  053701  002242          EID233: BIS     DEN,R1          ;SET DENSITY BIT
024372  052701  000100                  BIS     #100,R1         ;SET INTERRUPT BIT
024376  010137  023332                  MOV     R1,DRVFN        ;PASS UP FUNCTION WORD
024402  000207                  END233: RTS     PC              ;RETURN
                                        ;-------------------------------------------------------------------
024404  000000                  DVTST:  0                       ;DRIVE TEST WORD
                                        ;MOD 2.3.3 ----- END MODULE ----------------------------------------
```

```
3673                                    .SBTTL  MOD 2.3.4 - OUTPUT DRIVE FUNCTION
3674                                    ;-----------------------------------------------------------------------
3675
3676 024406  013701  025034            OTDVFN: MOV     CSADR,R1        ;GET STATUS REG ADR
3677 024412  062701  000002                    ADD     #2,R1           ;ADD 2 TO ADR
3678 024416  010137  025032                    MOV     R1,DBADR        ;SAVE AS DATA ADDRESS
3679 024422  012737  000040  025330            MOV     #DNBIT,RDYWD    ;READY TEST WD          (PASS TO 2.3.4.1)
3680 024430  013737  023330  025022            MOV     WDOT,WRDS       ;WORD FOR OUTPUT        (PASS TO 2.3.4.1)
3681 024436  013737  025034  025024            MOV     CSADR,ADRS      ;ADDRESS OF OUTPUT      (PASS TO 2.3.4.1)
3682 024444  004737  025042                    JSR     PC,OUTSWD       ;OUTPUT FUNCTION WD (FW) DO 2.3.4.1)
3683 024450  032737  040000  023330  IFA234: BIT     #40000,WDOT     ;IF FUNCTION IS
3684 024456  001402                            BEQ     THA234          ;NOT AN "INITIALIZE" (FW BIT#14=0)
3685 024460  000137  025016                    JMP     END234          ;THEN,
3686 024464  032737  000010  023330  THA234: BIT     #10,WDOT        ;IF FUNCTION IS
3687 024472  001043                            BNE     IFC234          ;"READ, WRITE, FILL, EMPTY" (FW BIT#3=0)
3688 024474  032737  000004  023330  IFH234: BIT     #4,WDOT         ;AND THEN IF FUNCTION IS
3689 024502  001047                            BNE     ELH234          ;"EMPTY, FILL" (FW BIT#2=0)
3690 024504  012737  000200  025330            MOV     #TRBIT,RDYWD    ;THEN SET OUTPUT READY TEST WORD (PASS TO 2.3 4.1)
3691 024512  013737  023326  025022            MOV     WDCT,WRDS       ;AND SET WORD FOR OUTPUT        (PASS TO 2.3.4.1)
3692 024520  013737  025032  025024            MOV     DBADR,ADRS      ;AND SET ADDRESS OF OUTPUT      (PASS TO 2.3.4.1)
3693 024526  004737  025042                    JSR     PC,OUTSWD       ;OUTPUT BASE ADDRESS WORD       DO 2.3.4.1
3694 024532  032737  000002  023330  IFK234: BIT     #2,WDOT         ;IF "FILL" (FW BIT#1=0)
3695 024540  001004                            BNE     ELK234          ;THEN
3696 024542  012737  034006  025022            MOV     #DATPAT,WRDS    ;SET DATA PATTERN ADR           (PASS TO 2.3.4.1)
3697 024550  000403                            BR      EIK234          ;BR TO END IF 'K'
3698 024552  012737  034406  025022  ELK234: MOV     #DATBUF,WRDS    ;SET DATA BUFFER ADR            (PASS TO 2.3.4.1)
3699 024560  012737  000200  025330  EIK234: MOV     #TRBIT,RDYWD    ;SET OUTPUT READY TEST WORD     (PASS TO 2.3.4.1)
3700 024566  013737  025032  025024            MOV     DBADR,ADRS      ;ADDRESS OF OUTPUT              (PASS TO 2.3.4.1)
3701 024574  004737  025042                    JSR     PC,OUTSWD       ;OUTPUT WORD COUNT WORD         DO 2.3.4.1
3702 024600  000444                            BR      EIH234          ;BRANCH TO END IF 'H'
3703 024602  032737  000004  023330  IFC234: BIT     #4,WDOT         ;IF FUNCTION WORD IS
3704 024610  001455                            BEQ     IFE234          ;"WRITE D.D" OR "READ E.C" (FW BIT #2=1)
3705 024612  032737  000002  023330  IFD234: BIT     #2,WDOT         ;THEN, IF FUNCTION IS
3706 024620  001035                            BNE     ELD234          ;"WRITE D.D", THEN (FW BIT#1=0)
3707 024622  012737  000200  025330  ELH234: MOV     #TRBIT,RDYWD    ;SET OUTPUT READY TEST WORD
3708 024630  013737  025040  025022            MOV     SECADR,WRDS     ;MOVE TRACK AND SECTOR ADDRESS
3709 024636  042737  177700  025022            BIC     #177700,WRDS    ;FORMAT TO SECTOR ADDRESS
3710 024644  013737  025032  025024            MOV     DBADR,ADRS      ;ADDRESS OF OUTPUT
3711 024652  004737  025042                    JSR     PC,OUTSWD       ;OUTPUT SECTOR ADDRESS
3712 024656  013737  025036  025022            MOV     TRKADR,WRDS     ;MOVE TRACK AND SECTOR ADDRESS
3713 024664  042737  177600  025022            BIC     #177600,WRDS    ;FORMAT TRACK ADDRESS
3714 024672  012737  000200  025330            MOV     #TRBIT,RDYWD    ;SET OUTPUT READY TEST WORD
3715 024700  013737  025032  025024            MOV     DBADR,ADRS      ;ADDRESS OF OUTPUT
3716 024706  004737  025042                    JSR     PC,OUTSWD       ;OUTPUT TRACK ADDRESS
3717 024712  000437                    EIH234: BR      EIB234          ;ENDIF H -DONE
3718 024714  012737  000200  025330  ELD234: MOV     #TRBIT,RDYWD    ;SET READY WD TO TR MODE
3719 024722  012737  033544  025022            MOV     #XERUUT,WRDS    ;EXT ERR. CODE TABLE ADD
3720 024730  013737  025032  025024            MOV     DBADR,ADRS      ;ADDRESS OF OUTPUT, RXDB
3721 024736  004737  025042                    JSR     PC,OUTSWD       ;O/P BASE ADD FOR ERR. CODE
3722 024742  000423                            BR      EIB234          ;DONE
3723 024744  032737  000002  023330  IFE234: BIT     #2,WDOT         ;IF FUNCTION IS
3724 024752  001404                            BEQ     ELE234          ;"READ STATUS" (FW BIT#1=1)
3725 024754  012737  000001  025026  THE234: MOV     #1,ERSTAT       ;THEN-SET ERR STATUS FLAG
3726 024762  000413                            BR      EIB234          ;DONE
3727 024764  012737  000200  025330  ELE234: MOV     #TRBIT,RDYWD    ;SET OUTPUT READY TEST WD
3728 024772  013737  025030  025022            MOV     VALWD,WRDS      ;VALIDATION WORD
3729 025000  013737  025032  025024            MOV     DBADR,ADRS      ;ADDRESS OF OUTPUT, RXDB
```

```
 3730 025006  004737  025042                JSR     PC,OUTSWD       ;OUTPUT VALIDATION WORD
 3731 025012  004737  025104      EIB234:   CALL    WATCH           ;CALL MOD U.2  -WATCH DOG
 3732 025016  000240              END234:   NOP                     ;
 3733 025020  000207                        RTS     PC              ;RETURN TO MOD 2.3
 3734                             ;-----------------------------------------------------------------
 3735 025022  000000              WRDS:     0                       ;MODULE 2.3.4.1 OUTPUT WORD
 3736 025024  000000              ADRS:     0                       ;MODULE 2.3.4.1 OUTPUT ADDRESS
 3737 025026  000000              ERSTAT:   0                       ;MODULE 0.0 ERR STATUS READ FLAG
 3738 025030  000111              VALWD:    111                     ;EXTERNAL, VALIDATION WD (SET DENS-ASCII "I")
 3739 025032  000000              DBADR:    0                       ;RX DATA BUFFER ADDRESS
 3740 025034  000000              CSADR:    0                       ;RX CONT/STATUS ADDRESS
 3741 025036  000000              TRKADR:   0                       ;TRACK ADDRESS
 3742 025040  000000              SECADR:   0                       ;SECTOR ADDRESS
 3743                             ;MOD 2.3.4 ----- END MODULE -------------------------------------
 3744
 3745
 3746
 3747
 3748                             .SBTTL  MOD 2.3.4.1 - OUTPUT SINGLE WORD
 3749                             ;-----------------------------------------------------------------
 3750
 3751 025042  000240              OUTSWD:   NOP                     ;
 3752 025044  013737  025034  025332        MOV     CSADR,CSRADR    ;SET C&S REG ADR
 3753 025052  013737  025330  025330        MOV     RDYWD,RDYWD     ;OUTPUT READY WORD (PASS TO DELAY)
 3754 025060  004737  025230              JSR     PC,DELAY        ;DELAY FOR READY  DO DELAY
 3755 025064  033777  025330  177742        BIT     RDYWD,@CSADR    ;IF READY,
 3756 025072  001403                      BEQ     ED2341          ;THEN
 3757 025074  013777  025022  177722        MOV     WRDS,@ADRS      ;MOV WORD TO ADDRESS
 3758 025102  000207              ED2341:   RTS     PC              ;RETURN TO MOD 2.3.4
 3759                             ;MOD  2.3.4.1 ------- END MODULE ---------------------------------
```

```
3762                                    .SBTTL  MOD U.2.3.4  - WATCH DOG TIMER
3763                                    ;-------------------------------------------------------------------
3764
3765 025104  005037  025226            WATCH:  CLR     DNFLAG          ;CLEAR DONE FLAG
3766 025110                                    SETPRI  #PRI00          ;SET PROCESSOR PRI=0 - ALLOW INTERRUPTS
3767 025116  013704  025222                    MOV     DX,R4           ;SET DELAY MULT
3768 025122  013703  025224            BAU234: MOV     DLY,R3          ;SET DELAY
3769 025126  005737  025226            IBU234: TST     DNFLAG          ;IF INTERRUPTS DONE FLAG
3770 025132  001410                            BEQ     LBU234          ;IS SET, THEN
3771 025134  032777  000040  177672    ICU234: BIT     #DNBIT,@CSADR   ;IF DONT BIT
3772 025142  001023                            BNE     XU234           ;IS NOT SET, THEN
3773 025144  012737  010000  002276            MOV     #BIT12,ERRTY    ;SET INTERR, BUT NO DONE ERROR
3774 025152  000417                            BR      XU234           ;BR TO MOD 'EXIT'
3775 025154  005303            LBU234: DEC     R3              ;DECREMENT DELAY COUNT
3776 025156  001363            UDU234: BNE     IBU234          ;DO UNIT DELAY COUNT=0
3777 025160  005304                    DEC     R4              ;DECREMENT DELAY MULT
3778 025162  001357            UAU234: BNE     BAU234          ;DO UNTIL DELAY MULT=0
3779 025164  032777  000040  177642    IEU234: BIT     #DNBIT,@CSADR   ;IF DONE BIT IS
3780 025172  001404                            BEQ     LEU234          ;SET, THEN
3781 025174  052737  020000  002276            BIS     #BIT13,ERRTY    ;SET DONE, BUT NO INTERRUPT ERROR
3782 025202  000403                            BR      XU234           ;BR TO MOD 'EXIT'
3783 025204  052737  040000  002274    LEU234: BIS     #BIT14,ERRSY    ;SET T.O. ERROR
3784 025212                            XU234:  SETPRI  #PRI06          ;SET PROCESSOR PRI=6 - NO INTERRUPTS
3785 025220  000207                            RTS     PC              ;RETURN TO MOD 2.3.4
3786                                    ;-------------------------------------------------------------------
3787 025222  000040            DX:     40                              ;DELAY MULT
3788 025224  100000            DLY:    100000                          ;DELAY
3789 025226  000000            DNFLAG: 0                               ;DONE FLAG
3790                                    ;MOD U.2.3.4 ---- END MODULE ----------------------------------------
3791
3792                                    .SBTTL  MOD U.2.3/4 DELAY
3793                                    ;-------------------------------------------------------------------
3794
3795 025230  000240            DELAY:  NOP                             ;
3796 025232  023727  025330  000000    IFAU23: CMP     RDYWD,#0        ;IF READY WORD
3797 025240  001430                            BEQ     XU23            ;EQUALS ZERO, THEN BR TO END IF 'A'
3798 025242  013704  025324                    MOV     RYDX,R4         ;SET READY DELAY MULT
3799 025246  013703  025326            BDAU23: MOV     RYDLY,R3        ;SET READY DELAY
3800 025252  033777  025330  000052    BDBU23: BIT     RDYWD,@CSRADR   ;IF READY
3801 025260  001020                            BNE     XU23            ;EQUAL TO "1" ,THEN BR TO END IF 'B'
3802 025262  005303                            DEC     R3              ;ELSE DECREMENT DELAY
3803 025264  001372                            BNE     BDBU23          ;DO UNTIL R3=0
3804 025266  005304                            DEC     R4              ;DECREMENT DELAY MULT.
3805 025270  001366                            BNE     BDAU23          ;DO UNTIL R4=0
3806 025272  052737  040000  002274            BIS     #40000,ERRSY    ;SET TIME OUT ERR
3807 025300  017737  000026  002246            MOV     @CSRADR,CSRUUT  ;GET UUT C&S REG
3808 025306  062737  000002  025332            ADD     #2,CSRADR       ;SET CSRADR TO DB REG
3809 025314  017737  000012  002250            MOV     @CSRADR,ESRUUT  ;GET UUT E&S REG
3810 025322  000207            XU23:   RTS     PC              ;RETURN TO CALLING MOD
3811                                    ;-------------------------------------------------------------------
3812 025324  000040            RYDX:   40                              ;READY MULTIPLIER
3813 025326  100000            RYDLY:  100000                          ;READY DELAY
3814 025330  000000            RDYWD:  0                               ;READY WORD - TEST FOR DEVICE READY
3815 025332  000000            CSRADR: 0                               ;C&S REG OF UNIT- WAITING FOR
3816                                    ;MOD U.2.3.4 ----- END MODULE ---------------------------------------
```

```
3819
3820                                    .SBTTL  MOD 2.4 - EVALUATE TEST RESULTS
3821                                    ;-----------------------------------------------------------------------
3822
3823 025334  013737  025410  027070  EVTSTR: MOV     TSTEV,FUNEV     ;PASS TEST FUNCTION
3824 025342  004737  026206                  CALL    EVDVST          ;CALL MOD 2.4.2 - EVALUATE DRIVE STATE
3825 025346  013737  025410  030622          MOV     TSTEV,FNEV4     ;PASS TEST FUNCTION
3826 025354  004737  030476                  CALL    EVUTEC          ;CALL MOD 2.4.4 - EVAL UNIT ERR CODE
3827 025360  032737  020000  025410  IFA24:  BIT     #20000,TSTEV    ;IF DATA CK BIT
3828 025366  001402                          BEQ     EIA24           ;IS SET, THEN
3829 025370  004737  025412                  CALL    EVDATA          ;CALL MOD 2.4.1 - EVALUATE DATA
3830 025374  013737  025410  027626  EIA24:  MOV     TSTEV,TSTCK     ;PASS DRIVE TEST
3831 025402  004737  027230                  CALL    UPDVST          ;CALL MOD 2.4.3 UPDATE DRIVE STATISTICS
3832 025406  000207                          RTS     PC              ;
3833                                    ;-----------------------------------------------------------------------
3834 025410  000000                     TSTEV:  0
3835                                    ;MOD 2.4 -----  END MODULE ----------------------------------------------
```

```
3838                                    .SBTTL  MOD 2.4.1 - EVALUATE DATA
3839                                    ;-----------------------------------------------------------------------
3840
3841 025412  005037  026054        EVDATA: CLR     DAERCT          ;CLEAR DATA ERR COUNT
3842 025416  005037  026046                CLR     SEEKCK          ;CLEAR SEEK CK
3843 025422  012737  000001  026062        MOV     #1,PTHEAD       ;SET PRINT HEADER FLAG
3844 025430  013701  002252                MOV     WDCNT,R1        ;SAVE WORD COUNT
3845 025434  006301                       ASL     R1              ;
3846 025436  162701  000001                SUB     #1,R1           ;SUBTRACT 2 TO GET CHECKSUM
3847 025442  012702  034006                MOV     #DATPAT,R2      ;GET ADDRESS DATA SOURCE
3848 025446  012703  034406                MOV     #DATBUF,R3      ;GET ADDRESS DATA BUFFER
3849 025452  060102                       ADD     R1,R2           ;CAL. ADDR SOURCE CHECKSUM
3850 025454  060103                       ADD     R1,R3           ;CAL. ADDR BUFFER CHECKSUM
3851 025456  121213        IFA241: CMPB    (R2),(R3)       ;IF CHECK SUMS
3852 025460  001407                BEQ     ELA241          ;NOT= THEN
3853 025462  032737  000002  021452  IFI241: BIT     #2,ERTSAV       ;IF CRC ERR
3854 025470  001003                BNE     ELA241          ;NOT SET,THEN
3855 025472  052737  000004  002276        BIS     #4,ERRTY        ;SET CHECKSUM ERR
3856 025500  005037  026052        ELA241: CLR     BYTNUM          ;CLEAR BYTE NUMBER
3857 025504  162701  000001                SUB     #1,R1           ;CAL. TOTAL BYTE COUNT-LAST TWO
3858 025510  010137  026050                MOV     R1,BYTCNT       ;SAVE BYTE COUNT
3859 025514  012701  034006        BDA241: MOV     #DATPAT,R1      ;SET TEMP#1=DATA SOURCE BEGIN ADR
3860 025520  012702  034406                MOV     #DATBUF,R2      ;SET TEMP#2=DATA BUFFER BEGIN ADR
3861 025524  063701  026052                ADD     BYTNUM,R1       ;CAL CURRENT BYTE ADDR (SOURCE)
3862 025530  063702  026052                ADD     BYTNUM,R2       ;CAL CURRENT BYTE ADDR (BUFFER)
3863 025534  121112                       CMPB    (R1),(R2)       ;IF SOURCE BYTE & BUFFER BYTE
3864 025536  001502                BEQ     ELB241          ;NOT EQUAL
3865 025540  005237  026054                INC     DAERCT          ;INCREMENT DATA ERR COUNT
3866 025544  052737  000010  002276        BIS     #10,ERRTY       ;SET DATA ERR-ERR TYPE
3867 025552  042737  000004  002276        BIC     #4,ERRTY        ;CLR CK SUM ERR-ERR TYPE
3868 025560  023727  026052  000002  IFC241: CMP     BYTNUM,#2       ;IF BYTE #0 OR #1
3869 025566  002006                BGE     IFE241          ;THEN
3870 025570  005737  026052        IFD241: TST     BYTNUM          ;IF BYTE #0
3871 025574  001003                BNE     IFE241          ;THEN
3872 025576  052737  000001  026046        BIS     #1,SEEKCK       ;SET SEEK ERR-ERR TYPE
3873 025604  023727  026054  000012  IFE241: CMP     DAERCT,#12      ;IF OVER 10 DATA ERRORS
3874 025612  103404                BLO     THF241          ;THEN
3875 025614  032737  000020  002204  IFF241: BIT     #20,SWREG       ;IF PRINT ONLY 10 DATA ERROR FLAG
3876 025622  001047                BNE     EIF241          ;IS NOT SET, THEN
3877 025624  111137  026056        THF241: MOVB    (R1),DATASB
3878 025630  111237  026060                MOVB    (R2),DATAWS
3879 025634  005737  026062        IFM241: TST     PTHEAD          ;IF PRINT HEADER
3880 025640  001420                BEQ     EIM241          ;OK, THEN
3881 025642  005037  026062                CLR     PTHEAD          ;CLEAR PRINT HEADER
3882 025646                                PRINTB  #DMSG1,UNIT,TRACK,SECTOR
3883 025702                        EIM241: PRINTB  #DMSG2,BYTNUM,<B,DATASB>,<B,DATAWS>
3884 025742  000240        EIF241: NOP             ;
3885 025744  005237  026052        ELB241: INC     BYTNUM          ;INCREMENT BYTE #
3886 025750  005337  026050                DEC     BYTCNT          ;DECREMENT BYTE COUNT
3887 025754  005737  026050                TST     BYTCNT          ;DO UNTIL BYTE COUNT
3888 025760  003255                       BGT     BDA241          ;EQUALS 0
3889 025762  005737  026046        IFJ241: TST     SEEKCK          ;IF DISK SEEK ERR
3890 025766  001413                BEQ     END241          ;IS SET AND
3891 025770  032737  000010  002276  IFK241: BIT     #10,ERRTY       ;IF DATA ERR
3892 025776  001007                BNE     END241          ;NOT SET AND
3893 026000  032737  000002  021452  IFL241: BIT     #2,ERTSAV       ;IF CRC ERR
3894 026006  001003                BNE     END241          ;NOT SET
```

```
3895 026010  052737  000001  002276          BIS     #1,ERRTY        ;THEN SET SEEK ERR
3896 026016  000240                  END241: NOP                     ;
3897 026020  005037  021452                  CLR     ERTSAV          ;CLEAR ERR TYP SAV
3898 026024  012705  034406                  MOV     #DATBUF,R5      ;GET BEGIN OF DATA BUFFER
3899 026030  012704  000200                  MOV     #128.,R4        ;SET WORD LENGTH OF TABLE
3900 026034  005025                  BDB241: CLR     (R5)+           ;CLEAR WORD IN DATA BUFFER TABLE
3901 026036  005304                          DEC     R4              ;DECREMENT WORD COUNT
3902 026040  005704                          TST     R4              ;DO UNTIL
3903 026042  001374                  EDB241: BNE     BDB241          ;ALL TABLE WORDS ZEROED
3904 026044  000207                          RTS     PC              ;RETURN
3905                                 ;-------------------------------------------------------------------
3906 026046  000000                  SEEKCK: 0                       ;SEEK CECK FLAG
3907 026050  000000                  BYTCNT: 0                       ;BYTE COUNT
3908 026052  000000                  BYTNUM: 0                       ;BYTE NUMBER
3909 026054  000000                  DAERCT: 0                       ;DATA ERR COUNT
3910 026056  000000                  DATASB: 0                       ;DATA SHOULD BE
3911 026060  000000                  DATAWS: 0                       ;DATA WAS
3912 026062  000000                  PTHEAD: 0                       ;PRINT HEADER FLAG
3913                                 ;-------------------------------------------------------------------
3914 026064     045     116     045  DMSG1:  .ASCIZ  /%N%A UNIT#%O1%A TRK#%D3%A SEC#%D2%N%A BYTE#%S2%AGOOD%S6%ABAD/
3915 026161     045     116     045  DMSG2:  .ASCIZ  /%N%S3%D3%S2%B8%S2%B8/
3916                                         .EVEN
3917                                 ;MOD 2.4.1 ----- END MODULE ----------------------------------------
```

```
3920                                        .SBTTL  MOD 2.4.2 - EVALUATE DRIVE STATE
3921                                        ;-----------------------------------------------------------------------
3922 026206  013705  002236          EVDVST: MOV     UUTADR,R5
3923 026212  013737  002246  027072          MOV     CSRUUT,CSREV    ;GET COMMAND & STATUS  LAST OP UUT
3924 026220  013737  002250  027074          MOV     ESRUUT,ESREV    ;GET ERROR STATUS LAST OP UUT
3925 026226  005037  033544                  CLR     XERUUT          ;CLEAR EXTENDED ERROR CODE LOCATION
3926 026232  032737  000040  027072  IFA242: BIT     #40,CSREV       ;IF DONE NOT
3927 026240  001032                          BNE     IFB242          ;SET THEN
3928 026242  012715  040000                  MOV     #40000,(R5)     ;ISSUE PROG INIT TO UUT
3929 026246  013737  002236  025332          MOV     UUTADR,CSRADR   ;SET CSR ADR
3930 026254  012737  000040  025330          MOV     #DNBIT,RDYWD    ;SET DONE TEST
3931 026262  004737  025230                  CALL    DELAY           ;WAIT FOR TR
3932 026266  032715  000040  IFC242: BIT     #40,(R5)        ;IF DONE NOT
3933 026272  001005                          BNE     ELC242          ;SET THEN
3934 026274  052737  000010  002274          BIS     #10,ERRSY       ;SET NO DONE ON INT-SYS ERR
3935 026302  000137  027064                  JMP     END242          ;BR TO END MOD
3936 026306  113701  027070  ELC242: MOVB    FUNEV,R1        ;GET DRIVE FUNCTION
3937 026312  042701  177770                  BIC     #177770,R1      ;CLEAR ALL BUT FUNCTION
3938 026316  050137  002274                  BIS     R1,ERRSY        ;SET NO DONE ON FUNCTION-SYS ERR
3939 026322  000137  027064                  JMP     END242          ;BR TO END MOD
3940 026326  004737  027076  IFB242: CALL    EVDVRE          ;CALL MOD 2.4.2.1 EVALUATE DRIVE RESPONSE
3941 026332  005737  002274                  TST     ERRSY           ;IF SYS ERR
3942 026336  001463                          BEQ     IFG242          ;NOT=0 THEN
3943 026340  032737  000001  002234          BIT     #1,UUT          ;IFDRV#1 UNDER TST
3944 026346  001404                          BEQ     1$              ;THEN
3945 026350  012737  000020  027066          MOV     #20,EVCMD       ;SET CMD TO DRV#1
3946 026356  000402                          BR      2$              ;BR
3947 026360  005037  027066  1$:     CLR     EVCMD           ;SET CMD TO DRV#0
3948 026364  052737  000013  027066  2$:     BIS     #13,EVCMD       ;SET READ UUT ESR IN CMD
3949 026372  053737  002242  027066          BIS     DEN,EVCMD       ;SET DEN FOR CMD
3950 026400  013715  027066                  MOV     EVCMD,(R5)      ;READ UUT ESR
3951 026404  013737  002236  025332          MOV     UUTADR,CSRADR   ;SET CSR ADR
3952 026412  012737  000040  025330          MOV     #DNBIT,RDYWD    ;SET DONE BIT
3953 026420  004737  025230                  CALL    DELAY           ;CALL
3954 026424  032715  000040  IFX242: BIT     #40,(R5)        ;IF DONE BIT
3955 026430  001005                          BNE     IFD242          ;NOT SET THEN
3956 026432  052737  000200  002274          BIS     #200,ERRSY      ;SET NO DONE BIT (SECONDARY PROBLEM)
3957 026440  000137  027064                  JMP     END242          ;BK TO END
3958 026444  032715  100000  IFD242: BIT     #100000,(R5)    ;IF ERR BIT
3959 026450  001403                          BEQ     IFE242          ;SET
3960 026452  052737  100000  002276          BIS     #100000,ERRTY   ;ERR BIT - ERR TYPE
3961 026460  013701  002236  IFE242: MOV     UUTADR,R1       ;GET UUT ADR
3962 026464  062701  000002                  ADD     #2,R1           ;CAL DBR ADR
3963 026470  032711  000200                  BIT     #200,(R1)       ;IF DRV RDY BIT
3964 026474  001102                          BNE     IFN242          ;EQUALS 0
3965 026476  052737  000040  002274          BIS     #40,ERRSY       ;SET DRIVE NOT RDY-SYS ERR
3966 026504  000561                          BR      IFS242          ;BR TO END IF 'E'
3967 026506  032737  002021  027074  IFG242: BIT     #2021,ESREV     ;IF ANY ESR ERR BIT SET
3968 026514  001410                          BEQ     IFH242          ;THEN
3969 026516  032737  100000  027072  IFI242: BIT     #100000,CSREV   ;IF UUT ERR BIT
3970 026524  001010                          BNE     IFJ242          ;NOT=1 THEN
3971 026526  052737  040000  002276          BIS     #40000,ERRTY    ;SET MISSING ERR BIT
3972 026534  000450                          BR      IFL242          ;BR TO IF 'L'
3973 026536  032737  100000  027072  IFH242: BIT     #100000,CSREV   ;IF UUT CSR ERR BIT
3974 026544  001456                          BEQ     IFN242          ;EQUALS 1 THEN
3975 026546  013701  025410          IFJ242: MOV     TSTEV,R1        ;GET TEST FUNCTION
3976 026552  042701  177774                  BIC     #177774,R1      ;CLEAR ALL BUT TWO BOTTOM BITS
```

```
3977 026556  022701  000002                    CMP     #2,R1           ;IF WRITE FUNCTION
3978 026562  001004                            BNE     IFK242          ;THEN
3979 026564  052737  004000  002276            BIS     #4000,ERRTY     ;SET WRITE ERR - ERR TYPE
3980 026572  000431                            BR      IFL242          ;BR TO IF 'L'
3981 026574  013701  025410          IFK242:   MOV     TSTEV,R1        ;GET TEST FUNCTION
3982 026600  042701  177770                    BIC     #177770,R1      ;CLEAR ALL BUT FUNCTION
3983 026604  022701  000003                    CMP     #3,R1           ;IF READ FUNCTION
3984 026610  001004                            BNE     IFM242          ;THEN
3985 026612  052737  002000  002276            BIS     #2000,ERRTY     ;SET READ ERR-ERR TYPE
3986 026620  000416                            BR      IFL242          ;BR TO IF 'L'
3987 026622  013701  025410          IFM242:   MOV     TSTEV,R1        ;GET TEST FUNCTION
3988 026626  042701  177771                    BIC     #177771,R1      ;CLEAR BITS
3989 026632  032701  000006                    BIT     #6,R1           ;IF. FILL/EMPTY BUFFER
3990 026636  001004                            BNE     ELM242          ;THEN
3991 026640  052737  001000  002276            BIS     #1000,ERRTY     ;SET FILL/EMPTY ERR-ERR TYP
3992 026646  000403                            BR      IFL242          ;BR TO IF 'L'
3993 026650  052737  000400  002276  ELM242:   BIS     #400,ERRTY      ;ELSE SET UNK ERR
3994 026656  032737  000001  027074  IFL242:   BIT     #1,ESREV        ;IF CRC ERR (ESR)
3995 026664  001406                            BEQ     IFN242          ;THEN
3996 026666  042737  000001  002276            BIC     #1,ERRTY        ;CLEAR ANY SEEK ERR
3997 026674  052737  000002  002276            BIS     #2,ERRTY        ;SET CRC ERR
3998 026702  032737  006010  027074  IFN242:   BIT     #6010,ESREV     ;IF ESR BIT#3,10,11 ARE
3999 026710  001404                            BEQ     IFF242          ;SET. THEN
4000 026712  052737  100000  002274            BIS     #100000,ERRSY   ;SET UNKNOWN ERR-SYS ERR
4001 026720  000453                            BR      IFS242          ;BR TO IF 'S'
4002 026722  013701  025410          IFF242:   MOV     TSTEV,R1        ;GET TEST FUNCTION
4003 026726  032701  000002                    BIT     #2,R1           ;IF FUNCTION WAS
4004 026732  001446                            BEQ     IFS242          ;POSSIBLE READ OR WRITE
4005 026734  032701  000005                    BIT     #5,R1           ;BUT REALLY
4006 026740  001043                            BNE     IFS242          ;IS READ OR WRITE, THEN
4007 026742  005737  002244          IFD242:   TST     DELDAT          ;IF DELETED DATA FLAG IS
4008 026746  001410                            BEQ     IFQ242          ;SET THEN
4009 026750  032737  000100  027074  IFP242:   BIT     #100,ESREV      ;IF UUT ESR DD BIT
4010 026756  001013                            BNE     IFR242          ;NOT SET THEN
4011 026760  052737  000100  002276            BIS     #100,ERRTY      ;SET MISSING DP MARK-ERR TYP
4012 026766  000407                            BR      IFR242          ;BR TO IF 'R'
4013 026770  032737  000100  027074  IFQ242:   BIT     #100,ESREV      ;IF D.D. BIT IS
4014 026776  001403                            BEQ     IFR242          ;SET THEN
4015 027000  052737  000040  002276            BIS     #40,ERRTY       ;SET UNEX DD BIT
4016 027006  032737  000020  027074  IFR242:   BIT     #20,ESREV       ;IF DEN. ERR. (ESR)
4017 027014  001403                            BEQ     IFU242          ;THEN
4018 027016  052737  020000  002274            BIS     #20000,ERRSY    ;SET DEN. ERR-SYS ERR
4019 027024  005737  002242          IFU242:   TST     DEN             ;IF DOUBLE DEN MODE IS
4020 027030  001407                            BEQ     IFS242          ;SET AND THEN
4021 027032  032737  000040  027074  IFV242:   BIT     #40,ESREV       ;IF. UUT RESPONDS IN
4022 027040  001003                            BNE     IFS242          ;SINGLE DENSITY, THEN
4023 027042  052737  010000  002274            BIS     #10000,ERRSY    ;SET DRIVE DENSITY ERR-SYS ERR
4024 027050  032737  100000  027072  IFS242:   BIT     #100000,CSREV   ;IF UUT ERR BIT
4025 027056  001402                            BEQ     END242          ;NOT=0 THEN
4026 027060  004737  005026                    CALL    RDERCD          ;CALL UUT - READ ERROR CODE
4027 027064  000207                  END242:   RTS     PC
4028                                 ;-------------------------------------------------------------------------
4029 027066  000000                  EVCMD:    0                       ;CMD WORD USED IN THIS MOD
4030 027070  000000                  FUNEV:    0
4031 027072  000000                  CSREV:    0
4032 027074  000000                  ESREV:    0
4033                                 ;MOD 2.4.2 ----- END MODULE ---------------------------------------------
```

```
4036
4037                                    .SBTTL  MOD 2.4.2.1 - EVALUATE DRIVE RESPONSE
4038                                    ;-------------------------------------------------------------------
4039
4040 027076  013701  025410            EVDVRE: MOV     TSTEV,R1        ;GET TEST FUNCTION
4041 027102  042701  177771                    BIC     #177771,R1      ;CLEAR BITS
4042 027106  032701  000006                    BIT     #6,R1           ;IF NOT FILL/EMPTY BUFFER
4043 027112  001445                            BEQ     6$              ;THEN
4044 027114  005737  002172                    TST     RXXX            ;IF RXXX
4045 027120  001421                            BEQ     1$              ;AND
4046 027122  032737  000002  002234            BIT     #2,UUT          ;SIDE # SELECTED
4047 027130  001403                            BEQ     2$              ;THEN
4048 027132  012701  001000                    MOV     #1000,R1        ;SET R1 TO TEST SIDE #1 SELECT
4049 027136  000401                            BR      3$              ;BR TO TEST RESPONSE
4050 027140  005001                    2$:     CLR     R1              ;SET R1 TO TEST SIDE #0 SELECT
4051 027142  013702  002250            3$:     MOV     ESRUUT,R2       ;GET ESR UNIT UNDER TEST
4052 027146  042702  176777                    BIC     #176777,R2      ;CLEAR ALL BITS BUT SIDE SELECT
4053 027152  020102                            CMP     R1,R2           ;IF SIDE SELECT
4054 027154  001403                            BEQ     1$              ;NOT=SIDE RESPONDING THEN
4055 027156  052737  001000  002274            BIS     #1000,ERRSY     ;SET WRONG SIDE RESPONDING SYS ERR
4056 027164  032737  000001  002234    1$:     BIT     #1,UUT          ;IF DRIVE #1 SELECTED
4057 027172  001403                            BEQ     4$              ;THEN
4058 027174  012701  000400                    MOV     #400,R1         ;SET R1 TO TEST DRIVE #1 SEL
4059 027200  000401                            BR      5$              ;BR TO TEST RESPONSE
4060 027202  005001                    4$:     CLR     R1              ;SET R1 TO TEST DRIVE #0 SEL
4061 027204  013702  002250            5$:     MOV     ESRUUT,R2       ;GET ESR UNIT UNDER TEST
4062 027210  042702  177377                    BIC     #177377,R2      ;CLEAR ALL BITS BUT DRIVE RESPONDING
4063 027214  020102                            CMP     R1,R2           ;
4064 027216  001403                            BEQ     6$              ;
4065 027220  052737  000400  002274            BIS     #400,ERRSY      ;SET WRONG DRIVE RESPONDING SYS ERR
4066 027226  000207                    6$:     RTS     PC              ;
4067                                    ;MOD 2.4.2.1 ----- END MODULE ----------------------------------------
```

```
                                        .SBTTL  MOD 2.4.3 - UPDATE DRIVE STATISTICS
                                        ;-------------------------------------------------------------------

027230  013737  027626  030342  UPDVST: MOV     TSTCK,FUNTY         ;PASS TEST FUNCTION TO UPDATE SEC CTR
027236  004737  030216                  CALL    UPSECT              ;CALL UP DATE SECTOR CONTENTS
027242  032737  000002  027606  IA243:  BIT     #2,ETSAV            ;IF ERRTY SAVE
027250  001405                          BEQ     EA243               ;HAS CRC ERR BIT SET, THEN
027252  004737  027722                  CALL    UDCRST              ;CALL UPDATE CRC STATISTICS
027256  005037  027606                  CLR     ETSAV               ;CLEAR ERR TYPE SAVE
027262  000457                          BR      IG243               ;BR TO IF 'G'
027264  013737  002276  027606  EA243:  MOV     ERRTY,ETSAV         ;SAVE ERR TYP --> ETSAV
027272  013737  002276  027614          MOV     ERRTY,STERRG        ;GET ERR TYP --> STAT ERR REG
027300  005037  027616                  CLR     STCNTR              ;ZERO STAT COUNTER
027304  032737  000002  027614  ID243:  BIT     #2,STERRG           ;IF ERR IS
027312  001403                          BEQ     BF243               ;CRC, THEN
027314  042737  006002  027614          BIC     #6002,STERRG        ;CLEAR CRC, RD, & WRT ERR BITS OF STAT ERR REG
027322  000241                  BF243:  CLC                         ;CLEAR CARRY BIT
027324  006037  027614                  ROR     STERRG              ;ROTATE RIGHT STAT ERROR REG
027330  103026                  IB243:  BCC     EB243               ;IF CARRY BIT SET, THEN
027332  013701  027616                  MOV     STCNTR,R1           ;GET STAT COUNTER
027336  006301                          ASL     R1                  ;& DOUBLE FOR WORD ADDRESSING
027340  062701  027630                  ADD     #ETTAB,R1           ;CAL. CLASSIFICATION WORD-ADDRESS
027344  011137  027620                  MOV     (R1),CLASWD         ;GET CLASSIFICATION WORD
027350  011102                          MOV     (R1),R2             ;GET CLASSIFICATION WORD-TO FIND LOG OFFSET
027352  000302                          SWAB    R2                  ;GET CLASSIFICATION WORD UPPER BYTE
027354  006302                          ASL     R2                  ;--SHIFT LEFT TO GET LOG REG OFFSET (LAST 6 BITS)
027356  006302                          ASL     R2                  ;--SHIFT LEFT AGAIN
027360  042702  177004                  BIC     #177004,R2          ;CLEAR UNWANTED BITS
027364  010237  027622                  MOV     R2,LOGOFF           ;SAVE ERROR LOG OFFSET
027370  005711                  IC243:  TST     (R1)                ;IF ERR TYP CLASSIFICATION WORD
027372  100403                          BMI     LC243               ;TYPE=SOFT, THEN
027374  004737  030072                  CALL    UDSFST              ;CALL UPDATE SOFT ERROR STATISTICS
027400  000402                          BR      EB243               ;BR TO END 'B'
027402  004737  027670          LC243:  CALL    UDHDST              ;CALL UPDATE HARD ERROR STATISTICS
027406  005237  027616          EB243:  INC     STCNTR              ;INCREMENT STAT COUNTER
027412  022737  000020  027616  UF243:  CMP     #16.,STCNTR         ;DO UNTIL ALL 16
027420  101340                          BHI     BF243               ;BITS ARE DONE
027422  013703  033544          IG243:  MOV     XERUUT,R3           ;GET EXTENDED ERROR CODE
027426  042703  177400                  BIC     #177400,R3          ;CLEAR UPPER BYTE
027432  005703                          TST     R3                  ;IF EXTENDED ERROR CODE
027434  001410                          BEQ     IH243               ;NOT=0, THEN
027436  162703  000010                  SUB     #10,R3              ;ADJ ERROR CODE # FOR LOGGING
027442  012702  007604                  MOV     #ECLOG,R2           ;GET LOC OF ERR CODE LOG
027446  060302                          ADD     R3,R2               ;ADD ERR CODE TO LOC ERR CODE LOG
027450  063702  002240                  ADD     UUTOFF,R2           ;FIND LOC ERR REG THIS UNIT
027454  005212                          INC     (R2)                ;INCREMENT UNIT ERR REG
027456  013703  002276          IH243:  MOV     ERRTY,R3            ;GET ERR TYPE
027462  042703  171774                  BIC     #171774,R3          ;CLEAR ALL ERRS BUT RD, WT, CRC, SEEK
027466  005703                          TST     R3                  ;IF ONE OF THESE ERRORS
027470  001412                          BEQ     II243               ;THEN
027472  013702  002254                  MOV     TRACK,R2            ;GET TRACK ADR
027476  006302                          ASL     R2                  ;DOUBLE TRACK ADR FOR WORD ADDRESSING
027500  006302                          ASL     R2                  ;ADJ TRK
027502  006302                          ASL     R2                  ; FOR ADR.
027504  062702  010070                  ADD     #TKXX,R2            ;ADD TRACK LOG LOCATION
027510  063702  002240                  ADD     UUTOFF,R2           ;FIND LOC ERR REG THIS UNIT
027514  005212                          INC     (R2)                ;INCREMENT UNIT ERR REG
```

```
4127 027516  005737  027610          II243:  TST     ERRSAV          ;IF ERR SAVE HAS
4128 027522  001023                          BNE     LI243           ;NO ERROR SET, THEN
4129 027524  005237  027612                  INC     ERSVCT          ;INCREMENT ERROR SAVE COUNTER
4130 027530  022737  000004  027612  IJ243:  CMP     #4,ERSVCT       ;IF ERROR SAVE COUNTER
4131 027536  101017                          BHI     EI243           ;NOT=4, THEN
4132 027540  012701  002306                  MOV     #SEEKRT,R1      ;SET BEGIN ADDRESS OF RETRY COUNTERS
4133 027544  012702  000011                  MOV     #11,R2          ;SET # OF RETRY COUNTERS
4134 027550  005021                  BK243:  CLR     (R1)+           ;CLEAR RETRY COUNTER
4135 027552  005302                          DEC     R2              ;DECREMENT RETRY COUNTER #
4136 027554  005702                  UK243:  TST     R2              ;DO UNTIL
4137 027556  001374                          BNE     BK243           ;ALL COUNTERS CLEARED
4138 027560  005037  027612                  CLR     ERSVCT          ;CLEAR ERROR SAVE COUNTER
4139 027564  005037  002304                  CLR     RETRY           ;CLEAR RETRY COUNTER
4140 027570  000402                          BR      EI243           ;BR TO END 'I'
4141 027572  005037  027612          LI243:  CLR     ERSVCT          ;CLEAR ERROR SAVE COUNT
4142 027576  013737  002276  027610  EI243:  MOV     ERRTY,ERRSAV    ;SAVE ERROR TYPE FOR NEXT ERROR CHECK
4143 027604  000207                  END243: RTS     PC              ;RETURN
4144                                 ;-------------------------------------------------------------------
4145 027606  000000                  ETSAV:  0                       ;ERR TYPE SAVE
4146 027610  000000                  ERRSAV: 0                       ;ERR TYPE SAVE REG
4147 027612  000000                  ERSVCT: 0                       ;ERROR SAVE COUNTER-COUNTS # OF NO ERROR PASSES
4148 027614  000000                  STERRG: 0                       ;STAT ERR REG
4149 027616  000000                  STCNTR: 0                       ;STAT COUNTER
4150 027620  000000                  CLASWD: 0                       ;ERROR CLASSIFICATION WORD-FROM TABLE
4151 027622  000000                  LOGOFF: 0                       ;ERROR LOG OFFSET FROM #CKSML
4152 027624  000000                  RTOFF:  0                       ;RETRY COUNTER OFFSET FROM # SEEKRT
4153 027626  000000                  TSTCK:  0                       ;TEST WORD-USED TO CHECK TEST DONE
4154                                 ;MOD 2.4.3 ----- END MODULE ----------------------------------------
4155
4156                                 ;----- ERROR TYPE CLASSIFICATION & OFFSETS TABLE ----------------------
4157                                                                 ;TYPE/LOG-OFF/RT-OFF/CLASS   /BIT#
4158                                                                 ;----/-------/------/--------/---------
4159 027630  005001                  ETTAB:  .WORD   005001          ;SFT /SEEK    /SEEK  /SK-RTMSK/  0
4160 027632  006005                          .WORD   006005          ;SFT /CRC     /CRC   /CRC      /  1
4161 027634  100407                          .WORD   100407          ;HRD /CKSML   /  -   /HD       /  2
4162 027636  012106                          .WORD   012106          ;SFT /DATA    /DATA  /DT-RTMSK/  3
4163 027640  154400                          .WORD   154400          ;HRD /  -     /  -   /   -    /  4
4164 027642  113227                          .WORD   113227          ;HRD /DDUNX   /DD    /HD       /  5
4165 027644  113227                          .WORD   113227          ;HRD /DDMIS   /DD    /HD       /  6
4166 027646  154400                          .WORD   154400          ;HRD /  -     /  -   /   -    /  7
4167 027650  154400                          .WORD   154400          ;HRD /UNK     /  -   /   -    /  8
4168 027652  101407                          .WORD   101407          ;HRD /FIL-EMP/  -   /HD       /  9
4169 027654  010164                          .WORD   010164          ;SFT /RD      /RD    /RD-RTMSK/ 10
4170 027656  011202                          .WORD   011202          ;SFT /WRT     /WT    /WT-RTMSK/ 11
4171 027660  103407                          .WORD   103407          ;HRD /INTR-ND/  -   /HD       / 12
4172 027662  104407                          .WORD   104407          ;HRD /D-NINTR/  -   /HD       / 13
4173 027664  102407                          .WORD   102407          ;HRD /ER-NSET/  -   /HD       / 14
4174 027666  154407                          .WORD   154407          ;HRD /ERR BIT/  -   /HD       / 15
4175                                                 !!!!!!
4176                                 ;               !!!!!!---<CLASSIFICATION (SEEK=1/CRC=5/DATA=6/WRITE=2/READ-4)
4177                                 ;               !!!!!----<RETRY COUNTER OFFSET
4178                                 ;               !!!!------<LOG REGISTER OFFSET-(FROM CKSML ADDRESS)
4179                                 ;               !--------<TYPE (SOFT=0/HARD=1)
4180                                 ;-------------------------------------------------------------------
```

```
4183                                    .SBTTL  MOD 2.4.3.1 - UPDATE HARD ERROR STATISTICS
4184                                    ;-----------------------------------------------------------------
4185
4186 027670  000240                    UDHDST: NOP                             ;
4187 027672  032737  000007  027620    IA2431: BIT     #7,CLASWD               ;IF ERROR CLASS WORD-
4188 027700  001007                            BNE     X2431                   ;CLASS=HD(7), THEN
4189 027702  013701  027622                    MOV     LOGOFF,R1               ;GET ERROR LOG OFFSET
4190 027706  062701  007354                    ADD     #CKSML,R1               ;ERR LOG ADR=ERR LOG OFF + CKSML ADR
4191 027712  063701  002240                    ADD     UUTOFF,R1               ;UUT ERR LOG ADR=UUT OFFSET + ERR LOG ADR
4192 027716  005211                            INC     (R1)                    ;INCREMENT THE ERROR LOG
4193 027720  000207                    X2431:  RTS     PC                      ;RETURN
4194                                    ;MOD 2.4.3.1 ----- END MODULE -----------------------------------
4195
4196
4197
4198                                    .SBTTL  MOD 2.4.3.2 - UPDATE CRC STATISTICS
4199                                    ;-----------------------------------------------------------------
4200
4201 027722  000240                    UDCRST: NOP                             ;
4202 027724  032737  020000  027626    IA2432: BIT     #BIT13,TSTCK            ;IF TEST=DATA CHECK
4203 027732  001425                            BEQ     LA2432                  ;BIT SET, THEN
4204 027734  032737  000010  002276    IB2432: BIT     #BIT03,ERRTY            ;IF ERR TYPE=DATA ERR
4205 027742  001007                            BNE     LB2432                  ;NOT SET, THEN
4206 027744  012737  000020  027622            MOV     #20,LOGOFF              ;SET LOG OFFSET=CRC BAD LOG
4207 027752  012737  000006  027624            MOV     #6,RTOFF                ;SET RETRY OFFSET=CRC ERR
4208 027760  000420                            BR      IC2432                  ;BR TO 'C'
4209 027762  012737  000050  027622    LB2432: MOV     #50,LOGOFF              ;SET DATA LOG OFFSET
4210 027770  005037  030474                    CLR     RTMASK                  ;CLEAR RETRY MASK
4211 027774  012737  000012  027624            MOV     #12,RTOFF               ;SET DUMMY DATA RETRY COUNTER OFFSET
4212 030002  004737  030344                    CALL    SFERLG                  ;CALL SOFT ERROR LOGGER
4213 030006  012737  000010  027622    LA2432: MOV     #10,LOGOFF              ;SET LOG OFFSET=CRC ERR LOG
4214 030014  012737  000006  027624            MOV     #6,RTOFF                ;SET RETRY OFFSET=CRC ERR
4215 030022  032737  010000  027626    IC2432: BIT     #BIT12,TSTCK            ;IF READ AFTER WRITE (RAW)
4216 030030  001407                            BEQ     LC2432                  ;BIT SET, THEN
4217 030032  012737  000020  030474            MOV     #BIT04,RTMASK           ;SET RETRY MASK=CRC
4218 030040  052737  000002  030474            BIS     #BIT1,RTMASK            ;SET RETRY MASK=WRITE
4219 030046  000406                            BR      EC2432                  ;BR TO END 'C'
4220 030050  012737  000020  030474    LC2432: MOV     #BIT04,RTMASK           ;SET RETRY MASK=CRC
4221 030056  052737  000004  030474            BIS     #BIT02,RTMASK           ;SET RETRY MASK=READ
4222 030064  004737  030344            EC2432: CALL    SFERLG                  ;CALL SOFT ERROR LOGGER
4223 030070  000207                            RETURN                          ;RETURN
4224                                    ;MOD 2.4.3.2 ----- END MODULE -----------------------------------
```

```
4227                                    .SBTTL  MOD 2.4.3.3 - UPDATE SOFT ERROR STATISTICS
4228                                    ;-----------------------------------------------------------------
4229
4230 030072  013702  027620            UDSFST: MOV     CLASWD,R2       ;PUT CLASSIFICATION WORD IN R1
4231 030076  006202                            ASR     R2              ;  SHIFT WORD RIGHT
4232 030100  006202                            ASR     R2              ;     3 TIMES TO GET
4233 030102  006202                            ASR     R2              ;       RETRY COUNTER OFFSET (LAST 6 BITS)
4234 030104  042702  177700                    BIC     #177700,R2      ;CLEAR TOP 10 BITS
4235 030110  010237  027624                    MOV     R2,RTOFF        ;SET RETRY COUNTER OFFSET
4236 030114  013702  027620            IA2433: MOV     CLASWD,R2       ;GET CLASSIFICATION WORD
4237 030120  042702  177770                    BIC     #177770,R2      ;CLEAR ALL BIT ERROR CLASSIFICATION
4238 030124  022702  000006                    CMP     #6,R2           ;IF ERROR
4239 030130  001022                            BNE     LA2433          ;CLASS=DATA, THEN
4240 030132  032737  010000  027626    IB2433: BIT     #BIT12,TSTCK    ;IF TEST HAS
4241 030140  001404                            BEQ     LB2433          ;READ AFTER WRITE (RAW) BIT SET, THEN
4242 030142  012737  000012  030474            MOV     #12,RTMASK      ;SET DATA & WRITE RETRY
4243 030150  000403                            BR      EB2433          ;BR TO END IF 'B'
4244 030152  012737  000014  030474    LB2433: MOV     #14,RTMASK      ;SET DATA & READ RETRY
4245 030160  012737  000010  027624    EB2433: MOV     #10,RTOFF       ;SET DATA RT COUNTER OFFSET
4246 030166  012737  000050  027622            MOV     #50,LOGOFF      ;SET DATA LOG OFFSET
4247 030174  000405                            BR      EA2433          ;BR TO END 'A'
4248 030176  010237  030474            LA2433: MOV     R2,RTMASK       ;ELSE-PUT CLASS INTO RETRY MASK
4249 030202  162737  000050  027622            SUB     #50,LOGOFF      ;ADJ. LOG OFFSET SO THAT 'SEK' IS LOG BEGIN
4250 030210  004737  030344    EA2433: CALL    SFERLG          ;CALL SOFT ERROR LOGGER
4251 030214  000207            X2433:  RTS     PC              ;RETURN
4252                                    ;MOD 2.4.3.3 ----- END MODULE ----------------------------------------
```

```
4255
4256                                    .SBTTL  MOD 2.4.3.4 - UPDATE SECTOR WRITTEN/READ COUNTERS
4257                                    ;-------------------------------------------------------------------
4258
4259 030216  013701  002234            UPSECT: MOV     UUT,R1          ;GET UNIT UNDER TEST
4260 030222  006301                            ASL     R1              ;DOUBLE FOR WORD ADDRESSING
4261 030224  006301                            ASL     R1              ;DOUBLE FOR 2 WORD ADDRESSING
4262 030226  042737  177770  030342            BIC     #177770,FUNTY   ;CLEAR ALL BUT FUNCTION
4263 030234  022737  000003  030342    IA2434: CMP     #3,FUNTY        ;IF FUNCTION TYPE
4264 030242  001002                            BNE     IB2434          ;IS READ, THEN
4265 030244  005002                            CLR     R2              ;CLEAR R2
4266 030246  000412                            BR      EA2434          ;BR TO END 'A'
4267 030250  022737  000002  030342    IB2434: CMP     #2,FUNTY        ;IF FUNCTION TYPE
4268 030256  001404                            BEQ     LB2434          ;IS NOT WRITE #1, THEN
4269 030260  022737  000006  030342    IC2434: CMP     #6,FUNTY        ;IF FUNCTION TYPE
4270 030266  001024                            BNE     XUPSCT          ;IS WRITE #2, THEN
4271 030270  012702  000020            LB2434: MOV     #20,R2          ;SET R2 OFFSET=WRITE
4272 030274  000241                    EA2434: CLC                     ;CLEAR CARRY BIT
4273 030276  060102                            ADD     R1,R2           ;SETUP OFFSET
4274 030300  005262  007314                    INC     READSC(R2)      ;INCREMENT SECTOR COUNTER
4275 030304  100015                            BPL     XUPSCT          ;IF BIT#15 SET, THEN
4276 030306  005062  007314                    CLR     READSC(R2)      ;CLEAR SECTOR COUNTER
4277 030312  062702  000002                    ADD     #2,R2           ;SETUP TO INCREMENT DOUBLE PRECISION WORD
4278 030316  005262  007314                    INC     READSC(R2)      ;INCREMENT DOUBLE PRECISION WORD
4279 030322  103006                            BCC     XUPSCT          ;IF CARRY BIT SET, THEN
4280 030324  005062  007314                    CLR     READSC(R2)      ;CLEAR DOUBLE PRECISION CTR
4281 030330  162702  000002                    SUB     #2,R2           ;
4282 030334  005062  007314                    CLR     READSC(R2)      ;CLEAR DOUBLE PRECISION CTR
4283 030340  000207                    XUPSCT: RETURN                  ;RETURN
4284                                    ;-------------------------------------------------------------------
4285 030342  000000                    FUNTY:  0                       ;STATISTICS FUNCTION CK
4286                                    ;-------------------------------------------------------------------
```

```
4289                                    .SBTTL  -    MOD 2.4.U.1 - SOFT ERROR LOGGER
4290                                    ;-------------------------------------------------------------------
4291
4292 030344  013701  027622            SFERLG: MOV     LOGOFF,R1       ;GET ERR LOG OFFSET
4293 030350  013702  027624                    MOV     RTOFF,R2        ;GET RETRY COUNTER OFFSET
4294 030354  062702  002306                    ADD     #SEEKRT,R2      ;CAL. RETRY COUNTER ADR
4295 030360  032737  000004  002204    IA24U1: BIT     #BIT02,SWREG    ;IF (SFT SW REG) RETRY ON ERROR, LOG SOFT OR HD ERROR
4296 030366  001004                            BNE     IB24U1          ;SET OR
4297 030370  032737  000004  002264            BIT     #EVL,FLGDRS     ;DRS "EVL" FLAG
4298 030376  001412                            BEQ     LB24U1          ;SET, THEN
4299 030400  021227  000012            IB24U1: CMP     (R2),#12        ;IF RETRY COUNTER
4300 030404  103007                            BHIS    LB24U1          ;EQUALS < 10 ERRORS, THEN
4301 030406  005212                            INC     (R2)            ;INCREMENT RETRY COUNTER
4302 030410  053737  030474  002304            BIS     RTMASK,RETRY    ;SET RT FLAGS PER RT MASK
4303 030416  005037  002300                    CLR     HARDER          ;CLEAR HARD ERROR
4304 030422  000413                            BR      EB24U1          ;BR TO END 'B'
4305 030424  062701  007514            LB24U1: ADD     #HSEK,R1        ;HD ERR LOG ADR=HARD SEEK ADR+LOG OFFSET
4306 030430  063701  002240                    ADD     UUTOFF,R1       ;UUT ERR LOG ADR=UUT OFFSET+LOG ADR
4307 030434  005211                            INC     (R1)            ;INCREMENT UUT HARD ERROR LOG
4308 030436  043737  030474  002304            BIC     RTMASK,RETRY    ;CLEAR RETRY FALGS USING RT MASK
4309 030444  005012                            CLR     (R2)            ;CLEAR RETRY COUNTER
4310 030446  005237  002300                    INC     HARDER          ;SET HARD ERROR FLAG
4311 030452  013701  027622            EB24U1: MOV     LOGOFF,R1       ;GET ERR LOG OFFSET
4312 030456  062701  007424                    ADD     #SEK,R1         ;ERR LOG ADR=SEK LOG ADR+LOG OFFSET
4313 030462  063701  002240                    ADD     UUTOFF,R1       ;UUT ERR LOG ADR=UUT OFFSET+LOG ADR
4314 030466  005211                            INC     (R1)            ;INCREMENT UUT ERROR LOG
4315 030470  000240            X24U1:  NOP                             ;
4316 030472  000207                            RTS     PC              ;RETURN
4317                                    ;-------------------------------------------------------------------
4318 030474  000000            RTMASK: 0                               ;RETRY MASK
4319                                    ;MOD 2.4.U1 ----- END MODULE ----------------------------------------
```

```
4322                                    .SBTTL  MOD 2.4.4 - EVALUATE UNIT ERROR CODE
4323                                    ;-------------------------------------------------------------------
4324
4325 030476  013701  033544      EVUTEC: MOV     XERUUT,R1       ;GET ERR CODE & SAVE
4326 030502  042701  177400              BIC     #177400,R1      ;CLEAR TOP BYTE
4327 030506  005701              IFA244: TST     R1              ;IF ERRCODE
4328 030510  001443                      BEQ     END244          ;NOT=0, THEN
4329 030512  006201                      ASR     R1              ;SHIFT ERR CODE FOR LOOK UP
4330 030514  006201                      ASR     R1              ;AND ADDRESSING
4331 030516  062701  030624              ADD     #ECCLAS,R1      ;CAL ERR TABLE CLASSIFICATION ADR
4332 030522  011102                      MOV     (R1),R2         ;GET ERR CODE CLASSIFICATION WORD
4333 030524  105702              IFB244: TSTB    R2              ;IF LOWER BYTE
4334 030526  001003                      BNE     IFC244          ;EQUALS 0, THEN
4335 030530  050237  002274              BIS     R2,ERRSY        ;SET ERR ONTO ERRSY
4336 030534  000431                      BR      END244          ;BR TO END IF 'B'
4337 030536  122702  000300      IFC244: CMPB    #300,R2         ;IF LOW BYTE
4338 030542  001024                      BNE     ELC244          ;EQUALS 300, THEN
4339 030544  022737  000003  030622  IFD244: CMP     #3,FNEV4        ;IF FUNCTION WAS
4340 030552  001004                      BNE     IFE244          ;A READ, THEN
4341 030554  052737  002000  002276          BIS     #2000,ERRTY     ;SET READ ERR
4342 030562  000416                      BR      END244          ;BR TO END IF 'B'
4343 030564  022737  000002  030622  IFE244: CMP     #2,FNEV4        ;IF FUNCTION WAS
4344 030572  001004                      BNE     ELE244          ;A WRITE, THEN
4345 030574  052737  004000  002276          BIS     #4000,ERRTY     ;SET WRITE ERROR
4346 030602  000406                      BR      END244          ;BR TO END IF 'B'
4347 030604  052737  040000  002276  ELE244: BIS     #40000,ERRTY    ;SET UNK ERROR
4348 030612  000402                      BR      END244          ;BR TO END IF 'B'
4349 030614  050237  002276      ELC244: BIS     R2,ERRTY        ;SET CLASSIFIED ERROR ONTO ERRTY
4350 030620  000207              END244: RTS     PC              ;RETURN
4351                                    ;-------------------------------------------------------------------
4352 030622  000000              FNEV4:  0                       ;FUNCTION FOR EVALUATION
4353                                    ;-------------------------------------------------------------------
4354 030624  000000              ECCLAS: .WORD   0               ;ERR CODE # 00  ---> NOT USED (NO ERROR)
4355 030626  000001                      .WORD   1               ;ERR CODE # 10  ---> SEEK
4356 030630  000001                      .WORD   1               ;ERR CODE # 20  ---> SEEK
4357 030632  000000                      .WORD   0               ;ERR CODE # 30  ---> NOT ASSIGNED
4358 030634  004000                      .WORD   4000            ;ERR CODE # 40  ---> SYS ERR
4359 030636  000001                      .WORD   1               ;ERR CODE # 50  ---> SEEK
4360 030640  002000                      .WORD   2000            ;ERR CODE # 60  ---> SELF DIAG ERR
4361 030642  000300                      .WORD   300             ;ERR CODE # 70  ---> READ OR WRITE ERR
4362 030644  004000                      .WORD   4000            ;ERR CODE # 100 ---> SYS ERR
4363 030646  000300                      .WORD   300             ;ERR CODE # 110 ---> READ OR WRITE ERR
4364 030650  000300                      .WORD   300             ;ERR CODE # 120 ---> READ OR WRITE ERR
4365 030652  000300                      .WORD   300             ;ERR CODE # 130 ---> READ OR WRITE ERR
4366 030654  000002                      .WORD   2               ;ERR CODE # 140 ---> CRC ERR
4367 030656  000001                      .WORD   1               ;ERR CODE # 150 ---> SEEK ERR
4368 030660  000300                      .WORD   300             ;ERR CODE # 160 ---> READ OR WRITE ERR
4369 030662  000300                      .WORD   300             ;ERR CODE # 170 ---> READ OR WRITE ERR
4370 030664  000002                      .WORD   2               ;ERR CODE # 200 ---> CRC ERR
4371 030666  000000                      .WORD   0               ;ERR CODE # 210 ---> NOT ASSIGNED
4372 030670  002000                      .WORD   2000            ;ERR CODE # 220 ---> SELF DIAG ERR
4373 030672  004000                      .WORD   4000            ;ERR CODE # 230 ---> SYS ERR
4374 030674  020000                      .WORD   20000           ;ERR CODE # 240 ---> DENSITY ERR
4375 030676  020000                      .WORD   20000           ;ERR CODE # 250 ---> DENSITY ERR
4376 030700  000000                      .WORD   0               ;ERR CODE # 260 ---> NOT ASSIGNED
4377                                    ;MOD 2.4.4 ----- END MODULE ----------------------------------------
```

```
4380                                        .SBTTL  MOD 2.5 - OUTPUT ERROR TYPE
4381                                        ;-------------------------------------------------------------------
4382 030702  013737  002276  002604  OTERTP: MOV     ERRTY,ERRREG    ;SET ERROR TYPE FOR PRINT OUT
4383 030710  013701  002276                  MOV     ERRTY,R1        ;GET ERROR TYPE
4384 030714  005002                          CLR     R2              ;CLEAR ERROR # COUNT
4385 030716  000240                  BDA25:  NOP                     ;
4386 030720  032701  000001          IFA25:  BIT     #1,R1           ;IF BIT #1
4387 030724  001405                          BEQ     ELA25           ;EQUALS 1, THEN
4388 030726  010204                          MOV     R2,R4           ;SAVE ERROR # COUNT
4389 030730  006304                          ASL     R4              ;DOUBLE ERR # COUNT FOR ADDRESSING
4390 030732  062704  031616                  ADD     #ET1,R4         ;SET ADDR FOR ERR MSG PRINT
4391 030736  000407                          BR      THA25           ;BR TO THEN 'A'
4392 030740  000241                  ELA25:  CLC                     ;CLEAR CARRY BIT
4393 030742  006201                          ASR     R1              ;SHIFT ERR TYPE RIGHT
4394 030744  005202                          INC     R2              ;INCREMENT ERROR # COUNT
4395 030746  022702  000017                  CMP     #17,R2          ;DC UNTIL ERROR # COUNT
4396 030752  001361                          BNE     BDA25           ;EQUALS 15, THEN
4397 030754  000507                          BR      EIA25           ;BR TO END IF 'A'
4398 030756  005003                  THA25:  CLR     R3              ;CLEAR R3
4399 030760  010205                          MOV     R2,R5           ;GET ERR#
4400 030762  062705  031656                  ADD     #ETCLAS,R5      ;CAL. ERR# CLASSIFICATION ADR
4401 030766  111503                          MOVB    (R5),R3         ;GET ERR# CLASSIFICATION
4402 030770  032703  000001          IFB25:  BIT     #1,R3           ;IF SOFT ERR
4403 030774  001415                          BEQ     IFC25           ;CLASS, THEN
4404 030776  005737  002300                  TST     HARDER          ;IF HARD ERR
4405 031002  001015                          BNE     ELB25           ;NOT SET, THEN
4406 031004  010237  002376                  MOV     R2,ERRNBR       ;SET ERR #
4407 031010  011437  002400                  MOV     (R4),ERRMSG     ;SET ERR MSG
4408 031014  012737  000003  002374          MOV     #SOFT,ERRTYP    ;SET ERRTYP=SOFT
4409 031022  004737  002354                  CALL    ERROR           ;CALL ERROR
4410 031026  000437                          BR      EIC25           ;
4411 031030  032703  000002          IFC25:  BIT     #2,R3           ;IF HARD ERR
4412 031034  001434                          BEQ     EIC25           ;CLASS, THEN
4413 031036  052702  000040          ELB25:  BIS     #40,R2          ;SET HARD ERROR #
4414 031042  010237  002376                  MOV     R2,ERRNBR       ;SET ERR #
4415 031046  011437  002400                  MOV     (R4),ERRMSG     ;SET ERR MSG
4416 031052  012737  000002  002374          MOV     #HARD,ERRTYP    ;PRESET ERRTYP=HARD ERR
4417 031060  032737  000004  002264  IFF25:  BIT     #EVL,FLGDRS     ;IF DRS "EVL" FLAG
4418 031066  001413                          BEQ     EIF25           ;IS SET, THEN
4419 031070  005237  002302                  INC     HDERCT          ;INCREMENT HARD ERROR CTR
4420 031074  023737  002302  002216  IFE25:  CMP     HDERCT,DFTL     ;IF DEVICE FATAL THRESHOLD
4421 031102  101005                          BHI     EIF25           ;REACHED, THEN
4422 031104  012737  000001  002374          MOV     #DVFT,ERRTYP    ;RESET ERRTYP=DEVICE FATAL
4423 031112  005037  002302                  CLR     HDERCT          ;CLEAR HARD ERROR CTR
4424 031116  004737  002354          EIF25:  CALL    ERROR           ;CALL ERROR
4425 031122  005237  002300                  INC     HARDER          ;SET HARD ERROR FLAG
4426 031126  013737  002276  002604  EIC25:  MOV     ERRTY,ERRREG    ;SET ERR TYPE FOR PRINT OUT
4427 031134  004737  002404                  CALL    PRTERR          ;CALL U.P.ERR - PRINT ERR INFO
4428 031140  013737  002276  021452          MOV     ERRTY,ERTSAV    ;SAVE ERR TYP FOR DATA CK
4429 031146  005037  002276                  CLR     ERRTY           ;CLEAR DEVICE ERR
4430 031152  004737  003034                  CALL    XERPRT          ;CALL MOD U.PRT.B - PRINT ERR CODE
4431 031156  005737  002300          IFD25:  TST     HARDER          ;IF NOT A
4432 031162  001002                          BNE     ELD25           ;HARDER, THEN
4433 031164  004737  031676                  CALL    PTRTY           ;CALL 2.5.1 - PRINT RETRY #
4434 031170  005037  002300          ELD25:  CLR     HARDER          ;CLEAR HARD ERROR FLAG
4435 031174  000207                  EIA25:  RTS     PC              ;RETURN
4436                                        ;-------------------------------------------------------------------
```

```
4437                                    ;-----------------------------------------------------------------
4438 031176     040     123     105    ERT1:   .ASCIZ  / SEEK ERR/
4439 031210     040     103     122    ERT2:   .ASCIZ  / CRC ERR/
4440 031221     040     103     113    ERT3:   .ASCIZ  / CK SUM ERR/
4441 031235     040     104     101    ERT4:   .ASCIZ  / DATA ERR/
4442 031247     040     125     116    ERT5:   .ASCIZ  / UNASSG ERR/
4443 031263     040     104     105    ERT6:   .ASCIZ  / DEL. DATA UNEXPECTED ERR/
4444 031315     040     104     105    ERT7:   .ASCIZ  / DEL. DATA MISSING ERR/
4445 031344     040     125     116    ERT8:   .ASCIZ  / UNASSG ERR/
4446 031360     040     125     116    ERT9:   .ASCIZ  / UNK ERR/
4447 031371     040     106     111    ERT10:  .ASCIZ  / FILL OR EMPTY BUFFER ERR/
4448 031423     040     122     105    ERT11:  .ASCIZ  / READ ERR/
4449 031435     040     127     122    ERT12:  .ASCIZ  / WRITE ERR/
4450 031450     040     111     116    ERT13:  .ASCIZ  / INTERRUPT BUT NO DONE BIT ERR/
4451 031507     040     104     117    ERT14:  .ASCIZ  / DONE BIT BUT NO INTERRUPT ERR/
4452 031546     040     105     122    ERT15:  .ASCIZ  / ERROR, BUT NO ERR BIT SET/
4453 031601     040     105     122    ERT16:  .ASCIZ  / ERR BIT SET/
4454                                            .EVEN
4455 031616  031176                    ET1:    .WORD   ERT1
4456 031620  031210                            .WORD   ERT2
4457 031622  031221                            .WORD   ERT3
4458 031624  031235                            .WORD   ERT4
4459 031626  031247                            .WORD   ERT5
4460 031630  031263                            .WORD   ERT6
4461 031632  031315                            .WORD   ERT7
4462 031634  031344                            .WORD   ERT8
4463 031636  031360                            .WORD   ERT9
4464 031640  031371                            .WORD   ERT10
4465 031642  031423                            .WORD   ERT11
4466 031644  031435                            .WORD   ERT12
4467 031646  031450                            .WORD   ERT13
4468 031650  031507                            .WORD   ERT14
4469 031652  031546                            .WORD   ERT15
4470 031654  031601                            .WORD   ERT16
4471                                    ;-----------------------------------------------------------------
4472                                                    ;ERROR                  - TYPE - ERR#
4473                                                    ;-----                  ------------
4474 031656     001                    ETCLAS: .BYTE   1               ;SEEK                   - SOFT - 0 -32
4475 031657     001                            .BYTE   1               ;CRC                    - SOFT - 1 -33
4476 031660     002                            .BYTE   2               ;CKSUM                  - HARD -   -34
4477 031661     001                            .BYTE   1               ;DATA                   - SOFT - 3 -35
4478 031662     000                            .BYTE   0               ;UNASSIGNED             -
4479 031663     002                            .BYTE   2               ;DEL. DATA UNEX         - HARD -   -37
4480 031664     002                            .BYTE   2               ;DEL. DATA MISSING      - HARD -   -38
4481 031665     000                            .BYTE   0               ;UNASSIGNED             -
4482 031666     002                            .BYTE   2               ;UNK ERR                - HARD -   -40
4483 031667     002                            .BYTE   2               ;FILL/EMPTY BUFFER      - HARD -   -41
4484 031670     001                            .BYTE   1               ;READ                   - SOFT - 10-42
4485 031671     001                            .BYTE   1               ;WRITE                  - SOFT - 11-43
4486 031672     002                            .BYTE   2               ;INTER-BUT NO DONE      - HARD -   -44
4487 031673     002                            .BYTE   2               ;DONE-BUT NO INTER      - HARD -   -45
4488 031674     002                            .BYTE   2               ;ERR-BUT NO ERR BIT     - HARD -   -46
4489 031675     002                            .BYTE   2               ;ERR BIT SET            - HARD -   -47
4490                                            .EVEN
4491                                    ;MOD 2.5 ----- END MODULE ---------------------------------------
```

```
4494
4495                                    .SBTTL  MOD 2.5.1 - PRINT RETRY
4496                                    ;-----------------------------------------------------------------------
4497
4498 031676  000240                    PTRTY:  NOP                     ;
4499 031700  005737  002304            IFA251: TST     RETRY           ;IF RETRY
4500 031704  001500                            BEQ     END251          ;NOT=0, THEN
4501 031706  032737  000001  002304    IFB251: BIT     #1,RETRY        ;IF RETRY
4502 031714  001405                            BEQ     IFC251          ;IS SEEK, THEN
4503 031716  013702  002306                    MOV     SEEKRT,R2       ;SET SEEK RT COUNT
4504 031722  012701  032110                    MOV     #MSKRT,R1       ;SET SEEK RT MSG
4505 031726  000465                            BR      EIB251          ;BR TO END IF 'B'
4506 031730  032737  000002  002304    IFC251: BIT     #2,RETRY        ;IF RETRY
4507 031736  001427                            BEQ     IFE251          ;IS WRT, THEN
4508 031740  032737  000030  002304    IFD251: BIT     #30,RETRY       ;IF RETRY
4509 031746  001416                            BEQ     ELD251          ;IS DATA OR CRC , THEN
4510 031750  032737  000010  002304    IFG251: BIT     #10,RETRY       ;IF RETRY
4511 031756  001405                            BEQ     ELG251          ;IS DATA, THEN
4512 031760  013702  002316                    MOV     DATART,R2       ;SET DATA RT COUNT
4513 031764  012701  032134                    MOV     #MDWTRT,R1      ;SET DATA WRT MSG
4514 031770  000444                            BR      EIB251          ;BR TO END IF 'B'
4515 031772  013702  002314            ELG251: MOV     CRCERT,R2       ;SET CRC RETRY COUNT
4516 031776  012701  032270                    MOV     #MCWTRT,R1      ;SET CRC WRT MSG
4517 032002  000437                            BR      EIB251          ;BR TO END IF 'B'
4518 032004  013702  002326            ELD251: MOV     WRTRT,R2        ;SET WRT RT COUNT
4519 032010  012701  032166                    MOV     #MWTRT,R1       ;SET WRT RT MSG
4520 032014  000432                            BR      EIB251          ;BR TO END IF 'B'
4521 032016  032737  000004  002304    IFE251: BIT     #4,RETRY        ;IF RETRY
4522 032024  001430                            BEQ     END251          ;IS READ, THEN
4523 032026  032737  000030  002304    IFF251: BIT     #30,RETRY       ;IF RETRY
4524 032034  001416                            BEQ     ELF251          ;IS DATA OR CRC, THEN
4525 032036  032737  000010  002304    IFH251: BIT     #10,RETRY       ;IF RETRY
4526 032044  001405                            BEQ     ELH251          ;IS DATA, THEN
4527 032046  013702  002316                    MOV     DATART,R2       ;SET DATA RT COUNT
4528 032052  012701  032213                    MOV     #MDRDRT,R1      ;SET DATA READ RT MSG
4529 032056  000411                            BR      EIB251          ;BR TO END IF 'B'
4530 032060  013702  002314            ELH251: MOV     CRCERT,R2       ;SET CRC RETRY COUNT
4531 032064  012701  032321                    MOV     #MCRDRT,R1      ;SET CRC READ MSG
4532 032070  000404                            BR      EIB251          ;BR TO END IF 'B'
4533 032072  013702  002324            ELF251: MOV     READRT,R2       ;SET READ RT COUNT
4534 032076  012701  032244                    MOV     #MRDRT,R1       ;SET READ RT MSG
4535 032102  004737  004536            EIB251: CALL    PRTB1S          ;PRINT RETRY # & TYPE
4536 032106  000207                    END251: RTS     PC              ;RETURN
4537                                    ;-----------------------------------------------------------------------
4538 032110      045     101     040    MSKRT:  .ASCIZ  /%A SEEK RETRY#%D2%N/
4539 032134      045     101     040    MDWTRT: .ASCIZ  /%A DATA WRITE RETRY#%D2%N/
4540 032166      045     101     040    MWTRT:  .ASCIZ  /%A WRITE RETRY#%D2%N/
4541 032213      045     101     040    MDRDRT: .ASCIZ  /%A DATA READ RETRY#%D2%N/
4542 032244      045     101     040    MRDRT:  .ASCIZ  /%A READ RETRY#%D2%N/
4543 032270      045     101     040    MCWTRT: .ASCIZ  /%A CRC WRITE RETRY#%D2%N/
4544 032321      045     101     040    MCRDRT: .ASCIZ  /%A CRC READ RETRY#%D2%N/
4545                                            .EVEN
4546                                    ;MOD 2.5.1 ----- END MODULE ----------------------------------------
```

```
4549                                    .SBTTL  MOD 2.6 - SET DRIVES DONE
4550                                    ;-------------------------------------------------------------------
4551
4552 032352  000240                     STDVDN: NOP                     ;
4553 032354  005737  021442                IFA26:  TST     DVDNCK          ;IF DRV DONE CK
4554 032360  001430                             BEQ     END26           ;IS SET, THEN
4555 032362  000240                             NOP                     ;
4556 032364  005037  021442                     CLR     DVDNCK          ;CLEAR DRV DONE CK
4557 032370  032737  000001  002234        IFB26:  BIT     #1,UUT          ;IF DRV#1 DONE
4558 032376  001404                             BEQ     ELB26           ;THEN
4559 032400  052737  000002  021432             BIS     #2,BTHDRV       ;SET DRV#1 DONE FLAG
4560 032406  000403                             BR      EIB26           ;BR TO END
4561 032410  052737  000001  021432        ELB26:  BIS     #1,BTHDRV       ;SET DRV#0 DONE FLAG
4562 032416  005001                        EIB26:  CLR     R1              ;CLEAR TEMP DRV DONE REG
4563 032420  013703  002234                     MOV     UUT,R3          ;GET UNIT UNDER TEST
4564 032424  000261                             SEC                     ;SET CARRY BIT
4565 032426  006101                        BDA26:  ROL     R1              ;MOVE DRV BIT
4566 032430  005303                             DEC     R3              ;DECREMENT UNIT UNDER TEST
4567 032432  005703                             TST     R3              ;DO UNTIL UNIT UNDER TST
4568 032434  002374                        DUA26:  BGE     BDA26           ;EQUALS -1
4569 032436  050137  021444                     BIS     R1,DRVDN        ;THEN SET THIS DRV DONE
4570 032442  000207                        END26:  RTS     PC              ;RETURN
4571                                    ;MOD 2.6 ---- END MODULE ----------------------------------------------
```

```
4574                                    .SBTTL  MOD 3.0 - OUTPUT EXERCISE COMPLETE
4575                                    ;-----------------------------------------------------------------
4576 032444  000240                     OTEXCM: NOP
4577 032446  023737  002232  002230             CMP     SUT,SDD         ;IF ALL SCHEDULED
4578 032454  001003                             BNE     END30           ;DRIVE DONE
4579 032456  012737  000001  014020             MOV     #1,EXCMP        ;SET EXERCISE COMPLETE
4580 032464  000207                     END30:  RTS     PC              ;RETURN
4581                                    ;MOD 3.0 ----- END MODULE ---------------------------------------
```

```
4584                                    .SBTTL  MOD 4.0 - OUTPUT SYSTEM ERROR
4585                                    ;-------------------------------------------------------------------
4586 032466  013701  002274            OTSYER: MOV     ERRSY,R1        ;GET SYSTEM ERR
4587 032472  000241                            CLC                     ;CLEAR CARRY BIT
4588 032474  006201                            ASR     R1              ;SHIFT
4589 032476  000241                            CLC                     ;
4590 032500  006201                            ASR     R1              ;       FUNCTION
4591 032502  006201                            ASR     R1              ;                OUT
4592 032504  005002                            CLR     R2              ;CLEAR ERR #  COUNT
4593 032506  000240                    BDA40:  NOP                     ;
4594 032510  032701  000001            IFA40:  BIT     #1,R1           ;IF BIT #1
4595 032514  001405                            BEQ     ELA40           ;EQUALS 1, THEN
4596 032516  010204                            MOV     R2,R4           ;SAVE ERROR # COUNT
4597 032520  006304                            ASL     R4              ;DOUBLE ERR # COUNT FOR ADDRESSING
4598 032522  062704  033416                    ADD     #SE1,R4         ;SET ADDR FOR ERR MSG PRINT
4599 032526  000406                            BR      THA40           ;BR TO THEN 'A'
4600 032530  006201                    ELA40:  ASR     R1              ;SHIFT ERR TYPE RIGHT
4601 032532  005202                            INC     R2              ;INCREMENT ERROR # COUNT
4602 032534  022702  000017                    CMP     #17,R2          ;DO UNTIL ERR # COUNT
4603 032540  001362                            BNE     BDA40           ;EQUALS 15, THEN
4604 032542  000452                            BR      EIA40           ;BR TO END IF 'A'
4605 032544  010205                    THA40:  MOV     R2,R5           ;GET ERR#
4606 032546  062705  033450                    ADD     #ESCLAS,R5      ;CAL. ERR# CLASSIFICATION ADR
4607 032552  111503                            MOVB    (R5),R3         ;GET ERR# CLASSIFICATION
4608 032554  032703  000002            IFB40:  BIT     #2,R3           ;IF DEVICE FATAL
4609 032560  001415                            BEQ     IFC40           ;ERROR, THEN
4610 032562  010205                            MOV     R2,R5           ;GET ERR#
4611 032564  052705  000100                    BIS     #100,R5         ;SET ERR CLASS=SYS
4612 032570  010537  002376                    MOV     R5,ERRNBR       ;SET ERR#
4613 032574  011437  002400                    MOV     (R4),ERRMSG     ;SET ERR MSG
4614 032600  012737  000001  002374            MOV     #DVFT,ERRTYP    ;SET DEVICE FATAL ERROR
4615 032606  004737  002354                    CALL    ERROR           ;CALL ERROR
4616 032612  000417                            BR      EIC40           ;BR TO END IF 'C'
4617 032614  032703  000004            IFC40:  BIT     #4,R3           ;IF SYSTEM FATAL
4618 032620  001414                            BEQ     EIC40           ;ERROR, THEN
4619 032622  010205                            MOV     R2,R5           ;GET ERR#
4620 032624  052705  000200                    BIS     #200,R5         ;SET ERR CLASS=SYS
4621 032630  010537  002376                    MOV     R5,ERRNBR       ;SET ERR#
4622 032634  011437  002400                    MOV     (R4),ERRMSG     ;SET ERR MSG
4623 032640  012737  000000  002374            MOV     #SYFT,ERRTYP    ;SET ERR TYP=SYS FATAL
4624 032646  004737  002354                    CALL    ERROR           ;CALL ERROR
4625 032652  013737  002274  002604    EIC40:  MOV     ERRSY,ERRREG    ;SET SYS ERR FOR PRINT OUT
4626 032660  004737  002404                    CALL    PRTERR          ;CALL U.P.ERR - PRINT ERR INFO
4627 032664  004737  003034                    CALL    XERPRT          ;CALL MOD U.PRT.B - PRINT ERROR CODE
4628 032670  000240                    EIA40:  NOP                     ;
4629 032672  005037  002274                    CLR     ERRSY           ;CLEAR SYS ERRORS
4630 032676  000207                    END40:  RTS     PC
4631                                    ;-------------------------------------------------------------------
```

```

                                                ;-----------------------------------------------------------------
 032700     040      116      117      SYSE4:   .ASCIZ   / NO DONE BIT ON INITIALIZE/
 032733     040      116      117      SYSE5:   .ASCIZ   / NO DONE BIT ON FUNCTION/
 032764     040      116      117      SYSE6:   .ASCIZ   / NO DRIVE READY BIT/
 033010     040      116      117      SYSE7:   .ASCIZ   / NO SIDE READY BIT/
 033033     040      116      117      SYSE8:   .ASCIZ   / NO DONE BIT AFTER READ STATUS/
 033072     040      127      122      SYSE9:   .ASCIZ   / WRONG DRIVE RESPONDING/
 033122     040      127      122      SYSE10:  .ASCIZ   / WRONG SIDE RESPONDING/
 033151     040      125      116      SYSE11:  .ASCIZ   / UNUSED/
 033161     040      125      116      SYSE12:  .ASCIZ   / UNUSED/
 033171     040      104      111      SYSE13:  .ASCIZ   / DISKETTE WRONG DENSITY ERR/
 033225     040      104      105      SYSE14:  .ASCIZ   / DENSITY ERR/
 033242     040      124      111      SYSE15:  .ASCIZ   / TIME OUT ON "TR" OR "DONE" BIT/
 033302     040      125      116      SYSE16:  .ASCIZ   / UNCLASSIFIED SYSTEM ERROR/
 033335     045      116      045      FUNCT:   .ASCIZ   /%N%AFUNCTION CODE:%03/
 033363     045      116      045      ERRORS:  .ASCIZ   /%N%ASYSTEM ERROR REG=%B%N/
                                                .EVEN
 033416  032700                        SE1:     .WORD    SYSE4
 033420  032733                                 .WORD    SYSE5
 033422  032764                                 .WORD    SYSE6
 033424  033010                                 .WORD    SYSE7
 033426  033033                                 .WORD    SYSE8
 033430  033072                                 .WORD    SYSE9
 033432  033122                                 .WORD    SYSE10
 033434  033151                                 .WORD    SYSE11
 033436  033161                                 .WORD    SYSE12
 033440  033171                                 .WORD    SYSE13
 033442  033225                                 .WORD    SYSE14
 033444  033242                                 .WORD    SYSE15
 033446  033302                                 .WORD    SYSE16
                                       ;-----------------------------------------------------------------
                                                                 ;ERROR                   - CLASS     -ERR#
                                                                 ;-----                   -------     -----
 033450     004                        ESCLAS:  .BYTE    4       ;NO DONE ON INIT         - SYS FATAL - 128
 033451     002                                 .BYTE    2       ;NO DONE ON FUNCTION     - DEV FATAL -  65
 033452     002                                 .BYTE    2       ;NO DRIVE RDY            - DEV FATAL -  66
 033453     002                                 .BYTE    2       ;NO SIDE RDY             - DEV FATAL -  67
 033454     004                                 .BYTE    4       ;NO DONE AFTER RD STA    - DEV FATAL -  68
 033455     004                                 .BYTE    4       ;WRG DRV RESPOND         - SYS FATAL - 133
 033456     000                                 .BYTE    0       ;WRG SIDE RESPOND        - SYS FATAL - 134
 033457     000                                 .BYTE    0       ;UNUSED                  - 0
 033460     002                                 .BYTE    2       ;UNUSED                  - 0
 033461     002                                 .BYTE    2       ;DISKETT WRG DEN         - DEV FATAL -  73
 033462     004                                 .BYTE    4       ;DENSITY ERR             - DEV FATAL -  74
 033463     004                                 .BYTE    4       ;T.O. ON "TR" OR "DONE"  - SYS FATAL - 139
 033464     004                                 .BYTE    4       ;SYS ERR                 - SYS FATAL - 140
                                                .EVEN
                                       ;MOD 4.0 ----- END MODULE ------------------------------------------
```

```
 4685                                   .SBTTL  -    MOD INTR.1 - INTERRUPT HANDLER #0
 4686                                   ;-------------------------------------------------------------------
 4687 033466  013737  002220  033542   INTH0:  MOV     U0ADR,INCSAD    ;SET UNIT #0 ADDRESS
 4688 033474  004737  033516                   CALL    SVUTRG          ;CALL MOD U.INTR.U - SAVE UNIT REG
 4689 033500  000002                     RTI                     ;
 4690                                   ;MOD U.INTR.1 ----- END MODULE -------------------------------------
 4691
 4692                                   .SBTTL  -    MOD INTR.2 - INTERRUPT HANDLER #1
 4693                                   ;-------------------------------------------------------------------
 4694 033502  013737  002222  033542   INTH1:  MOV     U1ADR,INCSAD    ;SET UNIT #1 ADDRESS
 4695 033510  004737  033516                   CALL    SVUTRG          ;CALL MOD U.INTR.U - SAVE UNIT REG
 4696 033514  000002                     RTI                     ;
 4697                                   ;MOD U.INTR.2 ----- END MODULE -------------------------------------
 4698
 4699                                   .SBTTL  MOD U.INTR.U - SAVE UNIT REG
 4700                                   ;-------------------------------------------------------------------
 4701 033516  012737  000001  025226   SVUTRG: MOV     #1,DNFLAG       ;SET DONE FLAG
 4702 033524  013701  033542                   MOV     INCSAD,R1       ;SAVE UUT ADDRESS
 4703 033530  012137  002246                   MOV     (R1)+,CSRUUT    ;SAVE UUT CSR
 4704 033534  011137  002250                   MOV     (R1),ESRUUT     ;SAVE UUT ESR
 4705 033540  000207                           RTS     PC              ;RETURN
 4706                                   ;-------------------------------------------------------------------
 4707 033542  000000                   INCSAD: 0                       ;INTERRUPTING UNIT CSR ADDRESS
 4708                                   ;MOD U.I.U ----- END MODULE ----------------------------------------
 4709
 4710                                   .SBTTL  -    READ ERROR CODE BUFFER
 4711                                   ;-------------------------------------------------------------------
 4712 033544      000                   XERUUT: .BYTE   0               ;ERROR CODE UUT
 4713 033545      000                   WC:     .BYTE   0               ;WORD COUNT UUT
 4714 033546      000                   CTK0:   .BYTE   0               ;CUR TRK DRV#0
 4715 033547      000                   CTK1:   .BYTE   0               ;CUR TRK DRV#1
 4716 033550      000                   TTRK:   .BYTE   0               ;TARGET TRK
 4717 033551      000                   TSEC:   .BYTE   0               ;TARGET SEC
 4718 033552      000                   SFTSTS: .BYTE   0               ;MICRO CODE SOFT STATUS
 4719 033553      000                   BTRK:   .BYTE   0               ;BAD TRK ADR
 4720                                   ;-------------------------------------------------------------------
 4721
 4722                                   .SBTTL  -    TRACK TABLE
 4723                                   ;-------------------------------------------------------------------
 4724 033554  000232                   TRKTBL: .REPT   154.            ;TRACK TABLE
 4727                                   ;-------------------------------------------------------------------
 4728
 4729                                   .SBTTL  -    DATA BUFFERS
 4730                                   ;-------------------------------------------------------------------
 4731 034006  000400                   DATPAT: .REPT   256.            ;DATA PATTERN
 4734 034406  000400                   DATBUF: .REPT   256.            ;DATA BUFFER
 4737                                   ;-------------------------------------------------------------------
 4738 035006                                   ENDTST
```

```
 4741                                   .TITLE PARAMETER CODING
 4752
 4753                                   .SBTTL  HARDWARE PARAMETER CODING SECTION
 4789
 4790                                   ;++
 4791                                   ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
 4792                                   ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
 4793                                   ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
 4794                                   ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
 4795                                   ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
 4796                                   ; WITH THE OPERATOR.
 4797                                   ;--
 4798
 4799 035010                                   BGNHRD
 4800
 4801 035012                                   GPRMA   MSG1,0,0,0,177777,YES
 4802 035022                                   GPRMA   MSG2,2,0,0,177777,YES
 4803 035032                                   GPRMD   MSG3,4,0,177777,0.,1.,YES
 4804 035044                                   GPRMD   MSG4,6,0,177777,0.,1.,YES
 4805
 4806 035056                                   EXIT    HRD
 4807
 4813 035060                                   ENDHRD
 4814                                   ;-----------------------------------------------------------------------
 4815 035060     122     130     040   MSG1:   .ASCIZ  /RX BUS ADR/
 4816 035073     126     105     103   MSG2:   .ASCIZ  /VECTOR ADR/
 4817 035106     104     122     111   MSG3:   .ASCIZ  /DRIVE #   /
 4818 035121     105     130     120   MSG4:   .ASCIZ  /EXP WRD-CR/
 4819                                   ;-----------------------------------------------------------------------
 4820                                   .EVEN
```

```
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

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

035134                          BGNSFT

035136                          GPRML   MSG6,2,1,YES
035144                          XFERF   1$
035146                          GPRML   MSG7,2,2,YES
035154                  1$:     GPRMD   MSG8,4,0,177777,0,6,YES
035166                          GPRMD   MSG11,6,0,177777,0,6,YES
035200                          GPRMD   MSG14,10,0,177777,0,6,YES
035212                          GPRMD   MSG9,24,D,177777,1.,10000.,YES
035224                          GPRML   MSG15,12,1,YES
035232                          GPRML   MSG16,12,2,YES
035240                          GPRML   MSG17,2,100,YES
035246                          XFERF   4$
035250                          GPRML   MSG18,12,4,YES
035256                          GPRML   MSG19,12,10,YES
035264                          GPRML   MSG20,12,20,YES
035272                          GPRML   MSG21,12,40,YES
035300                  4$:     GPRML   MSG22,2,200,YES
035306                          XFERF   5$
035310                          GPRMD   MSG23,14,D,177777,0.,76.,YES
035322                          GPRMD   MSG24,16,D,177777,0.,76.,YES
035334                  5$:     GPRML   MSG25,2,400,YES
035342                          XFERF   6$
035344                          GPRMD   MSG26,20,D,177777,1.,26.,YES
035356                          GPRMD   MSG27,22,D,177777,1.,26.,YES
035370                  6$:     GPRML   MSG5,0,177777,YES
035376                          EXIT    SFT


                                .EVEN

                                ENDSFT
035400
```

```
                                     ;------------------------------------------------------------------------
          000015                              CR==15                          ;CARRIAGE RETURN
          000012                              LF==12                          ;LINE FEED
035400     122      130      130     MSG5:    .ASCIZ  /RXXX EXPANSION TYPE <CR> /
035432     110      105      114     MSG6:    .ASCIZ  /HELP TEST SETUP /
035453     105      130      105     MSG7:    .ASCII  /EXERCISE OPTIONS/<CR><LF>
035475     040      040      040              .ASCII  /   0 = WRITE-READ-DATA CK & READ-DATA CK/<CR><LF>
035547     040      040      040              .ASCII  /   1 = WRITE ONLY/<CR><LF>
035572     040      040      040              .ASCII  /   2 = WRITE-READ/<CR><LF>
035615     040      040      040              .ASCII  /   3 = WRITE-READ-DATA CHECK/<CR><LF>
035653     040      040      040              .ASCII  /   4 = READ-DATA CHECK ONLY/<CR><LF>
035710     040      040      040              .ASCII  /   5 = READ ONLY (CRC CHECK)/<CR><LF>
035746     040      040      040              .ASCII  /   6 = WRITE-READ-DATA CHECK ON ALTERNATE DRIVES/<CR><LF>
036030     104      101      124              .ASCII  /DATA PATTERN OPTIONS/<CR><LF>
036056     040      040      040              .ASCII  /   0 = RANDOM/<CR><LF>
036075     040      040      040              .ASCII  /   1 = ZEROS/<CR><LF>
036113     040      040      040              .ASCII  /   2 = ONES/<CR><LF>
036130     040      040      040              .ASCII  /   3 = FLOATING ZERO/<CR><LF>
036156     040      040      040              .ASCII  /   4 = FLOATING ONE/<CR><LF>
036203     040      040      040              .ASCII  /   5 = 125/<CR><LF>
036217     040      040      040              .ASCII  /   6 = 333/<CR><LF>
036233     124      122      101              .ASCII  /TRACK SEQUENCE OPTIONS/<CR><LF>
036263     040      040      040              .ASCII  /   0 = RANDOM/<CR><LF>
036302     040      040      040              .ASCII  /   1 = INCREMENT O.D./<CR><LF>
036331     040      040      040              .ASCII  /   2 = DECREMENT I.D./<CR><LF>
036360     040      040      040              .ASCII  /   3 = INCREMENT O.D.-DECREMENT I.D./<CR><LF>
036426     040      040      040              .ASCII  /   4 = BOUNCE BETWEEN I.D. & O.D./<CR><LF>
036471     040      040      040              .ASCII  /   5 = BOUNCE BETWEEN INCR. O.D. & DECR. I.D./<CR><LF>
036550     040      040      040              .ASCII  /   6 = BOUNCE BETWEEN O.D. & DECR. I.D./<CR><LF>
036621     040      040      040              .ASCII  /       (O.D. = OUTSIDE DIA. & I.D. = INSIDE DIA.)/<CR><LF>
036703     055      076      104              .ASCII  /->DEVICE FATAL THRESHOLD LVL=NO. OF HARD ERRS THAT CAUSE DEVICE FATAL ERR/<
037016     040      040      111              .ASCII  /  IF DRS "EVL" FLAG IS SET, BUT HARD ERR WILL STILL LOG AS A HARD ERR./<CR>
037126     040      040      124              .ASCII  /  THE "EVL" FLAG WILL CAUSE 10 RETRIED SOFT ERRS TO BECOME A HARD ERR/<CR><
037235     124      131      120              .ASCIZ  /TYPE "CR" TO CONTINUE/
037263     105      130      105     MSG8:    .ASCIZ  /EXERCISE #        (0-6)/
037312     104      101      124     MSG11:   .ASCIZ  /DATA PATTERN #    (0-6)/
037341     124      122      101     MSG14:   .ASCIZ  /TRACK SEQUENCE # (0-6)/
037370     104      105      126     MSG9:    .ASCIZ  /DEVICE FATAL THRESHOLD LEVEL/
037425     122      125      116     MSG15:   .ASCIZ  /RUN TEST IN DOUBLE DENSITY    /
037463     122      125      116     MSG16:   .ASCIZ  /RUN TEST IN DELETED DATA MODE/
037521     101      116      131     MSG17:   .ASCIZ  /ANY PROGRAM CONTROL FLAGS     /
037557     040      040      040     MSG18:   .ASCIZ  /   RETRY ON ERROR, LOG SOFT & HARD ERRS/
037627     040      040      040     MSG19:   .ASCIZ  /   RECALIBRATE ON SEEK ERRORS              /
037677     040      040      040     MSG20:   .ASCIZ  /   PRINT ONLY 10 DATA ERRORS & CONTINUE/
037747     040      040      040     MSG21:   .ASCIZ  /   CLEAR STATISTICAL TABLES NEXT PASS  /
040017     115      117      104     MSG22:   .ASCIZ  /MODIFY TRACK ADDRESS LIMITS  /
040055     040      040      040     MSG23:   .ASCIZ  /   OUTER DIAMETER ADR #/
040105     040      040      040     MSG24:   .ASCIZ  /   INNER DIAMETER ADR #/
040135     115      117      104     MSG25:   .ASCIZ  /MODIFY SECTOR ADDRESS LIMITS /
040173     040      040      040     MSG26:   .ASCIZ  /   MIN. SECTOR ADR #/
040220     040      040      040     MSG27:   .ASCIZ  /   MAX. SECTOR ADR #/
                                     ;------------------------------------------------------------------------
                                              .EVEN
```

```
 4935                                   .SBTTL  -    PATCH AREA
 4936                                   ;-------------------------------------------------------------------------
 4937 040246  000000                    PATCH:  0                          ;PATCH AREA
 4938         040450                    .=.+200
 4939                                   ;-------------------------------------------------------------------------
 4940
 4947
 4948
 4949 040450                                    LASTAD
      040454                            L$LAST::
 4950 040454                                    ENDMOD
 4951
 4952 040454                                    BGNSETUP        2
 4953 040454                                    BGNPTAB
 4954 040460  177170                            177170
 4955 040462  000264                            264
 4956 040464  000000                            0
 4957 040466  000000                            0
 4958 040470                                    ENDPTAB
 4959 040470                                    BGNPTAB
 4960 040474  177170                            177170
 4961 040476  000264                            264
 4962 040500  000001                            1
 4963 040502  000000                            0
 4964 040504                                    ENDPTAB
 4965 040504                                    ENDSETUP
 4966         000001                    .END
```

PARAMETER CODING MACRO M1200 15-DEC-82 13:50 PAGE 151-1
SYMBOL TABLE

```
ABORT   002270          BYTNUM  026052          C$GPHR= 000042          DUC20   021000          EF09  = 000011 G
ADR   = 000020 G        CKDVAV  014742          C$GPLO= 000030          DUMSG1  013442          EF10  = 000012 G
ADRS    025024          CKSML   007354          C$GPRI= 000040          DUMSG2  013503          EF11  = 000013 G
ADRTST  012774          CKSMRT  002310          C$INIT= 000011          DVDNCK  021442          EF12  = 000014 G
ADVTRK  021440          CLASWD  027620          C$INLP= 000020          DVFT  = 000001 G        EF13  = 000015 G
ASSEMB= 000010          CLRSTA  020656          C$MANI= 000050          DVTST   024404          EF14  = 000016 G
BAU234  025122          CMD     002332          C$MEM = 000031          DX      025222          EF15  = 000017 G
BC00    013706          CNSCLC  023316          C$MSG = 000023          EA1211  016004          EF16  = 000020 G
BDAU23  025246          CNTKLC  023320          C$OPEN= 000034          EA243   027264          EG1211  015526
BDA121  014756          CONTRL  013564          C$PNTB= 000014          EA2433  030210          EH1211  015750
BDA133  020666          CR    = 000015 G        C$PNTF= 000017          EA2434  030274          EIA11   014126
BDA241  025514          CRC     007434          C$PNTS= 000016          EB24U1  030452          EIA12   014374
BDA25   030716          CRCBAD  007444          C$PNTX= 000015          EB243   027406          EIA121  015232
BDA26   032426          CRCBRT  002312          C$QIO = 000377          EB2433  030160          EIA24   025374
BDA40   032506          CRCERT  002314          C$RDBU= 000007          ECCLAS  030624          EIA25   031174
BDBU23  025252          CSADR   025034          C$REFG= 000047          ECLOG   007604          EIA40   032670
BDB20   021014          CSEC    023276          C$RESE= 000033          ECTAB   003116          EIB121  015050
BDB241  026034          CSRADR  025332          C$REVI= 000003          EC1     003170          EIB20   021354
BDVSCD  021434          CSREV   027072          C$RFLA= 000021          EC10    003455          EIB23   022646
BF243   027322          CSRUUT  002246          C$RPT = 000025          EC11    003603          EIB234  025012
BG00    013566          CTKO    033546          C$SEFG= 000046          EC12    003660          EIB251  032102
BIT0  = 000001 G        CTK1    033547          C$SPRI= 000041          EC13    003717          EIB26   032416
BIT00 = 000001 G        CTRK    023306          C$SVEC= 000037          EC14    003775          EIC11   011756
BIT01 = 000002 G        CURSEC  023710          C$TPRI= 000013          EC15    004021          EIC11   014212
BIT02 = 000004 G        CURTRK  024240          DAERCT  026054          EC16    004107          EIC121  015212
BIT03 = 000010 G        CVSTUT  004756          DARDRT  002320          EC17    004153          EIC20   021106
BIT04 = 000020 G        CVUNIT  004752          DATA    007474          EC2     003236          EIC25   031126
BIT05 = 000040 G        CVUTST  004654          DATART  002316          EC20    004207          EIC40   032652
BIT06 = 000100 G        C$AU  = 000052          DATASB  026056          EC21    004254          EID121  015226
BIT07 = 000200 G        C$AUTO= 000061          DATAWS  026060          EC22    004311          EID23   023032
BIT08 = 000400 G        C$BRK = 000022          DATA0   017520          EC23    004360          EID232  024162
BIT09 = 001000 G        C$BSEG= 000004          DATA1   017536          EC24    004413          EID233  024366
BIT1  = 000002 G        C$BSUB= 000002          DATBUF  034406          EC2432  030064          EIE12   014562
BIT10 = 002000 G        C$CEFG= 000045          DATBYT  017746          EC25    004442          EIE21   022146
BIT11 = 004000 G        C$CLCK= 000062          DATPAT  034006          EC3     003304          EIE22   022456
BIT12 = 010000 G        C$CLEA= 000012          DAWTRT  002322          EC4     003332          EIE23   023134
BIT13 = 020000 G        C$CLOS= 000035          DBADR   025032          EC5     003400          EIF11   012224
BIT14 = 040000 G        C$CLP1= 000006          DDERCT  002330          EC6     003451          EIF20   021154
BIT15 = 000040 G        C$CVEC= 000036          DELAY   025230          EC7     003477          EIF21   022122
BIT2  = 000004 G        C$DCLN= 000044          DE DAT  002244          EDB241  026042          EIF241  025742
BIT3  = 000010 G        C$DODU= 000051          DEN     002242          EDC20   021404          EIF25   031116
BIT4  = 000020 G        C$DRPT= 000024          DFPTBL  002160 G        EDD0    013746          EIH20   021232
BIT5  = 000040 G        C$DU  = 000053          DFTL    002216          ED1211  016000          EIH232  024012
BIT6  = 000100 G        C$EDIT= 000003          DIAGMC= 000000          ED2341  025102          EIH234  024712
BIT7  = 000200 G        C$ERDF= 000055          DLDTER  007504          EF.CON= 000036 G        EII21   022116
BIT8  = 000400 G        C$ERHG= 000056          DLY     025224          EF.NEW= 000035 G        EII231  023370
BIT9  = 001000 G        C$ERRO= 000060          DMSG1   026064          EF.PWR= 000034 G        EIJ23   023200
BK243   027550          C$ERSF= 000054          DMSG2   026161          EF.RES= 000037 G        EIK234  024560
BOE   = 000400 G        C$ERSO= 000057          DNBIT = 000040 G        EF.STA= 000040 G        EIM241  025702
BRONPT  017462          C$ESCA= 000010          DNFLAG  025226          EF01  = 000001 G        EI243   027576
BRONTK  020126          C$ESEG= 000005          DRIVEN  015270          EF02  = 000002 G        ELA10   014054
BTHDRV  021432          C$ESUB= 000003          DRVDN   021444          EF03  = 000003 G        ELA11   014120
BTRK    033553          C$ETST= 000001          DRVFN   023332          EF04  = 000004 G        ELA12   014270
BTRP4 = 000004 G        C$EXIT= 000032          DRVTST  023324          EF05  = 000005 G        ELA20   020774
BTPP6 = 000004 G        C$GETB= 000026          DUA121  015246          EF06  = 000006 G        ELA231  023462
BUFERL  007364          C$GETW= 000027          DUA26   032434          EF07  = 000007 G        ELA241  025500
BYTCNT  026050          C$GMAN= 000043          DUB20   021370          EF08  = 000010 G        ELA25   030740
```

SYMBOL TABLE

```
ELA40   032530    ENDST   011240          ETTAB   027630          GETSEC  023334          IB1211  015334
ELB11   014162    ENDTKS  020632          ET1     031616          GETTRK  023742          IB24U1  030400
ELB12   014342    ENDUP   002576          EVCMD   027066          GETTST  021454          IB243   027330
ELB121  015036    ENDXER  003112          EVDATA  025412          GPSUN0  014626          IB2432  027734
ELB20   021276    END00   014012          EVDVRE  027076          GPSUN1  014702          IB2433  030132
ELB22   022352    END121  015260          EVDVST  026206          GTDRV   022320          IB2434  030250
ELB231  023622    END13   017374          EVL     = 000004 G      GTDVFN  024254          ICATDP  012632
ELB232  024206    END131  017702          EVTSTR  025334          GTEX    017302          ICU234  025134
ELB241  025744    END133  020674          EVUTEC  030476          GTEXCD  014076          IC1211  015372
ELB25   031036    END20   021420          EXADR   022154          GTSYEX  014022          IC243   027370
ELB26   032410    END22   022500          EXADTB  022164          GTSYS   014216          IC2432  030022
ELC11   014206    END231  023642          EXCMP   014020          GTTK    020062          IC2434  030260
ELC22   022400    END232  024214          EXHCP   021430          G$CNTO= 000200          ID      020652
ELC231  023620    END233  024402          EXMSG   003114          G$DELM= 000372          IDATDP  012676
ELC233  024340    END234  025016          EXN     021424          G$DISP= 000003          IDCOMP  020512
ELC242  026306    END241  026016          EX1     022204          G$EXCP= 000400          IDENT1  002606
ELC244  030614    END242  027064          EX2     022214          G$HILI= 000002          IDU     = 000040 G
ELD11   012300    END243  027604          EX3     022230          G$LOLI= 000001          ID00    01371-
ELD22   022422    END244  030620          EX4     022244          G$NO  = 000000          ID1211  015424
ELD231  023610    END251  032106          EX5     022254          G$OFFS= 000400          ID243   027304
ELD233  024362    END26   032442          EX6     022264          G$OFSI= 000376          IEATDP  012720
ELD234  024714    END30   032464          EX7     022300          G$PRMA= 000001          IER     = 020000 G
ELD25   031170    END40   032676          E$END = 002100          G$PRMD= 000002          IEU234  025164
ELD251  032004    ERRBLK  002402 G        E$LOAD= 000035          G$PRML= 000000          IE00    013726
ELE12   014556    ERRMSG  002400 G        FCKMSG  017223          G$RADA= 000140          IE1211  015444
ELE22   022450    ERRNBR  002376 G        FIN     011520          G$RADB= 000000          IFAI1   011670
ELE23   023130    ERROR   002354          FIRST   014074          G$RADD= 000040          IFATDP  012756
ELE234  024764    ERRORS  033363          FLAGS   002266          G$RADL= 000120          IFAUP   002444
ELE244  030604    ERRREG  002604          FLGDRS  002264          G$RADO= 000020          IFAU23  025232
ELF12   014546    ERRSAV  027610          FLOAT0  017546          G$XFER= 000004          IFA10   014040
ELF20   021134    ERRSY   002274          FLOAT1  017614          G$YES = 000010          IFA11   014100
ELF231  023602    ERRTY   002276          FNEV4   030622          HARD  = 000002 G        IFA12   014244
ELF232  024100    ERRTYP  002374 G        FORMCK  015304          HARDER  002300          IFA121  014760
ELF251  032072    ERSTAT  025026          FUNCT   033335          HCRC    007524          IFA20   020750
ELGI1   012022    ERSVCT  027612          FUNEV   027070          HCRCBD  007534          IFA21   021520
ELG12   014622    ERTSAV  021452          FUNTY   030342          HDATA   007564          IFA22   022322
ELG21   021736    ERT1    031176          F$AU  = 000015          HDD     007574          IFA23   022516
ELG251  031772    ERT10   031371          F$AUTO= 000020          HDERCT  002302          IFA231  023410
ELMI1   012066    ERT11   031423          F$BGN = 000040          HELP  = 000000          IFA232  024024
ELM12   014412    ERT12   031435          F$CLEA= 000007          HOE   = 100000 G        IFA233  024262
ELM20   021224    ERT13   031450          F$DU  = 000016          HRD     007544          IFA234  024450
ELM231  023452    ERT14   031507          F$END = 000041          HSEK    007514          IFA24   025360
ELM234  024622    ERT15   031546          F$HARD= 000004          HWRT    007554          IFA241  025456
ELM251  032060    ERT16   031601          F$HW  = 000013          IAATDP  012552          IFA242  026232
ELII1   012250    ERT2    031210          F$INIT= 000006          IAREC   005112          IFA244  030506
ELJ21   022064    ERT3    031221          F$JMP = 000050          IA00    013666          IFA25   030720
ELKI1   012146    ERT4    031235          F$MOD = 000000          IA1211  015324          IFA251  031700
ELK20   020744    ERT5    031247          F$MSG = 000011          IA24U1  030360          IFA26   032354
ELK234  024552    ERT6    031263          F$PROT= 000021          IA243   027242          IFA40   032510
ELLI1   012210    ERT7    031315          F$PWR = 000017          IA2431  027672          IFBI1   011710
ELL20   021270    ERT8    031344          F$RPT = 000012          IA2432  027724          IFB10   014024
ELM242  026650    ERT9    031360          F$SEG = 000003          IA2433  030114          IFB12   014316
ELN21   021704    ESCLAS  033450          F$SOFT= 000005          IA2434  030234          IFB121  015010
ENDCVT  004750    ESREV   027074          F$SRV = 000010          IBATDP  012574          IFB13   017342
ENDI1   012324    ESRUUT  002250          F$SUB = 000002          IBE   = 010000 G        IFB20   021036
ENDLD   017742    ETCLAS  031656          F$SW  = 000014          IBU234  025126          IFB21   021546
ENDRPT  005406    ETSAV   027606          F$TEST= 000001          IB00    013700          IFB22   022332
```

PARAMETER CODING MACRO M1200 15-DEC-82 13:50 PAGE 151-3 SEQ 107
SYMBOL TABLE

```
IFB23   022606  IFE251  022016  IFM20   021356  ITER2   017116  LOE    = 040000 G
IFB231  023504  IFI1    011772  IFM21   021654  ITER3   017200  LOGOFF  027622
IFB232  024120  IFF12   014502  IFM241  025634  ITMSG   016130  LOT    = 000010 G
IFB233  024314  IFF121  015174  IFM242  026622  ITMSG1  016334  L$ACP   002110 G
IFB242  026326  IFF20   021122  IFN21   021664  ITMSG2  016357  L$APT   002036 G
IFB244  030524  IFF21   021510  IFN242  026702  ITMSG3  016401  L$AU    013562 G
IFB25   030770  IFF23   023072  IFO21   022076  ITMSG4  016454  L$AUT   002070 G
IFB251  031706  IFF231  023552  IFO242  026742  ITMSG5  016521  L$AUTO  012552 G
IFB26   032370  IFF232  024064  IFP242  026750  ITMSG6  016576  L$CCP   002106 G
IFB40   032554  IFF241  025614  IFQ242  026770  ITMSG7  016652  L$CLEA  012522 G
IFC11   011724  IFF242  026722  IFR242  027006  ITMSG8  016704  L$CO    002032 G
IFC11   014166  IFF25   031060  IFS242  027050  ITMSG9  016753  L$DEPO  002011 G
IFC12   014420  IFF251  032026  IFU242  027024  ITPRNT  016102  L$DESC  002122 G
IFC121  015116  IFGI1   011776  IFV242  027032  IXE    = 004000 G L$DESP  002076 G
IFC13   017350  IFG12   014576  IFX242  026424  I$AU   = 000041  L$DEVP  002060 G
IFC20   021052  IFG20   021142  IF00    013776  I$AUTO= 000041  L$DISP  002154 G
IFC21   021570  IFG21   021714  IF1211  015464  I$CLN  = 000041  L$DLY   002116 G
IFC22   022360  IFG23   023040  IGATDP  012602  I$DU   = 000041  L$DTP   002040 G
IFC23   022714  IFG231  023422  IG1211  015502  I$HRD  = 000041  L$DTYP  002034 G
IFC231  023526  IFG232  024102  IG243   027422  I$INIT= 000041  L$DU    013274 G
IFC232  024136  IFG242  026506  IHATDP  012616  I$MOD  = 000041  L$DUT   002072 G
IFC233  024322  IFG251  031750  IH1211  015554  I$MSG  = 000041  L$DVTY  002346 G
IFC234  024602  IFHI1   012040  IH243   027456  I$PROT= 000040  L$EF    002052 G
IFC241  025560  IFH12   014400  IIATDP  012644  I$PTAB= 000041  L$ENVI  002044 G
IFC242  026266  IFH121  015076  II1211  015662  I$PWR  = 000041  L$ERRT  002374 G
IFC244  030536  IFH20   021210  II243   027516  I$RPT  = 000041  L$ETP   002102 G
IFC25   031030  IFH21   021752  IJATDP  012660  I$SEG  = 000041  L$EXP1  002046 G
IFC251  031730  IFH23   023154  IJ1211  015672  I$SETU= 000041  L$EXP4  002064 G
IFC40   032614  IFH231  023432  IJ243   027530  I$SFT  = 000041  L$EXP5  002066 G
IFD11   011744  IFH232  023756  IKATDP  012726  I$SRV  = 000041  L$HARD  035012 G
IFD12   014430  IFH234  024474  ILATDP  012742  I$SUB  = 000041  L$HIME  002120 G
IFD121  015156  IFH242  026536  INCSAD  033542  I$TST  = 000041  L$HPCP  002016 G
IFD21   021622  IFH251  032036  INCTRK  021436  J$JMP  = 000167  L$HPTP  002022 G
IFD22   022402  IFII1   012104  INDITK  002210  LAREC    005130  L$HW    002160 G
IFD23   022742  IFI121  015136  INIT    011250  LA2432   030006  L$ICP   002104 G
IFD231  023544  IFI20   021064  INITER  011470  LA2433   030176  L$INIT  011250 G
IFD232  024146  IFI21   021774  INITL   014016  LBU234   025154  L$LADP  002026 G
IFD233  024344  IFI23   022552  INITTK  024252  LB1211   015366  L$LAST  040454 G
IFD234  024612  IFI231  023346  INMSG2  012332  LB24U1   030424  L$LOAD  002100 G
IFD241  025570  IFI241  025462  INMSG3  012432  LB2432   027762  L$LUN   002074 G
IFD242  026444  IFI242  026516  INTCMD  015266  LB2433   030152  L$MREV  002050 G
IFD244  030544  IFJI1   012114  INTER   007414  LB2434   030270  L$NAME  002000 G
IFD25   031156  IFJ21   022030  INTER1  011606  LC243    027402  L$PRIO  002042 G
IFD251  031740  IFJ23   022706  INTER2  016167  LC2432   030050  L$PROT  011242 G
IFEI1   011764  IFJ241  025762  INTER3  016235  LD00     013742  L$PRT   002112 G
IFE12   014444  IFJ242  026546  INTER4  016305  LD1211   015772  L$REPP  002062 G
IFE121  015164  IFKI1   012124  INTH0   033466  LEU234   025204  L$REV   002010 G
IFE21   022136  IFK20   020700  INTH1   033502  LE1211   015762  L$RPT   005140 G
IFE22   022430  IFK21   021576  INTLV   023706  LF     = 000012 G L$SOFT  035136 G
IFE23   023064  IFK234  024532  ISR    = 000100 G LF00     014010  L$SPC   002056 G
IFE232  024170  IFK241  025770  ITCSAD  015272  LH1211   015742  L$SPCP  002020 G
IFE233  024302  IFK242  026574  ITDBAD  015274  LINECT   005636  L$SPTP  002024 G
IFE234  024744  IFLI1   012164  ITDROP  016064  LINES    005640  L$STA   002030 G
IFE241  025604  IFL20   021246  ITERMG  016132  LINTYP   005642  L$SW    002172 G
IFE242  026460  IFL21   021476  ITERR   016016  LI1211   015732  L$TEST  002114 G
IFE244  030564  IFL241  026000  ITERUT  016153  LI243    027572  L$TIML  002014 G
IFE25   031074  IFL242  026656  ITER1   017032  LOAD     017704  L$UNIT  002012 G
```

PARAMETER CODING MACRO M1200 15-DEC-82 13:50 PAGE 151-4
SYMBOL TABLE

```
L10000  002170          NSEC    023674          PRIO2 = 000100 G        SDD     002230          SYSE8   033033
L10001  002220          NXSCSA  023656          PRIO3 = 000140 G        SECADR  025040          SYSE9   033072
L10002  004506          OD      020650          PRIO4 = 000200 G        SECDN   002262          S$LSYM= 010000
L10003  004514          ODCOMP  020524          PRIO5 = 000240 G        SECTOR  002256          TARGET  020640
L10004  005406          ONEFIL= 000001          PRIO6 = 000300 G        SEEK    023322          TBPRCT  022160
L10006  011602          OTDITK  002206          PRIO7 = 000340 G        SEEKCK  026046          THA234  024464
L10007  012550          OTDVFN  024406          PRNUM   005644          SEEKRT  002306          THA25   030756
L10010  012772          OTERTP  030702          PRTBOS  004516          SEK     007424          THA40   032544
L10011  013434          OTEXCM  032444          PRTB1   004510 G        SEQUEN  020654          THB231  023514
L10012  013562          OTSYER  032466          PRTB1S  004536          SEQ1    020164          THC13   017366
L10013  035006          OUTSWD  025042          PRTCTR  005646          SEQ2    020220          THD23   022772
L10014  013664          O$APTS= 000000          PRTDAT  005510          SEQ3    020254          THE22   022440
L10015  013750          O$AU  = 000001          PRTECD  002272          SEQ4    020272          THE234  024754
L10016  035060          O$BGNR= 000001          PRTERR  002404          SEQ5    020340          THF231  023560
L10017  035400          O$BGNS= 000001          PRTHDR  005414          SEQ6    020422          THF241  025624
L10020  040460          O$DU  = 000001          PRT1    005504          SEQ7    020476          TKTBPT  020634
L10021  040474          O$ERRT= 000001          PRT2    005506          SETUP   011364          TKTL    024242
L10022  040470          O$GNSW= 000001          PTDAT1  006243          SE1     033416          TKXX    010070
L10024  040504          O$POIN= 000001          PTEC    006200          SFERLG  030344          TRACK   002254
MAXSEC  002214          O$SETU= 000001          PTECN   006327          SFERR   021446          TRAP    013260
MAXTRK  024234          PAR     006026          PTFMN1  006315          SFPTBL  002172 G        TRBIT = 000200 G
MCRDRT  032321          PAT     017750          PTHEAD  026062          SFTSTS  033552          TRKADR  025036
MCWTRT  032270          PATCH   040246          PTRDSC  006116          SOFT  = 000003 G        TRKCNT  020636
MDRDRT  032213          PAT125  017622          PTRTY   031676          SSEC    023664          TRKDN   002260
MDWTRT  032134          PAT333  017646          PTTK    006225          STCNTR  027616          TRKDNF  024230
MINSEC  002212          PG      017524          PTTKN   006343          STDVDN  032352          TRKINC  024236
MINTRK  024232          PLOC    011604          PTUNT1  006253          STERRG  027614          TRKSEQ  002202
MRDRT   032244          PNT   = 001000 G        PTUNT2  006274          STKSEQ  017752          TRKTBL  033554
MSG1    035060          POWERF= 000001 G        PTWTSC  006147          STSCDN  023712          TRPMS1  013144
MSG11   037312          PREPT1  006002          PT19SP  006105          STSCFG  023662          TSAVCT  022162
MSG14   037341          PREPT2  006030          PT20SP  006074          STSTPA  017376          TSEC    033551
MSG15   037425          PREPT3  006050          RANDAT  017656          SUM     017744          TST     021422
MSG16   037463          PRESCK  020536          RANGEN  004560          SUT     002232          TSTCK   027626
MSG17   037521          PRESTK  020642          RANUM   004652          SUTCV   004754          TSTEV   025410
MSG18   037557          PRI   = 002000 G        RAN1    004646          SUTDRP  013440          TSTN    002176
MSG19   037627          PRIDXX  006360          RAN2    004650          SUTPOS  015302          TSTPAT  002200
MSG2    035073          PRID01  006426          RD      007454          SUTPTR  021426          TSTPTR  022152
MSG20   037677          PRID02  006455          RDERCD  005026          SVCGBL= 000000          TSTSUT  022502
MSG21   037747          PRID03  006504          RDYWD   025330          SVCINS= 177777          TSTWD   022156
MSG22   040017          PRID04  006533          READRT  002324          SVCSUB= 177777          TTRK    033550
MSG23   040055          PRID05  006562          READSC  007314          SVCTAG= 177777          T$ARGC= 000004
MSG24   040105          PRID06  006611          RECCMD  005136          SVCTST= 177777          T$CODE= 001004
MSG25   040135          PRID07  006640          REFCMD  015264          SVUTRG  033516          T$ERRN= 000000
MSG26   040173          PRID08  006667          REFDRV  015306          SWREG   002204          T$EXCP= 000000
MSG27   040220          PRID09  006716          REPORT  005140          SYFT  = 000000 G        T$FLAG= 000041
MSG3    035106          PRID10  006745          RESTAR= 000002 G        SYSERR= 004000 G        T$FREE= 040504
MSG4    035121          PRID11  006774          RESTK   021450          SYSE10  033122          T$GMAN= 000000
MSG5    035400          PRID12  007023          RETRY   002304          SYSE11  033151          T$HILI= 000032
MSG6    035432          PRID13  007052          RTMASK  030474          SYSE12  033161          T$LAST= 000001
MSG7    035453          PRID14  007101          RTOFF   027624          SYSE13  033171          T$LOLI= 000001
MSG8    037263          PRID15  007130          RXXX    002172          SYSE14  033225          T$LSYM= 010000
MSG9    037370          PRID16  007157          RX2BIT= 004000 G        SYSE15  033242          T$LTNO= 000001
MSKRT   032110          PRID17  007206          RYDLY   025326          SYSE16  033302          T$NEST= 177777
MWTRT   032166          PRID18  007235          RYDX    025324          SYSE4   032700          T$NS0 = 000000
NEWTRK  020572          PRID19  007264          SAVDLY  016014          SYSE5   032733          T$NS1 = 000005
NOERL   007374          PRIO0 = 000000 G        SCPSCT  023660          SYSE6   032764          T$NS2 = 000003
NONE    004506 G        PRIO1 = 000040 G        SCSYEX  020676          SYSE7   033010          T$PCNT= 000000
```

PARAMETER CODING MACRO M1200 15-DEC-82 13:50 PAGE 151-5
SYMBOL TABLE

```
T$PTAB= 010023          T$$INI= 010006          UDU234  025156          UT11    002344          XERUUT  033544
T$PTHV= 000002          T$$MSG= 010003          UF243   027412          UUT     002234          XER1    002663
T$PTNU= 000002          T$$PC = 000002          UG00    013766          UUTADR  002236          XER2    002744
T$SAVL= 177777          T$$PRO= 010005          UKINT   007404          UUTOFF  002240          XID     020646
T$SEGL= 177777          T$$PIA= 010023          UK243   027554          U0ADR   002220          XOD     020644
T$SEKO= 010003          T$$RPT= 010004          UNIT    002334          U0VECT  002224          XPG     017554
T$SIZE= 000014          T$$SEG= 010003          UNITDP  013436          U1ADR   002222          XPSUN0  014700
T$SUBN= 000002          T$$SOF= 010017          UNITST  005024          U1VECT  002226          XPSUN1  014740
T$TAGL= 177777          T$$SUB= 010015          UNPKHP  011656          VALWD   025030          XREC    005134
T$TAGN= 010025          T$$SW = 010001          UNT     012330          WATCH   025104          XUPSCT  030340
T$TEMP= 000000          T$$TES= 010013          UNTCD   015300          WC      033545          XU23    025322
T$TEST= 000001          TOMSG   013124          UNTCNT  015276          WDCNT   002252          XU234   025212
T$TSTM= 177777          T1      013564 G        UNTCOD  012326          WDCT    023326          XXPG    017630
T$TSTS= 000001          T1.1    013566          UPDVST  027230          WDOT    023330          X$ALWA= 000000
T$$AU = 010012          T1.2    013706          UPSECT  030216          WRDS    025022          X$FALS= 000040
T$$AUT= 010010          UAM   = 000200 G        UTCNT   005412          WRITSC  007334          X$OFFS= 000400
T$$CLE= 010007          UAU234  025162          UTSCDN  023704          WRT     007464          X$TRUE= 000020
T$$DAT= 010024          UC00    013752          UTTST   005410          WRTRT   002326          X1211   016012
T$$DU = 010011          UDCRST  027722          UT00    002336          XATDP   012766          X24U1   030470
T$$HAR= 010016          UDHDST  027670          UT01    002340          XDVTST  022504          X2431   027720
T$$HW = 010000          UDSFST  030072          UT10    002342          XERPRT  003034          X2433   030214
```

```
. ABS.  040504     000
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  28641 WORDS  ( 112 PAGES)
DYNAMIC MEMORY:  19748 WORDS  ( 75 PAGES)
ELAPSED TIME:  00:03:13
CNRXDA.BIN/DS:GBL/EN:AMA:ABS,CNRXDA.LST/CR/-SP/NL:CND:MD:BEX=SVC34/MLB,CNRXDA.MAC
```

CNRXDA CREATED BY MACRO ON 15-DEC-82 AT 13:51 PAGE 1
SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES								
ABORT	002270		#21-1115	*50-1914	*50-1929	56-2097	56-2120	*56-2131	*58-2154	58-2158	*60-2194
			*67-2339	67-2356	67-2363	67-2370	67-2376	*71-2500			
ADR	= 000020	G	#19-983								
ADRS	025024		*107-3681	*107-3692	*107-3700	*107-3710	*107-3715	*107-3720	*107-3729	#107-3736	107-3757
ADRTST	012774		56-2096	56-2119	#58-2153						
ADVTRK	021440		*87-3076	*87-3097	87-3100	*87-3108	#87-3129				
ASSEMB	= 000010		16-786	16-786							
BAU234	025122		#109-3768	109-3778							
BC00	013706		#67-2358	67-2373							
BDAU23	025246		#109-3799	109-3805							
BDA121	014756		#73-2541	73-2589							
BDA133	020666		#85-3025	85-3027							
BDA241	025514		#113-3859	113-3888							
BDA25	030716		#131-4385	131-4396							
BDA26	032426		#135-4565	135-4568							
BDA40	032506		#139-4593	139-4603							
BDBU23	025252		#109-3800	109-3803							
BDB20	021014		87-3052	#87-3057	87-3117						
BDB241	026034		#113-3900	113-3903							
BDVSCD	021434		*87-3043	87-3094	*87-3096	#87-3127	*99-3560	*99-3562			
BF243	027322		119-4084	#119-4086	119-4106						
BG00	013566		#67-2337	67-2375							
BIT0	= 000001	G	#19-983	#19-1014	19-1065	52-1994	52-2017				
BIT00	= 000001	G	#19-983	19-983	#19-1003	19-1014					
BIT01	= 000002	G	#19-983	19-983	#19-1002	19-1013					
BIT02	= 000004	G	#19-983	19-983	#19-1001	19-1012	89-3155	95-3386	121-4221	127-4295	
BIT03	= 000010	G	#19-983	19-983	#19-1000	19-1011	95-3393	121-4204			
BIT04	= 000020	G	#19-983	19-983	#19-999	19-1010	121-4217	121-4220			
BIT05	= 000040	G	#19-983	19-983	19-1009						
BIT06	= 000100	G	#19-983	19-983	#19-997	19-1008					
BIT07	= 000200	G	#19-983	19-983	#19-996	19-1007					
BIT08	= 000400	G	#19-983	19-983	#19-995	19-1006					
BIT09	= 001000	G	#19-983	19-983	#19-994	19-1005					
BIT1	= 000002	G	#19-983	#19-1013	19-1064	52-2003	52-2025	121-4218			
BIT10	= 002000	G	#19-983	#19-993							
BIT11	= 004000	G	#19-983	#19-992	19-1057	19-1066					
BIT12	= 010000	G	#19-983	#19-991	109-3773	121-4215	123-4240				
BIT13	= 020000	G	#19-983	#19-990	109-3781	121-4202					
BIT14	= 040000	G	#19-983	#19-989	69-2400	109-3783					
BIT15	= 000040	G	#19-983	#19-988	#19-998						
BIT2	= 000004	G	#19-983	#19-1012	52-1997	52-2020					
BIT3	= 000010	G	#19-983	#19-1011	52-2006	52-2028					
BIT4	= 000020	G	#19-983	#19-1010	77-2639						
BIT5	= 000040	G	#19-983	#19-1009							
BIT6	= 000100	G	#19-983	#19-1008							
BIT7	= 000200	G	#19-983	#19-1007							
BIT8	= 000400	G	#19-983	#19-1006	77-2621						
BIT9	= 001000	G	#19-983	#19-1005	77-2644						
BK243	027550		#119-4134	119-4137							
BOE	= 000400	G	#19-983								
BRONPT	017462		*83-2782	*83-2790	#83-2796						
BRONTK	020126		*85-2900	*85-2907	#85-2908	85-3003					

CNRXDA CREATED BY MACRO ON 15-DEC-82 AT 13:51 PAGE 2
SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES								
BTHDRV	021432		*87-3042	87-3067	87-3069	*87-3070	*87-3084	#87-3126	*135-4559	*135-4561	
BTRK	033553		27-1261	#143-4719							
BTRP4	= 000004	G	#19-1062	58-2155	58-2157						
BTRP6	= 000006	G	#19-1063								
BUFERL	007364		#48-1837								
BYTCNT	026050		*113-3858	*113-3886	113-3887	#113-3907					
BYTNUM	026052		*113-3856	113-3861	113-3862	113-3868	113-3870	113-3883	*113-3885	#113-3908	
CKDVAV	014742		71-2464	71-2489	#73-2538						
CKSML	007354		38-1626	#48-1836	121-4190						
CKSMRT	002310		#21-1125								
CLASWD	027620		*119-4092	#119-4150	121-4187	123-4230	123-4236				
CLRSTA	020656		81-2759	#85-3023							
CMD	002332		#23-1138	27-1257	*67-2348	*77-2667	*95-3433				
CNSCLC	023316		*95-3379	95-3380	95-3422	95-3424	95-3429	95-3436	#97-3456		
CNTKLC	023320		*95-3375	95-3376	95-3418	95-3428	95-3435	#97-3457			
CONTRL	013564		#67-2336								
CR	= 000015	G	#149-4881	149-4885	149-4886	149-4887	149-4888	149-4889	149-4890	149-4891	149-4892
			149-4893	149-4894	149-4895	149-4896	149-4897	149-4898	149-4899	149-4900	149-4901
			149-4902	149-4903	149-4904	149-4905	149-4906	149-4907	149-4908	149-4909	149-4910
			149-4911	149-4912							
CRC	007434		#48-1842								
CRCBAD	007444		#48-1843								
CRCBRT	002312		#21-1126								
CRCERT	002314		#21-1127	133-4515	133-4530						
CSADR	025034		*95-3400	*95-3437	107-3676	107-3681	#107-3740	107-3752	107-3755	109-3771	109-3779
CSEC	023276		95-3364	95-3377	#97-3447						
CSRADR	025332		*37-1540	*71-2444	*71-2453	*71-2481	*73-2557	*77-2646	*77-2655	*107-3752	109-3800
			109-3807	*109-3808	109-3809	#109-3815	*115-3929	*115-3951			
CSREV	027072		*115-3923	115-3926	115-3969	115-3973	115-4024	#115-4031			
CSRUUT	002246		#21-1104	27-1257	*67-2345	*77-2661	*109-3807	115-3923	*143-4703		
CTKO	033546		27-1260	#143-4714							
CTK1	033547		27-1260	#143-4715							
CTRK	023306		95-3358	95-3373	#97-3451						
CURSEC	023710		*95-3380	*95-3422	95-3424	*99-3487	*99-3499	#99-3550			
CURTRK	024240		*95-3376	95-3418	*101-3580	*101-3593	101-3600	*101-3602	101-3603	101-3605	*101-3613
			*101-3618	#103-3630							
CVSTUT	004756		#35-1511	87-3050							
CVUNIT	004752		35-1489	35-1491	35-1497	#35-1504	*62-2225				
CVUTST	004654		#35-1487	62-2226							
C$AU	= 000052		#16-786	64-2272							
C$AUTO	= 000061		#16-786	56-2132							
C$BRK	= 000022		#16-786								
C$BSEG	= 000004		#16-786	73-2544	77-2614	87-3057					
C$BSUB	= 000002		#16-786	67-2337	67-2358						
C$CEFG	= 000045		#16-786								
C$CLCK	= 000062		#16-786								
C$CLEA	= 000012		#16-786	54-2072							
C$CLOS	= 000035		#16-786								
C$CLP1	= 000006		#16-786	67-2368							
C$CVEC	= 000036		#16-786	54-2067	54-2070	58-2157					
C$DCLN	= 000044		#16-786	50-1930	52-2038	56-2130	67-2378				
C$DODU	= 000051		#16-786	56-2101	56-2104	56-2110	56-2113	56-2124	56-2127	79-2706	

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
C$DRPT	= 000024	#16-786	67-2380							
C$DU	= 000053	#16-786	62-2232							
C$EDIT	= 000003	#16-786	16-829							
C$ERDF	= 000055	#16-786								
C$ERHR	= 000056	#16-786								
C$ERRO	= 000060	#16-786	27-1249	58-2170	79-2698					
C$EPSF	= 000054	#16-786								
C$ERSO	= 000057	#16-786								
C$ESCA	= 000010	#16-786								
C$ESEG	= 000005	#16-786	73-2580	77-2682	87-3116					
C$ESUB	= 000003	#16-786	67-2352	67-2369						
C$ETST	= 000001	#16-786	143-4738							
C$EXIT	= 000032	#16-786	67-2381							
C$GETB	= 000026	#16-786								
C$GETW	= 000027	#16-786								
C$GMAN	= 000043	#16-786	77-2632							
C$GPHR	= 000042	#16-786	50-1923							
C$GPLO	= 000030	#16-786								
C$GPRI	= 000040	#16-786								
C$INIT	= 000011	#16-786	50-1935							
C$INLP	= 000020	#16-786	89-3150	95-3381						
C$MANI	= 000050	#16-786	77-2630							
C$MEM	= 000031	#16-786								
C$MSG	= 000023	#16-786	31-1349	31-1369						
C$OPEN	= 000034	#16-786								
C$PNTB	= 000014	#16-786	27-1257	31-1371	31-1374	113-3882	113-3883			
C$PNTF	= 000017	#16-786	50-1928	52-2037	52-2040	62-2222	62-2230			
C$PNTS	= 000016	#16-786	44-1744	44-1756	44-1766					
C$PNTX	= 000015	#16-786	27-1260	27-1261	29-1289					
C$QIO	= 000377	#16-786								
C$RDBU	= 000007	#16-786								
C$REFG	= 000047	#16-786	50-1898	50-1902	50-1911					
C$RESE	= 000033	#16-786	#16-786	54-2071	71-2441					
C$REVI	= 000003	#16-786	16-829							
C$RFLA	= 000021	#16-786	50-1897							
C$RPT	= 000025	#16-786	38-1650							
C$SEFG	= 000046	#16-786								
C$SPRI	= 000041	#16-786	109-3766	109-3784						
C$SVEC	= 000037	#16-786	50-1931	50-1934	58-2155					
C$TPRI	= 000013	#16-786								
DAERCT	026054	*113-3841	*113-3865	113-3873	#113-3909					
DARDRT	002320	#21-1129								
DATA	007474	#48-1846								
DATART	002316	#21-1128	133-4512	133-4527						
DATASB	026056	*113-3877	113-3883	#113-3910						
DATAWS	026060	*113-3878	113-3883	#113-3911						
DATA0	017520	83-2797	#83-2805							
DATA1	017536	83-2798	#83-2811							
DATBUF	034406	107-3698	113-3848	113-3860	113-3898	#143-4734				
DATBYT	017746	*83-2805	*83-2811	*83-2814	*83-2826	*83-2829	*83-2832	*83-2836	*83-2839	*83-2843
		83-2853	83-2854	#83-2865						
DATPAT	034006	83-2791	83-2794	95-3427	107-3696	113-3847	113-3859	#143-4731		

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES								
DAWTRT	002322		#21-1130								
DBADR	025032		*107-3678	107-3692	107-3700	107-3710	107-3715	107-3720	107-3729	#107-3739	
DDERCT	002330		#21-1133								
DELAY	025230		37-1542	71-2445	71-2454	71-2482	73-2559	77-2648	77-2659	107-3754	#109-3795
			115-3931	115-3953							
DELDAT	002244		#21-1103	*69-2423	*69-2425	87-3086	*87-3088	*87-3090	105-3651	115-4007	
DEN	002242		#21-1102	37-1536	*69-2428	*69-2430	105-3664	115-3949	115-4019		
DFPTBL	002160	G	#18-866								
DFTL	002216		#18-903	131-4420							
DIAGMC	= 000000		16-786	16-786							
DLDTER	007504		#48-1847								
DLY	025224		109-3768	#109-3788							
DMSG1	026064		113-3882	#113-3914							
DMSG2	026161		113-3883	#113-3915							
DNBIT	= 000040	G	#19-1056	71-2443	71-2446	71-2452	71-2455	71-2477	71-2480	71-2483	73-2558
			77-2656	107-3679	109-3771	109-3779	115-3930	115-3952			
DNFLAG	025226		*109-3765	109-3769	#109-3789	*143-4701					
DRIVEN	015270		*73-2552	*73-2555	#75-2598						
DRVDN	021444		*87-3045	*87-3069	87-3080	*87-3091	#87-3131	*135-4569			
DRVFN	023332		95-3399	95-3433	95-3434	#97-3462	*105-3666				
DRVTST	023324		*87-3101	87-3103	95-3405	95-3425	95-3431	#97-3459			
DUA121	015246		#73-2587								
DUA26	032434		#135-4568								
DUB20	021370		87-3112	#87-3114							
DUC20	021000		#87-3054								
DUMSG1	013442		62-2230	#62-2237							
DUMSG2	013503		62-2222	#62-2238							
DVDNCK	021442		*87-3044	#87-3130	*89-3170	*89-3176	135-4553	*135-4556			
DVFT	= 000001	G	#19-1060	131-4422	139-4614						
DVTST	024404		*95-3397	*95-3430	*95-3431	105-3643	#105-3669				
DX	025222		109-3767	#109-3787							
EA1211	016004		77-2677	#77-2682							
EA243	027264		119-4076	#119-4080							
EA2433	030210		123-4247	#123-4250							
EA2434	030274		125-4266	#125-4272							
EB24U1	030452		127-4304	#127-4311							
EB243	027406		119-4088	119-4102	#119-4104						
EB2433	030160		123-4243	#123-4245							
ECCLAS	030624		129-4331	#129-4354							
ECLOG	007604		38-1636	#48-1855	119-4112						
ECTAB	003116		29-1287	#29-1297							
EC1	003170		29-1297	#31-1322							
EC10	003555		29-1304	#31-1329							
EC11	003603		29-1305	#31-1330							
EC12	003660		29-1306	#31-1331							
EC13	003714		29-1307	#31-1332							
EC14	003773		29-1308	#31-1333							
EC15	004021		29-1309	#31-1334							
EC16	004107		29-1310	#31-1335							
EC17	004153		29-1311	#31-1336							
EC2	003236		29-1298	#31-1323							
EC20	004207		29-1312	#31-1337							

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES						
EC21	004254		29-1313	#31-1338					
EC22	004311		29-1314	#31-1339					
EC23	004360		29-1315	#31-1340					
EC24	004413		29-1316	#31-1341					
EC2432	030064		121-4219	#121-4222					
EC25	004442		29-1317	#31-1342					
EC3	003304		29-1299	#31-1324					
EC4	003332		29-1300	#31-1325					
EC5	003400		29-1301	#31-1326					
EC6	003451		29-1302	#31-1327					
EC7	003477		29-1303	#31-1328					
EDB241	026042		#113-3903						
EDC20	021404		87-3056	#87-3118					
ED00	013746		67-2364	67-2366	#67-2368				
ED1211	016000		77-2679	#77-2681					
ED2341	025102		107-3756	#107-3758					
EF.CON	= 000036	G	#19-983	#19-1021					
EF.NEW	= 000035	G	#19-983	#19-1022					
EF.PWR	= 000034	G	#19-983	#19-1023	50-1898				
EF.RES	= 000037	G	#19-983	#19-1020	50-1911				
EF.STA	= 000040	G	#19-983	#19-1019	50-1902				
EF01	= 000001	G	#19-1040						
EF02	= 000002	G	#19-1039						
EF03	= 000003	G	#19-1038						
EF04	= 000004	G	#19-1037						
EF05	= 000005	G	#19-1036						
EF06	= 000006	G	#19-1035						
EF07	= 000007	G	#19-1034						
EF08	= 000010	G	#19-1033						
EF09	= 000011	G	#19-1032						
EF10	= 000012	G	#19-1031						
EF11	= 000013	G	#19-1030						
EF12	= 000014	G	#19-1029						
EF13	= 000015	G	#19-1028						
EF14	= 000016	G	#19-1027						
EF15	= 000017	G	#19-1026						
EF16	= 000020	G	#19-1025						
EG1211	015526		77-2641	77-2643	#77-2645				
EH1211	015750		77-2671	77-2673	#77-2675				
EIA11	014126		69-2417	#69-2419					
EIA12	014374		71-2450	71-2459	#71-2466				
EIA121	015232		73-2543	73-2582	#73-2584				
EIA24	025374		111-3828	#111-3830					
EIA25	031174		131-4397	#131-4435					
EIA40	032670		139-4604	#139-4628					
EIB121	015050		73-2553	#73-2556					
EIB20	021354		87-3093	87-3099	#87-3110				
EIB23	022646		95-3363	#95-3373					
EIB234	025012		107-3717	107-3722	107-3726	#107-3731			
EIB251	032102		133-4505	133-4514	133-4517	133-4520	133-4529	133-4532	#133-4535
EIB26	032416		135-4560	#135-4562					
EIC11	011756		52-1982	#52-1986					

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
EIC11	014212	69-2429	#69-2431							
EIC121	015212	73-2563	73-2567	73-2571	#73-2579					
EIC20	021106	87-3066	#87-3071							
EIC25	031126	131-4410	131-4412	#131-4426						
EIC40	032652	139-4616	139-4618	#139-4625						
EID121	015226	73-2573	73-2575	73-2577	#73-2583					
EID23	023032	95-3396	#95-3403							
EID232	024162	101-3609	#101-3613							
EID233	024366	105-3662	#105-3664							
EIE12	014564	71-2492	#71-2494							
EIE21	022146	89-3223	#89-3225							
EIE22	022456	93-3317	93-3327	#93-3329						
EIE23	023134	95-3420	#95-3422							
EIF11	012224	52-1996	52-1999	52-2005	52-2008	52-2019	52-2022	52-2027	#52-2030	
EIF20	021154	87-3075	#87-3080							
EIF21	022122	89-3152	89-3163	89-3177	89-3179	89-3183	89-3185	89-3190	89-3193	89-3198
		89-3214	89-3217	#89-3219						
EIF241	025742	113-3876	#113-3884							
EIF25	031116	131-4418	131-4421	#131-4424						
EIH20	021232	87-3089	#87-3091							
EIH232	024012	101-3573	#101-3581							
EIH234	024712	107-3702	#107-3717							
EII21	022116	89-3204	89-3210	#89-3218						
EII231	023370	99-3473	#99-3479							
EIJ23	023200	95-3383	95-3404	95-3426	#95-3430					
EIK234	024560	107-3697	#107-3699							
EIM241	025702	113-3880	#113-3883							
EI243	027576	119-4131	119-4140	#119-4142						
ELA10	014054	69-2397	#69-2399							
ELA11	014120	69-2415	#69-2418							
ELA12	014270	71-2447	#71-2451							
ELA20	020774	87-3049	#87-3053							
ELA231	023462	99-3486	#99-3499							
ELA241	025500	113-3852	113-3854	#113-3856						
ELA25	030740	131-4387	#131-4392							
ELA40	032530	139-4595	#139-4600							
ELB11	014162	69-2422	#69-2425							
ELB12	014342	71-2456	#71-2460							
ELB121	015036	73-2550	#73-2554							
ELB20	021276	87-3062	#87-3100							
ELB22	022352	93-3310	#93-3313							
ELB231	023622	99-3504	#99-3529							
ELB232	024206	101-3604	101-3616	#101-3618						
ELB241	025744	113-3864	#113-3885							
ELB25	031036	131-4405	#131-4413							
ELB26	032410	135-4558	#135-4561							
ELC11	014206	69-2427	#69-2430							
ELC22	022400	93-3315	#93-3318							
ELC231	023620	99-3510	#99-3528							
ELC233	024340	105-3655	#105-3658							
ELC242	026306	115-3933	#115-3936							
ELC244	030614	129-4338	#129-4349							

SYMBOL	VALUE	REFERENCES				
ELDI1	012300	52-1984	#52-2040			
ELD22	022422	93-3320	#93-3323			
ELD231	023610	99-3515	#99-3526			
ELD233	024362	105-3660	#105-3663			
ELD234	024714	107-3706	#107-3718			
ELD25	031170	131-4432	#131-4434			
ELD251	032004	133-4509	#133-4518			
ELE12	014556	71-2478	#71-2493			
ELE22	022450	93-3325	#93-3328			
ELE23	023130	95-3413	95-3415	#95-3421		
ELE234	024764	107-3724	#107-3727			
ELE244	030604	129-4344	#129-4347			
ELF12	014546	71-2484	#71-2491			
ELF20	021134	87-3074	#87-3076			
ELF231	023602	99-3517	#99-3523			
ELF232	024100	101-3596	#101-3599			
ELF251	032072	133-4524	#133-4533			
ELGI1	012022	52-1993	#52-1997			
ELG12	014622	71-2497	#71-2501			
ELG21	021736	89-3187	#89-3191			
ELG251	031772	133-4511	#133-4515			
ELHI1	012066	52-2002	#52-2006			
ELH12	014412	71-2467	#71-2470			
ELH20	021224	87-3087	#87-3090			
ELH231	023452	99-3491	#99-3496			
ELH234	024622	107-3689	#107-3707			
ELH251	032060	133-4526	#133-4530			
ELI11	012250	52-2011	#52-2037			
ELJ21	022064	89-3206	#89-3211			
ELKI1	012146	52-2016	#52-2020			
ELK20	020744	87-3039	#87-3047			
ELK234	024552	107-3695	#107-3698			
ELLI1	012210	52-2024	#52-2028			
ELL20	021270	87-3095	#87-3098			
ELM242	026650	115-3990	#115-3993			
ELN21	021704	89-3181	#89-3184			
ENDCVT	004750	35-1494	35-1496	35-1500	#35-1502	
ENDI1	012324	52-2036	52-2039	#52-2041		
ENDLD	017742	83-2857	#83-2862			
ENDRPT	005406	#38-1650				
ENDST	011240	#48-1858	85-3024			
ENDTKS	020632	85-2898	85-3001	#85-3004		
ENDUP	002576	27-1259	#27-1263			
ENDXER	003112	29-1282	#29-1291			
END00	014012	67-2379	#67-2381			
END121	015260	73-2588	#73-2590			
END13	017374	81-2757	#81-2761			
END131	017702	83-2808	83-2821	83-2835	83-2846	#83-2849
END133	020674	#85-3028				
END20	021420	87-3085	87-3115	#87-3120		
END22	022500	#93-3334				
END231	023642	99-3522	99-3525	99-3527	99-3528	#99-3533

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SYMBOL	VALUE		REFERENCES								
END232	024214		101-3599	101-3614	#101-3619						
END233	024402		#105-3667								
END234	025016		107-3685	#107-3732							
END241	026016		113-3890	113-3892	113-3894	#113-3896					
END242	027064		115-3935	115-3939	115-3957	115-4025	#115-4027				
END243	027604		#119-4143								
END244	030620		129-4328	129-4336	129-4342	129-4346	129-4348	#129-4350			
END251	032106		133-4500	133-4522	#133-4536						
END26	032442		135-4554	#135-4570							
END30	032464		137-4578	#137-4580							
END40	032676		#139-4630								
ERRBLK	002402	G	*27-1247	#27-1252	*58-2168	*79-2695					
ERRMSG	002400	G	#27-1252	*58-2167	*79-2694	*131-4407	*131-4415	*139-4613	*139-4622		
ERRNBR	002376	G	#27-1252	*58-2166	*79-2693	*131-4406	*131-4414	*139-4612	*139-4621		
ERROR	002354		#27-1247	131-4409	131-4424	139-4615	139-4624				
ERRORS	033363		#141-4650								
ERRREG	002604		*27-1263	#27-1266	*131-4382	*131-4426	*139-4625				
ERRSAV	027610		119-4127	*119-4142	#119-4146						
ERRSY	002274		#21-1118	*37-1545	*60-2193	*67-2343	67-2353	67-2360	*69-2400	77-2649	*85-2897
			87-3114	*109-3783	*109-3806	*115-3934	*115-3938	115-3941	*115-3956	*115-3965	*115-4000
			*115-4018	*115-4023	*117-4055	*117-4065	*129-4335	139-4586	139-4625	*139-4629	
ERRTY	002276		#21-1119	*67-2344	87-3111	*109-3773	*109-3781	*113-3855	*113-3866	*113-3867	113-3891
			*113-3895	*115-3960	*115-3971	*115-3979	*115-3985	*115-3991	*115-3993	*115-3996	*115-3997
			*115-4011	*115-4015	119-4080	119-4081	119-4116	119-4142	121-4204	*129-4341	*129-4345
			*129-4347	*129-4349	131-4382	131-4383	131-4426	131-4428	*131-4429		
ERRTYP	002374	G	#27-1252	*58-2169	*79-2696	*131-4408	*131-4416	*131-4422	*139-4614	*139-4623	
ERSTAT	025026		*107-3725	#107-3737							
ERSVCT	027612		*119-4129	119-4130	*119-4138	*119-4141	#119-4147				
ERTSAV	021452		*87-3046	#87-3134	113-3853	113-3893	*113-3897	*131-4428			
ERT1	031176		#131-4438	131-4455							
ERT10	031371		#131-4447	131-4464							
ERT11	031423		#131-4448	131-4465							
ERT12	031435		#131-4449	131-4466							
ERT13	031450		#131-4450	131-4467							
ERT14	031507		#131-4451	131-4468							
ERT15	031546		#131-4452	131-4469							
ERT16	031601		#131-4453	131-4470							
ERT2	031210		#131-4439	131-4456							
ERT3	031221		#131-4440	131-4457							
ERT4	031235		#131-4441	131-4458							
ERT5	031247		#131-4442	131-4459							
ERT6	031263		#131-4443	131-4460							
ERT7	031315		#131-4444	131-4461							
ERT8	031344		#131-4445	131-4462							
ERT9	031360		#131-4446	131-4463							
ESCLAS	033450		139-4606	#141-4668							
ESREV	027074		*115-3924	115-3967	115-3994	115-3998	115-4009	115-4013	115-4016	115-4021	#115-4032
ESRUUT	002250		#21-1105	27-1257	*67-2346	*77-2662	*109-3809	115-3924	117-4051	117-4061	*143-4704
ETCLAS	031656		131-4400	#131-4474							
ETSAV	027606		119-4075	*119-4078	*119-4080	#119-4145					
ETTAB	027630		119-4091	#119-4159							
ET1	031616		131-4390	#131-4455							

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SYMBOL	VALUE		REFERENCES								
EVCMD	027066		*115-3945	*115-3947	*115-3948	*115-3949	115-3950	#115-4029			
EVDATA	025412		111-3829	#113-3841							
EVDVRE	027076		115-3940	#117-4040							
EVDVST	026206		111-3824	#115-3922							
EVL	= 000004	G	#19-983	89-3157	95-3388	127-4297	131-4417				
EVTSTR	025334		87-3104	#111-3823							
EVUTEC	030476		111-3826	#129-4325							
EXADR	022154		*89-3146	89-3220	#89-3229						
EXADTB	022164		89-3144	#89-3234							
EXCMP	014020		*67-2338	67-2372	#67-2384	*137-4579					
EXHCP	021430		*87-3041	87-3077	*87-3079	*87-3092	#87-3125				
EXMSG	003114		*29-1288	29-1289	#29-1294						
EXN	021424		*87-3058	#87-3123	89-3142						
EX1	022204		89-3235	#91-3247							
EX2	022214		89-3236	#91-3251							
EX3	022230		89-3237	#91-3257							
EX4	022244		89-3238	#91-3263							
EX5	022254		89-3239	#91-3267							
EX6	022264		89-3240	#91-3271							
EX7	022300		89-3234	89-3241	#91-3277						
E$END	= 002100		#16-786								
E$LOAD	= 000035		#16-786	16-829							
FCKMSG	017223		77-2632	#79-2739							
FIN	011520		50-1901	50-1922	#50-1931						
FIRST	014074		*69-2401	#69-2404	81-2754						
FLAGS	002266		#21-1114	*50-1892	*50-1900	*50-1913	69-2393				
FLGDRS	002264		#21-1113	*50-1897	89-3157	95-3388	127-4297	131-4417			
FLOAT0	017546		83-2799	#83-2814							
FLOAT1	017614		83-2800	#83-2829							
FNEV4	030622		*111-3825	129-4339	129-4343	#129-4352					
FORMCK	015304		#75-2604	77-2632	77-2633	*77-2635					
FUNCT	033335		#141-4649								
FUNEV	027070		*111-3823	115-3936	#115-4030						
FUNTY	030342		*119-4073	*125-4262	125-4263	125-4267	125-4269	#125-4285			
F$AU	= 000015		#16-786	64-2264	64-2272						
F$AUTO	= 000020		#16-786	56-2091	56-2132						
F$BGN	= 000040		#16-786	16-812	18-914	19-976	31-1348	31-1367	37-1553	38-1606	38-1614
			48-1876	50-1891	54-2059	56-2091	62-2212	64-2264	67-2335	67-2337	67-2337
			67-2352	67-2358	67-2358	67-2369	67-2381	73-2544	77-2614	87-3057	143-4738
			145-4799	145-4806	147-4840	147-4866	151-4950	151-4952	151-4953	151-4953	151-4958
			151-4959	151-4959	151-4964	151-4965					
F$CLEA	= 000007		#16-786	54-2059	54-2072						
F$DU	- 000016		#16-786	62-2212	62-2232						
F$END	= 000041		#16-786	16-786	16-786	16-786	16-786	16-786	16-786	16-786	16-786
			16-786	16-786	16-786	16-786	16-786	16-786	16-786	16-786	16-812
			18-914	19-976	31-1349	31-1369	37-1553	38-1606	38-1650	50-1935	54-2072
			56-2132	62-2232	64-2272	67-2335	67-2335	67-2335	67-2337	67-2337	67-2352
			67-2352	67-2358	67-2358	67-2369	67-2369	67-2381	73-2580	77-2682	87-3116
			143-4738	143-4738	145-4806	145-4813	147-4866	147-4877	151-4950	151-4952	151-4953
			151-4958	151-4959	151-4964	151-4965					
F$HARD	= 000004		#16-786	145-4799	145-4806	145-4806	145-4813	147-4843	147-4852	147-4858	147-4862
			147-4866								

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SYMBOL VALUE REFERENCES

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES								
			147-4846	147-4847	147-4848	147-4849	147-4850	147-4851	147-4853	147-4854	147-4855
			147-4856	147-4857	147-4859	147-4860	147-4861	147-4863	147-4864	147-4865	
HARD	= 000002	G	#19-1059	131-4416							
HARDER	002300		#21-1120	*127-4303	*127-4310	131-4404	*131-4425	131-4431	*131-4434		
HCRC	007524		#48-1849								
HCRCBD	007534		#48-1850								
HDATA	007564		#48-1853								
HDD	007574		#48-1854								
HDERCT	002302		#21-1121	*131-4419	131-4420	*131-4423					
HELP	= 000000		#15-765	16-773	16-777	16-803	16-821	16-831	16-850	18-873	18-905
			#19-919	19-966	19-1067	23-1183	23-1189	25-1210	25-1220	25-1228	31-1351
			31-1356	31-1361	33-1389	33-1396	33-1402	33-1409	33-1415	33-1422	33-1431
			33-1439	33-1446	33-1453	#38-1559	48-1860	50-1936	50-1945	54-2061	54-2074
			62-2206	62-2241	64-2266	64-2274	#145-4744	145-4808	145-4821	147-4868	151-4941
HOE	= 100000	G	#19-983								
HRD	007544		#48-1851								
HSEK	007514		#48-1848	127-4305							
HWRT	007554		#48-1852								
IAATDP	012552		#56-2092								
IAREC	005112		#37-1543								
IA00	013666		#67-2353								
IA1211	015324		77-2612	#77-2615							
IA24U1	030360		#127-4295								
IA243	027242		#119-4075								
IA2431	027672		#121-4187								
IA2432	027724		#121-4202								
IA2433	030114		#123-4236								
IA2434	030234		#125-4263								
IBATDP	012574		#56-2097								
IBE	= 010000	G	#19-983								
IBU234	025126		#109-3769	109-3776							
IB00	013700		67-2354	#67-2356							
IB1211	015334		#77-2617								
IB24U1	030400		127-4296	#127-4299							
IB243	027330		#119-4088								
IB2432	027734		#121-4204								
IB2433	030132		#123-4240								
IB2434	030250		125-4264	#125-4267							
ICATDP	012632		56-2103	#56-2105							
ICU234	025134		#109-3771								
IC1211	015372		77-2616	#77-2624							
IC243	027370		#119-4099								
IC2432	030022		121-4208	#121-4215							
IC2434	030260		#125-4269								
ID	020652		*69-2420	*81-2752	85-2890	#85-3013					
IDATDP	012676		56-2093	56-2098	56-2106	#56-2115					
IDCOMP	020512		#85-2982								
IDENT1	002606		27-1257	#27-1268							
IDU	= 000040	G	#19-983								
ID00	013714		#67-2360								
ID1211	015424		77-2622	#77-2630							
ID243	027304		#119-4083								

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SYMBOL	VALUE		REFERENCES			
IEATDP	012720		#56-2120			
IER	= 020000	G	#19-983			
IEU234	025164		#109-3779			
IE00	013726		#67-2363			
IE1211	015444		#77-2633			
IFAI1	011670		#52-1969			
IFATDP	012756		56-2116	56-2126	#56-2128	
IFAUP	002444		#27-1258			
IFAU23	025232		#109-3796			
IFA10	014040		69-2394	#69-2396		
IFA11	014100		#69-2414			
IFA12	014244		#71-2446			
IFA121	014760		#73-2542			
IFA20	020750		#87-3048	87-3055		
IFA21	021520		89-3148	89-3151	#89-3153	
IFA22	022322		#93-3307			
IFA23	022516		#95-3347			
IFA231	023410		#99-3485			
IFA232	024024		#101-3584			
IFA233	024262		#105-3644			
IFA234	024450		#107-3683			
IFA24	025360		#111-3827			
IFA241	025456		#113-3851			
IFA242	026232		#115-3926			
IFA244	030506		#129-4327			
IFA2[illegible]	030720		#131-4386			
IFA251	031700		#133-4499			
IFA26	032354		#135-4553			
IFA40	032510		#139-4594			
IFB11	011710		52-1970	#52-1974		
IFB10	014024		#69-2393			
IFB12	014316		#71-2455			
IFB121	015010		#73-2549			
IFB13	017342		#81-2754			
IFB20	021036		#87-3061			
IFB21	021546		89-3154	#89-3159		
IFB22	022332		#93-3309			
IFB23	022606		95-3355	#95-3362		
IFB231	023504		#99-3503			
IFB232	024120		101-3601	#101-3603		
IFB233	024314		105-3645	105-3650	#105-3652	
IFB242	026326		115-3927	#115-3940		
IFB244	030524		#129-4333			
IFB25	030770		#131-4402			
IFB251	031706		#133-4501			
IFB26	032370		#135-4557			
IFB40	032554		#139-4608			
IFC11	011724		52-1975	#52-1978		
IFC11	014166		69-2424	#69-2426		
IFC12	014420		71-2465	71-2469	#71-2471	
IFC121	015116		73-2561	#73-2564		
IFC13	017350		#81-2756			

SYMBOL	VALUE	REFERENCES		
IFC20	021052	#87-3064		
IFC21	021570	89-3160	#89-3164	
IFC22	022360	93-3312	#93-3314	
IFC23	022714	95-3382	#95-3384	
IFC231	023526	99-3495	99-3498	#99-3509
IFC232	024136	#101-3607		
IFC233	024322	#105-3654		
IFC234	024602	107-3687	#107-3703	
IFC241	025560	#113-3868		
IFC242	026266	#115-3932		
IFC244	030536	129-4334	#129-4337	
IFC25	031030	131-4403	#131-4411	
IFC251	031730	133-4502	#133-4506	
IFC40	032614	139-4609	#139-4617	
IFD11	011744	52-1979	#52-1983	
IFD12	014430	71-2472	#71-2474	
IFD121	015156	73-2569	#73-2572	
IFD21	021622	#89-3171		
IFD22	022402	93-3308	#93-3319	
IFD23	022742	95-3387	#95-3390	
IFD231	023544	#99-3514		
IFD232	024146	101-3608	#101-3610	
IFD233	024344	105-3653	105-3657	#105-3659
IFD234	024612	#107-3705		
IFD241	025570	#113-3870		
IFD242	026444	115-3955	#115-3958	
IFD244	030544	#129-4339		
IFD25	031156	#131-4431		
IFD251	031740	#133-4508		
IFE11	011764	52-1973	52-1977	#52-1987
IFE12	014444	#71-2477		
IFE121	015164	#73-2574		
IFE21	022136	#89-3222		
IFE22	022430	93-3322	#93-3324	
IFE23	023064	95-3408	95-3410	#95-3412
IFE232	024170	101-3611	#101-3615	
IFE233	024302	#105-3649		
IFE234	024744	107-3704	#107-3723	
IFE241	025604	113-3869	113-3871	#113-3873
IFE242	026460	115-3959	#115-3961	
IFE244	030564	129-4340	#129-4343	
IFE25	031074	#131-4420		
IFE251	032016	133-4507	#133-4521	
IFF11	011772	#52-1989		
IFF12	014502	#71-2483		
IFF121	015174	#73-2576		
IFF20	021122	#87-3073		
IFF21	021510	#89-3150		
IFF23	023072	#95-3414		
IFF231	023552	#99-3516		
IFF232	024064	#101-3595		
IFF241	025614	#113-3875		

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SYMBOL	VALUE	REFERENCES				
IFF242	026722	115-3999	#115-4002			
IFF25	031060	#131-4417				
IFF251	032026	#133-4523				
IFG11	011776	#52-1991				
IFG12	014576	71-2473	71-2475	71-2490	#71-2496	
IFG20	021142	#87-3077				
IFG21	021714	89-3165	89-3167	#89-3186		
IFG23	023040	95-3385	95-3389	#95-3405		
IFG231	023422	#99-3488				
IFG232	024102	101-3585	#101-3600			
IFG242	026506	115-3942	#115-3967			
IFG251	031750	#133-4510				
IFH11	012040	52-1990	#52-2000			
IFH12	014400	#71-2467				
IFH121	015076	#73-2560				
IFH20	021210	87-3078	#87-3086			
IFH21	021752	89-3156	89-3158	#89-3194		
IFH23	023154	95-3411	#95-3425			
IFH231	023432	#99-3490				
IFH232	023756	#101-3572				
IFH234	024474	#107-3688				
IFH242	026536	115-3968	#115-3973			
IFH251	032036	#133-4525				
IFI11	012104	52-1988	#52-2009			
IFI121	015136	73-2565	#73-2568			
IFI20	021064	87-3065	#87-3067			
IFI21	021774	89-3195	89-3197	#89-3199		
IFI23	022552	95-3352	#95-3354			
IFI231	023346	#99-3472				
IFI241	025462	#113-3853				
IFI242	026516	#115-3969				
IFJ11	012114	#52-2012				
IFJ21	022030	89-3200	#89-3205			
IFJ23	022706	#95-3381				
IFJ241	025762	#113-3889				
IFJ242	026546	115-3970	#115-3975			
IFK11	012124	#52-2015				
IFK20	020700	#87-3038				
IFK21	021576	#89-3166				
IFK234	024532	#107-3694				
IFK241	025770	#113-3891				
IFK242	026574	115-3978	#115-3981			
IFL11	012164	52-2014	#52-2023			
IFL20	021246	87-3068	#87-3094			
IFL21	021476	#89-3147				
IFL241	026000	#113-3893				
IFL242	026656	115-3972	115-3980	115-3986	115-3992	#115-3994
IFM20	021356	#87-3111				
IFM21	021654	89-3172	89-3174	#89-3178		
IFM241	025634	#113-3879				
IFM242	026622	115-3984	#115-3987			
IFN21	021664	#89-3180				

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SYMBOL	VALUE		REFERENCES								
IFN242	026702		115-3964	115-3974	115-3995	#115-3998					
IFO21	022076		#89-3213								
IFO242	026742		#115-4007								
IFP242	026750		#115-4009								
IFQ242	026770		115-4008	#115-4013							
IFR242	027006		115-4010	115-4012	115-4014	#115-4016					
IFS242	027050		115-3966	115-4001	115-4004	115-4006	115-4020	115-4022	#115-4024		
IFU242	027024		115-4017	#115-4019							
IFV242	027032		#115-4021								
IFX242	026424		#115-3954								
IF00	013776		67-2371	#67-2376							
IF1211	015464		#77-2637								
IGATDP	012602		#56-2099								
IG1211	015502		77-2638	#77-2640							
IG243	027422		119-4079	#119-4107							
IHATDP	012616		56-2100	#56-2102							
IH1211	015554		#77-2649								
IH243	027456		119-4110	#119-4116							
IIATDP	012644		#56-2108								
II1211	015662		#77-2663								
II243	027516		119-4119	#119-4127							
IJATDP	012660		56-2109	#56-2111							
IJ1211	015672		#77-2665								
IJ243	027530		#119-4130								
IKATDP	012726		#56-2122								
ILATDP	012742		56-2123	#56-2125							
INCSAD	033542		*143-4687	*143-4694	143-4702	#143-4707					
INCTRK	021436		*87-3100	*87-3107	#87-3128	95-3414	95-3416				
INDITK	002210		#18-900	69-2420	81-2752	101-3570					
INIT	011250		#50-1892								
INITER	011470		50-1910	#50-1928							
INITL	014016		*67-2340	#67-2383	87-3038	*87-3109	89-3147	95-3362	99-3472		
INITTK	024252		*87-3040	101-3572	*101-3574	#103-3635					
INMSG2	012332		52-2037	#52-2046							
INMSG3	012432		52-2040	#52-2047							
INTCMD	015266		*73-2551	*73-2554	73-2556	#75-2597					
INTER	007414		#48-1840								
INTER1	011606		50-1928	#50-1958							
INTER2	016167		71-2448	71-2493	#79-2724						
INTER3	016235		71-2457	71-2491	#79-2725						
INTER4	016305		71-2498	#79-2726							
INTHO	033466		50-1931	#143-4687							
INTH1	033502		50-1934	#143-4694							
INTLV	023706		99-3488	99-3496	99-3506	#99-3549					
ISR	= 000100	G	#19-983								
ITCSAD	015272		*73-2538	73-2556	73-2557	73-2568	#75-2599	77-2645	77-2646	77-2655	77-2661
			77-2663	77-2665	77-2668						
ITDBAD	015274		*73-2540	73-2560	73-2564	73-2576	#75-2600	77-2617	77-2624	77-2651	77-2662
ITDROP	016064		73-2581	77-2683	#79-2705						
ITERMG	016132		79-2694	#79-2722							
ITERR	016016		71-2449	71-2458	71-2494	73-2579	77-2675	77-2681	#79-2693		
ITERUT	016153		79-2714	#79-2723							

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CNRXDA     CREATED BY  MACRO  ON 15-DEC-82 AT 13:51     PAGE 16
SYMBOL CROSS REFERENCE                                  CREF   V01
SYMBOL  VALUE          REFERENCES
ITER1     017032        77-2670   #79-2736
ITER2     017116        77-2672   #79-2737
ITER3     017200        73-2562   #79-2738
ITMSG     016130       *71-2448  *71-2457   *71-2491   *71-2493   *73-2562   *73-2566   *73-2570   *73-2578   *77-2619
                       *77-2627  *77-2670   *77-2672   *77-2674   *77-2678   *77-2680    79-2716   #79-2720
ITMSG1    016334        73-2566   #79-2727
ITMSG2    016357        73-2578   #79-2728
ITMSG3    016401        77-2619   #79-2729
ITMSG4    016454        77-2674   #79-2730
ITMSG5    016521        73-2570   #79-2731
ITMSG6    016576        77-2627   #79-2732
ITMSG7    016652        77-2678   #79-2733
ITMSG8    016704        77-2680   #79-2734
ITMSG9    016753        77-2653   #79-2735
ITPRNT    016102        77-2620    77-2628    79-2699   #79-2713
IXE     = 004000  G     #19-983
I$AU    = 000041        #16-786   #64-2264   #64-2272
I$AUTO  = 000041        #16-786   #56-2091   #56-2132
I$CLN   = 000041        #16-786   #54-2059   #54-2072
I$DU    = 000041        #16-786   #62-2212   #62-2232
I$HRD   = 000041        #145-4799 #145-4813
I$INIT  = 000041        #16-786   #50-1891   #50-1935
I$MOD   = 000041        #16-786    16-812    #16-812    18-914    #18-914    19-976    #19-976    37-1553   #37-1553
                         38-1606  #38-1606    151-4950  #151-4950
I$MSG   = 000041        #16-786   #31-1348   #31-1349   #31-1367   #31-1369
I$PROT  = 000040        #16-786   #48-1876
I$PTAB  = 000041        #16-786    151-4953  #151-4953   151-4958  #151-4958   151-4959  #151-4959   151-4964  #151-4964
I$PWR   = 000041        #16-786
I$RPT   = 000041        #16-786   #38-1614   #38-1650
I$SEG   = 000041        #16-786    67-2335    67-2337    67-2358   #73-2544   #73-2580   #77-2614   #77-2682   #87-3057
                        #87-3116
I$SETU  = 000041        #16-786    151-4952  #151-4952   151-4953   151-4959   151-4965  #151-4965
I$SFT   = 000041        #147-4840 #147-4877
I$SRV   = 000041        #16-786
I$SUB   = 000041        #16-786    67-2335    67-2337   #67-2337    67-2352   #67-2352   #67-2352    67-2358   #67-2358
                         67-2369  #67-2369   #67-2369
I$TST   - 000041        #16-786    67-2335   #67-2335    67-2337    67-2358    67-2381    143-4738  #143-4738  #143-4738
J$JMP   = 000167        #16-786
LAREC     005130        37-1544   #37-1547
LA2432    030006        121-4203  #121-4213
LA2433    030176        123-4239  #123-4248
LBU234    025154        109-3770  #109-3775
LB1211    015366        77-2618   #77-2623
LB24U1    030424        127-4298   127-4300  #127-4305
LB2432    027762        121-4205  #121-4209
LB2433    030152        123-4241  #123-4244
LB2434    030270        125-4268  #125-4271
LC243     027402        119-4100  #119-4103
LC2432    030050        121-4216  #121-4220
LD00      013742        67-2361   #67-2367
LD1211    015772        77-2631   #77-2680
LEU234    025204        109-3780  #109-3783
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SYMBOL  VALUE          REFERENCES
LE1211    015762        77-2634   #77-2678
LF      = 000012  G    #149-4882   149-4885   149-4886   149-4887   149-4888   149-4889   149-4890   149-4891   149-4892
                        149-4893   149-4894   149-4895   149-4896   149-4897   149-4898   149-4899   149-4900   149-4901
                        149-4902   149-4903   149-4904   149-4905   149-4906   149-4907   149-4908   149-4909   149-4910
                        149-4911   149-4912
LFOO      014010        67-2377   #67-2380
LH1211    015742        77-2650   #77-2674
LINECT    005636       *38-1624   *38-1634   *38-1644    40-1683   *40-1699    40-1700   #40-1704
LINES     005640       *38-1628   *38-1638   *38-1647    40-1700   #40-1705   *42-1715   *42-1732    42-1733
LINTYP    005642       *38-1639   *38-1648    40-1684   #40-1706
LI1211    015732        77-2664   #77-2672
LI243     027572        119-4128  #119-4141
LOAD      017704        83-2806    83-2819    83-2833    83-2844   #83-2853
LOE     = 040000  G    #19-983
LOGOFF    027622       *119-4098  #119-4151   121-4189  *121-4206  *121-4209  *121-4213  *123-4246  *123-4249   127-4292
                        127-4311
LOT     = 000010  G    #19-983
L$ACP     002110  G    #16-829
L$APT     002036  G    #16-829
L$AU      013562  G     16-829    #64-2264
L$AUT     002070  G    #16-829
L$AUTO    012552  G     16-829    #56-2091
L$CCP     002106  G    #16-829
L$CLEA    012522  G     16-829    #54-2059
L$CO      002032  G    #16-829
L$DEPO    002011  G    #16-829
L$DESC    002122  G     16-829    #16-837
L$DESP    002076  G    #16-829
L$DEVP    002060  G    #16-829
L$DISP    002154  G     16-829    #16-848
L$DLY     002116  G    #16-829
L$DTP     002040  G    #16-829
L$DTYP    002034  G    #16-829
L$DU      013274  G     16-829    #62-2212
L$DUT     002072  G    #16-829
L$DVTY    002346  G     16-829    #25-1209
L$EF      002052  G    #16-829
L$ENVI    002044  G    #16-829
L$ERRT    002374  G     16-829    #27-1252
L$ETP     002102  G    #16-829
L$EXP1    002046  G    #16-829
L$EXP4    002064  G    #16-829
L$EXP5    002066  G    #16-829
L$HARD    035012  G     16-829     145-4799  #145-4799
L$HIME    002120  G    #16-829
L$HPCP    002016  G    #16-829
L$HPTP    002022  G    #16-829
L$HW      002160  G     16-829     18-866    #18-866
L$ICP     002104  G    #16-829
L$INIT    011250  G     16-829    #50-1891
L$LADP    002026  G    #16-829
L$LAST    040454  G     16-829    #151-4949   151-4965
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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES						
L$LOAD	002100	G	#16-829						
L$LUN	002074	G	#16-829	*27-1248	*58-2161	*58-2163	*58-2165	*79-2697	
L$MREV	002050	G	#16-829						
L$NAME	002000	G	#16-829						
L$PRIO	002042	G	#16-829						
L$PROT	011242	G	16-829	#48-1876					
L$PRT	002112	G	#16-829						
L$REPP	002062	G	#16-829						
L$REV	002010	G	#16-829						
L$RPT	005140	G	16-829	#38-1614					
L$SOFT	035136	G	16-829	147-4840	#147-4840				
L$SPC	002056	G	#16-829						
L$SPCP	002020	G	#16-829						
L$SPTP	002024	G	#16-829						
L$STA	002030	G	#16-829						
L$SW	002172	G	16-8	18-891	#18-891				
L$TEST	002114	G	#16-82						
L$TIML	002014	G	#16-829						
L$UNIT	002012	G	#16-829	50-1909	50-1921				
L10000	002170		18-866	#18-879					
L10001	002220		18-891	#18-912					
L10002	004506		#31-1349						
L10003	004514		#31-1369						
L10004	005406		#38-1650						
L10006	011602		#50-1935						
L10007	012550		#54-2072						
L10010	012772		#56-2132						
L10011	013434		#62-2232						
L10012	013562		#64-2272						
L10013	035006		67-2381	#143-4738					
L10014	013664		#67-2352						
L10015	013750		#67-2369						
L10016	035060		145-4799	145-4806	#145-4813				
L10017	035400		147-4840	147-4866	#147-4877				
L10020	040460		#151-4953						
L10021	040474		151-4953	#151-4959					
L10022	040470		151-4953	#151-4958					
L10024	040504		151-4959	#151-4964					
MAXSEC	002214		#18-902	99-3503	99-3509	99-3514	99-3516		
MAXTRK	024234		*101-3570	101-3600	101-3607	101-3610	101-3615	#103-3628	
MCRDRT	032321		133-4531	#133-4544					
MCWTRT	032270		133-4516	#133-4543					
MDRDRT	032213		133-4528	#133-4541					
MDWTRT	032134		133-4513	#133-4539					
MINSEC	002212		#18-901	99-3485	99-3499	99-3500	99-3501	99-3503	
MINTRK	024232		*101-3571	101-3580	101-3602	101-3603	101-3615	101-3618	#103-3627
MRDRT	032244		133-4534	#133-4542					
MSG1	035060		145-4801	#145-4815					
MSG11	037312		147-4846	#149-4915					
MSG14	037341		147-4847	#149-4916					
MSG15	037425		147-4849	#149-4918					
MSG16	037463		147-4850	#149-4919					

SYMBOL VALUE REFERENCES

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MSG17    037521          147-4851  #149-4920
MSG18    037557          147-4853  #149-4921
MSG19    037627          147-4854  #149-4922
MSG2     035073          145-4802  #145-4816
MSG20    037677          147-4855  #149-4923
MSG21    037747          147-4856  #149-4924
MSG22    040017          147-4857  #149-4925
MSG23    040055          147-4859  #149-4926
MSG24    040105          147-4860  #149-4927
MSG25    040135          147-4861  #149-4928
MSG26    040173          147-4863  #149-4929
MSG27    040220          147-4864  #149-4930
MSG3     035106          145-4803  #145-4817
MSG4     035121          145-4804  #145-4818
MSG5     035400          147-4865  #149-4883
MSG6     035432          147-4842  #149-4884
MSG7     035453          147-4844  #149-4885
MSG8     037263          147-4845  #149-4914
MSG9     037370          147-4848  #149-4917
MSKRT    032110          133-4504  #133-4538
MWTRT    032166          133-4519  #133-4540
NEWTRK   020572           85-2923   85-2931   85-2950   85-2965   85-2977   85-2994  #85-2996
NOERL    007374         #48-1838
NONE     004506  G       27-1247  #31-1348   79-2695
NSEC     023674          99-3482  #99-3544
NXSCSA   023656         *99-3534  #99-3537
OD       020650         *69-2419  *81-2751   85-2888   85-2892  #85-3012
ODCOMP   020524           85-2983  #85-2985
ODTFLG  = ******           50-1893   151-4966
ONEFIL  = 000001         #2-3        16-807    18-915    19-916    19-929    37-1555   38-1556   38-1569   145-4754
OTDITK   002206         #18-899      69-2419   81-2751   95-3359   95-3370   101-3571
OTDVFN   024406           95-3401    95-3438  #107-3676
OTERTP   030702           87-3113   #131-4382
OTEXCM   032444           67-2365    67-2367  #137-4576
OTSYER   032466           67-2355    67-2362  #139-4586
OUTSWD   025042          107-3682   107-3693   107-3701  107-3711  107-3716  107-3721  107-3730  #107-3751
O$APTS  = 000000         #16-786     16-829
O$AU    = 000001         #16-786    #16-819     16-829
O$BGNR  = 000001         #16-786    #16-819     16-829
O$BGNS  = 000001         #16-786    #16-819     16-829
O$DU    = 000001         #16-786    #16-819     16-829
O$ERRT  = 000001         #16-786    #16-819     16-829
O$GNSW  = 000001         #16-786    #16-819     16-829
O$POIN  = 000001         #16-786    #16-819    #16-819   #16-819   #16-819   #16-819   #16-819   #16-819   16-819
                          16-829
O$SETU  = 000001         #16-786    #16-819     16-829    151-4949
PAR      006026         *40-1666   *40-1683   *40-1691    44-1744  #44-1747
PAT      017750         *81-2748    83-2784   *83-2786    83-2787  #83-2866
PATCH    040246         #151-4937
PAT125   017622           83-2801  #83-2832
PAT333   017646           83-2802  #83-2839
PG       017524         #83-2806    83-2809    83-2812
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SYMBOL	VALUE		REFERENCES							
PLOC	011604		*50-1923	#50-1956	52-1968					
PNT	= 001000	G	#19-983							
POWERF	= 000001	G	#19-1065	50-1900	69-2393					
PREPT1	006002		40-1668	40-1685	40-1695	42-1718	#44-1744			
PREPT2	006030		40-1661	40-1688	#44-1756					
PREPT3	006050		42-1727	#44-1766						
PRESCK	020536		85-2986	#85-2988						
PRESTK	020642		*85-2885	*85-2887	85-2917	85-2925	85-2969	85-2988	*85-3002	#85-3009
PR1	= 002000	G	#19-983							
PRIDXX	006360		38-1627	#46-1786						
PRID01	006426		46-1786	#46-1808						
PRID02	006455		46-1787	#46-1809						
PRID03	006504		46-1788	#46-1810						
PRID04	006533		46-1789	#46-1811						
PRID05	006562		46-1790	#46-1812						
PRID06	006611		46-1791	#46-1813						
PRID07	006640		46-1792	#46-1814						
PRID08	006667		46-1793	#46-1815						
PRID09	006716		46-1794	#46-1816						
PRID10	006745		46-1795	#46-1817						
PRID11	006774		46-1796	#46-1818						
PRID12	007023		46-1797	#46-1819						
PRID13	007052		46-1798	#46-1820						
PRID14	007101		46-1799	#46-1821						
PRID15	007130		46-1800	#46-1822						
PRID16	007157		46-1801	#46-1823						
PRID17	007206		46-1802	#46-1824						
PRID18	007235		46-1803	#46-1825						
PRID19	007264		46-1804	#46-1826						
PRI00	= 000000	G	#19-983	#19-1051	109-3766					
PRI01	= 000040	G	#19-983	#19-1050						
PRI02	= 000100	G	#19-983	#19-1049						
PRI03	= 000140	G	#19-983	#19-1048						
PRI04	= 000200	G	#19-983	#19-1047						
PRI05	= 000240	G	#19-983	#19-1046						
PRI06	= 000300	G	#19-983	#19-1045	50-1931	50-1934	58-2155	109-3784		
PRI07	= 000340	G	#19-983	#19-1044						
PRNUM	005644		*38-1625	*38-1635	*38-1645	40-1681	#40-1707			
PRTBOS	004516		#31-1371	71-2499	79-2717					
PRTB1	004510	G	#31-1367	58-2168						
PRTB1S	004536		31-1368	#31-1374	77-2654	79-2715	133-4535			
PRTCTR	005646		38-1619	#42-1714						
PRTDAT	005510		38-1629	38-1640	38-1649	#40-1680				
PRTECD	002272		#21-1116	27-1258	*27-1262	*37-1534				
PRTERR	002404		#27-1257	77-2676	131-4427	139-4626				
PRTHDR	005414		38-1618	38-1622	38-1632	38-1643	#40-1659			
PRT1	005504		*38-1616	*38-1620	*38-1630	*38-1641	40-1660	#40-1674		
PRT2	005506		*38-1617	*38-1621	*38-1631	*38-1642	40-1667	#40-1675		
PTDAT1	006243		40-1694	#44-1775						
PTEC	006200		38-1630	#44-1773						
PTECN	006327		38-1637	38-1639	#44-1779					
PTFMN1	006315		42-1726	#44-1778						

SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES								
PTHEAD	026062		*113-3843	113-3879	*113-3881	#113-3912					
PTRDSC	006116		42-1717	#44-1771							
PTRTY	031676		131-4433	#133-4498							
PTTK	006225		38-1641	#44-1774							
PTTKN	006343		38-1648	#44-1780							
PTUNT1	006253		38-1621	38-1631	38-1642	#44-1776					
PTUNT2	006274		38-1617	#44-1777							
PTWTSC	006147		42-1736	#44-1772							
PT19SP	006105		38-1620	#44-1770							
PT20SP	006074		38-1616	#44-1769							
RANDAT	017656		83-2803	#83-2842	83-2847						
RANGEN	004560		#33-1460	83-2842	85-2980						
RANUM	004652		*33-1475	#33-1480	83-2843	*85-2981	85-2982	85-2985	85-2988	85-2990	
RAN1	004646		33-1461	*33-1467	33-1472	#33-1478					
RAN2	004650		33-1462	33-1469	*33-1474	#33-1479					
RD	007454		#48-1844								
RDERCD	005026		#37-1532	77-2669	115-4026						
RDYWD	025330		*37-1541	*71-2443	*71-2452	*71-2480	*73-2558	*77-2647	*77-2656	*107-3679	*107-3690
			*107-3699	*107-3707	*107-3714	*107-3718	*107-3727	107-3753	*107-3753	107-3755	109-3796
			109-3800	#109-3814	*115-3930	*115-3952					
READRT	002324		#21-1131	133-4533							
READSC	007314		42-1716	#48-1834	85-3023	*125-4274	*125-4276	*125-4278	*125-4280	*125-4282	
RECCMD	005136		*37-1535	*37-1536	37-1537	#37-1550					
REFCMD	015264		#75-2596	*77-2621	*77-2629	*77-2636	*77-2639	*77-2644	77-2645	77-2667	
REFDRV	015306		73-2583	#77-2611							
REPORT	005140		#38-1615								
RESTAR	= 000002	G	#19-1064	50-1913							
RESTK	021450		*87-3071	*87-3072	*87-3082	*87-3083	#87-3133	95-3354	95-3356	*95-3361	
RETRY	002304		#21-1123	*67-2341	89-3153	89-3194	89-3196	89-3199	*89-3202	89-3205	*89-3208
			*89-3215	95-3384	95-3390	*95-3403	*119-4139	*127-4302	*127-4308	133-4499	133-4501
			133-4506	133-4508	133-4510	133-4521	133-4523	133-4525			
RTMASK	030474		*121-4210	*121-4217	*121-4218	*121-4220	*121-4221	*123-4242	*123-4244	*123-4248	127-4302
			127-4308	#127-4318							
RTOFF	027624		#119-4152	*121-4207	*121-4211	*121-4214	*123-4235	*123-4245	127-4293		
RXXX	002172		#18-893	52-1987	56-2105	71-2466	71-2471	71-2516	73-2572	77-2640	95-3347
			105-3652	117-4044							
RX2BIT	= 004000	G	#19-1057	73-2568							
RYDLY	025326		109-3799	#109-3813							
RYDX	025324		77-2657	*77-2658	*77-2660	109-3798	#109-3812				
SAVDLY	016014		*77-2657	77-2660	#77-2686						
SCPSCT	023060		99-3488	*99-3502	*99-3513	*99-3521	*99-3531	#99-3538			
SCSYEX	020676		67-2359	#87-3037							
SDD	002230		#21-1097	*62-2229	*67-2342	*87-3080	137-4577				
SECADR	025040		*95-3436	95-3440	107-3708	#107-3742					
SECDN	002262		#21-1111	89-3164	*95-3360	95-3412	*99-3533				
SECTOR	002256		#21-1109	*95-3440	113-3882						
SEEK	023322		*95-3395	*95-3402	*95-3419	*95-3421	#97-3458				
SEEKCK	026046		*113-3842	*113-3872	113-3889	#113-3906					
SEEKRT	002306		#21-1124	119-4132	127-4294	133-4503					
SEK	007424		#48-1841	127-4312							
SEQUEN	020654		*81-2750	*85-2899	85-2901	*85-2903	85-2904	#85-3014			
SEQ1	020164		85-2909	#85-2917	85-2938						

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CNRXDA     CREATED BY  MACRO  ON 15-DEC-82 AT 13:51      PAGE 22
SYMBOL CROSS REFERENCE                                    CREF   V01
SYMBOL  VALUE              REFERENCES
SEQ2       020220           85-2910   #85-2925    85-2936
SEQ3       020254           85-2911   #85-2933
SEQ4       020272           85-2912   #85-2940
SEQ5       020340           85-2913   #85-2952
SEQ6       020422           85-2914   #85-2967
SEQ7       020476           85-2915   #85-2979    85-2984    85-2987    85-2989
SETUP      011364           50-1912   #50-1914
SE1        033416          139-4598  #141-4652
SFERLG     030344          121-4212   121-4222   123-4250  #127-4292
SFERR      021446          *87-3047   *87-3119   #87-3132
SFPTBL     002172    G     #18-891
SFTSTS     033552           27-1261  #143-4718
SOFT     = 000003    G     #19-1058   131-4408
SSEC       023664           99-3474    99-3479   #99-3540
STCNTR     027616         *119-4082   119-4089  *119-4104   119-4105  #119-4149                                              M
STDVDN     032352           87-3063  #135-4552
STERRG     027614         *119-4081   119-4083  *119-4085  *119-4087  #119-4148
STKSEQ     017752           81-2753   #85-2884
STSCDN     023712           99-3519    99-3530   #99-3558
STSCFG     023662           99-3490   *99-3492   *99-3526   #99-3539                                                        M
STSTPA     017376           81-2749   #83-2782                                                                              M
SUM        017744          *83-2783   *83-2853    83-2858   *83-2859    83-2860   #83-2864
SUT        002232          #21-1098   *50-1908   *52-1994   *52-1997   *52-2003   *52-2006   *52-2017   *52-2020   *52-2025
                           *52-2028   *62-2228   *71-2468   *71-2470    71-2474   *71-2495    71-2496    73-2542    77-2611
                            87-3048    93-3314    93-3324   137-4577
SUTCV      004754          *35-1488   *35-1493   *35-1495   *35-1499   *35-1501   #35-1505    62-2227                         M
SUTDRP     013440          *62-2227    62-2228    62-2229   #62-2235   *79-2705
SUTPOS     015302          *71-2461   *71-2485    73-2542   *73-2584   #75-2603    77-2611    79-2705
SUTPTR     021426           35-1511   *67-2350    87-3048   *87-3053    87-3054   *87-3081   *87-3118   #87-3124
SVCGBL   = 000000          #16-786    #16-795     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
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                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
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                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     M
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-837
                            16-837     16-837     16-848     16-848     16-848     18-866     18-866     18-866     18-866
                            18-866     18-866     18-891     18-891     18-891     18-891     18-891     18-891     25-1209
                            25-1209    25-1209    27-1252    27-1252    27-1252    31-1348    31-1348    31-1348    31-1367
                            31-1367    31-1367    38-1614    38-1614    38-1614    48-1876    48-1876    48-1876    50-1891
                            50-1891    50-1891    54-2059    54-2059    54-2059    56-2091    56-2091    56-2091    62-2212
                            62-2212    62-2212    64-2264    64-2264    64-2264   145-4799   145-4799   145-4799   147-4840    M
                           147-4840   147-4840  #151-4949   151-4949   151-4949   151-4949
SVCINS   = 177777          #16-786    #16-792     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
                            16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829     16-829
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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
		16-829	16-829	16-829	16-829	16-829	16-829	16-829	16-829	16-829
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		16-829	16-829	16-829	16-829	16-837	16-837	16-848	16-848	18-866
		18-891	25-1209	25-1209	27-1249	27-1257	27-1257	27-1257	27-1257	27-1257
		27-1257	27-1257	27-1257	27-1257	27-1260	27-1260	27-1260	27-1260	27-1260
		27-1260	27-1260	27-1260	27-1260	27-1260	27-1260	27-1260	27-1260	27-1261
		27-1261	27-1261	27-1261	27-1261	27-1261	27-1261	27-1261	27-1261	27-1261
		27-1261	27-1261	27-1261	29-1289	29-1289	29-1289	29-1289	29-1289	31-1349
		31-1369	31-1371	31-1371	31-1371	31-1371	31-1371	31-1374	31-1374	31-1374
		31-1374	31-1374	31-1374	38-1650	44-1744	44-1744	44-1744	44-1744	44-1744
		44-1744	44-1756	44-1756	44-1756	44-1756	44-1756	44-1766	44-1766	44-1766
		44-1766	44-1766	44-1766	44-1766	50-1897	50-1897	50-1898	50-1898	50-1899
		50-1902	50-1902	50-1903	50-1911	50-1911	50-1912	50-1923	50-1923	50-1923
		50-1924	50-1928	50-1928	50-1928	50-1928	50-1928	50-1930	50-1931	50-1931
		50-1931	50-1931	50-1931	50-1931	50-1934	50-1934	50-1934	50-1934	50-1934
		50-1934	50-1935	52-2037	52-2037	52-2037	52-2037	52-2037	52-2037	52-2038
		52-2040	52-2040	52-2040	52-2040	52-2040	52-2040	54-2067	54-2067	54-2070
		54-2070	54-2071	54-2072	56-2101	56-2101	56-2104	56-2104	56-2110	56-2110
		56-2113	56-2113	56-2124	56-2124	56-2127	56-2127	56-2130	56-2132	58-2155
		58-2155	58-2155	58-2155	58-2155	58-2155	58-2157	58-2157	58-2170	62-2222
		62-2222	62-2222	62-2222	62-2222	62-2222	62-2230	62-2230	62-2230	62-2230
		62-2230	62-2230	62-2232	64-2272	67-2337	67-2352	67-2358	67-2368	67-2369
		67-2378	67-2380	67-2381	67-2381	71-2441	73-2544	73-2580	77-2614	77-2630
		77-2631	77-2632	77-2632	77-2632	77-2632	77-2632	77-2632	77-2682	79-2698
		79-2706	79-2706	87-3057	87-3116	89-3150	89-3151	95-3381	95-3382	109-3766
		109-3766	109-3784	109-3784	113-3882	113-3882	113-3882	113-3882	113-3882	113-3882
		113-3882	113-3882	113-3883	113-3883	113-3883	113-3883	113-3883	113-3883	113-3883
		113-3883	113-3883	113-3883	143-4738	145-4799	145-4801	145-4801	145-4801	145-4801
		145-4802	145-4802	145-4802	145-4802	145-4803	145-4803	145-4803	145-4803	145-4803
		145-4804	145-4804	145-4804	145-4804	145-4804	145-4806	145-4813	147-4840	147-4842
		147-4842	147-4842	147-4843	147-4844	147-4844	147-4844	147-4845	147-4845	147-4845
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		147-4853	147-4853	147-4853	147-4854	147-4854	147-4854	147-4855	147-4855	147-4855
		147-4856	147-4856	147-4856	147-4857	147-4857	147-4857	147-4858	147-4859	147-4859
		147-4859	147-4859	147-4859	147-4860	147-4860	147-4860	147-4860	147-4860	147-4861
		147-4861	147-4861	147-4862	147-4863	147-4863	147-4863	147-4863	147-4863	147-4864
		147-4864	147-4864	147-4864	147-4864	147-4865	147-4865	147-4865	147-4866	147-4877
		151-4949	151-4949	151-4949	151-4953	151-4953	151-4959	151-4959		
SVCSUB	= 177777	#16-786	#16-794	67-2337	67-2337	67-2337	67-2358	67-2358	67-2358	
SVCTAG	= 177777	#16-786	#16-796	18-879	18-879	18-879	18-912	18-912	18-912	31-1349
		31-1349	31-1349	31-1369	31-1369	31-1369	38-1650	38-1650	38-1650	50-1935
		50-1935	50-1935	54-2072	54-2072	54-2072	56-2132	56-2132	56-2132	62-2232
		62-2232	62-2232	64-2272	64-2272	64-2272	67-2352	67-2352	67-2352	67-2369
		67-2369	67-2369	73-2580	73-2580	73-2580	77-2632	77-2632	77-2632	77-2682
		77-2682	77-2682	87-3116	87-3116	87-3116	143-4738	143-4738	143-4738	145-4813
		145-4813	145-4813	147-4877	147-4877	147-4877	151-4953	151-4953	151-4953	151-4958
		151-4958	151-4958	151-4959	151-4959	151-4959	151-4964	151-4964	151-4964	
SVCTST	= 177777	#16-786	#16-793	67-2335	67-2335	67-2335				
SVUTRG	033516	143-4688	143-4695	#143-4701						
SWREG	002204	#18-898	67-2374	69-2396	69-2414	69-2421	69-2426	77-2615	81-2756	•81-2758

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE		REFERENCES								
			89-3155	95-3386	95-3393	113-3875	127-4295				
SYFT	= 000000	G	#19-1061	139-4623							
SYSERR	= 004000	G	#19-1066	60-2193							
SYSE10	033122		#141-4642	141-4658							
SYSE11	033151		#141-4643	141-4659							
SYSE12	033161		#141-4644	141-4660							
SYSE13	033171		#141-4645	141-4661							
SYSE14	033225		#141-4646	141-4662							
SYSE15	033242		#141-4647	141-4663							
SYSE16	033302		#141-4648	141-4664							
SYSE4	032700		#141-4636	141-4652							
SYSE5	032733		#141-4637	141-4653							
SYSE6	032764		#141-4638	141-4654							
SYSE7	033010		#141-4639	141-4655							
SYSE8	033033		#141-4640	141-4656							
SYSE9	033072		#141-4641	141-4657							
S$LSYM	= 010000		#16-786	#18-879	#18-912	#31-1349	#31-1369	#38-1650	#50-1935	#54-2072	#56-2132
			#62-2232	#64-2272	#67-2352	#67-2369	73-2544	73-2544	#73-2544	77-2614	77-2614
			#77-2614	77-2632	77-2632	77-2632	#77-2632	87-3057	87-3057	#87-3057	#143-4738
			#145-4813	#147-4877							
TARGET	020640		*85-2886	*85-2888	*85-2919	*85-2921	*85-2927	*85-2929	*85-2942	*85-2945	*85-2949
			*85-2957	*85-2961	*85-2964	*85-2971	*85-2974	*85-2976	*85-2990	*85-2993	85-2999
			85-3000	85-3002	#85-3008						
TBPRCT	022160		*89-3162	89-3166	*89-3169	89-3186	*89-3188	*89-3191	*89-3216	*89-3218	#89-3231
THA234	024464		107-3684	#107-3686							
THA25	030756		131-4391	#131-4398							
THA40	032544		139-4599	#139-4605							
THB231	023514		#99-3505								
THC13	017366		81-2755	#81-2759							
THD23	022772		95-3394	#95-3397							
THE22	022440		93-3318	#93-3326							
THE234	024754		#107-3725								
THF231	023560		99-3489	#99-3518							
THF241	025624		113-3874	#113-3877							
TKTBPT	020634		*85-2884	*85-2997	85-2998	#85-3006					
TKTL	024242		101-3575	101-3586	#103-3631						
TKXX	010070		38-1646	#48-1856	119-4124						
TRACK	002254		#21-1108	*9[illegible]-3439	113-3882	119-4120					
TRAP	013260		58-2155	#60-2193							
TRBIT	= 000200	G	#19-1055	37-1541	77-2647	107-3690	107-3699	107-3707	107-3714	107-3718	107-3727
TRKADR	025036		*95-3435	95-3439	107-3712	#107-3741					
TRKCNT	020636		*85-2893	*85-2894	*85-2895	*85-2947	*85-2991	#85-3007			
TRKDN	002260		#21-1110	89-3173	*89-3175	*101-3619					
TRKDNF	024230		*101-3585	*101-3597	*101-3612	*101-3617	101-3619	#103-3626			
TRKINC	024236		*95-3416	101-3584	*101-3620	#103-3629					
TRKSEQ	002202		#18-897	81-2750	85-2899						
TRKTBL	033554		85-2996	101-3589	#143-4724						
TRPMS1	013144		58-2160	#58-2174							
TSAVCT	022162		*89-3203	*89-3209	*89-3211	89-3213	#89-3232				
TSEC	033551		27-1261	#143-4717							
TST	021422		*87-3060	87-3061	87-3064	87-3073	87-3101	87-3105	#87-3122		
TSTCK	027626		*111-3830	119-4073	#119-4153	121-4202	121-4215	123-4240			

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SYMBOL CROSS REFERENCE CREF V01

SYMBOL	VALUE	REFERENCES								
TSTEV	025410	*87-3103	111-3823	111-3825	111-3827	111-3830	#111-3834	115-3975	115-3981	115-3987
		115-4002	117-4040							
TSTN	002176	#18-895	87-3058							
TSTPAT	002200	#18-896	81-2748							
TSTPTR	022152	*89-3149	89-3159	*89-3161	*89-3168	*89-3182	*89-3184	*89-3189	*89-3192	*89-3201
		*89-3207	*89-3212	89-3219	*89-3224	#89-3228				
TSTSUT	022502	*93-3311	*93-3313	93-3314	*93-3321	*93-3323	93-3324	#93-3336		
TSTWD	022156	87-3060	89-3171	89-3178	89-3180	*89-3221	#89-3230			
TTRK	033550	27-1261	#143-4716							
T$ARGC	= 000004	#16-829	16-829	#16-829	16-829	16-829	#16-829	16-829	16-829	#16-829
		16-829	16-829	#16-829	16-829	16-829	#16-829	16-829	16-829	#16-829
		16-829	16-829	#16-829	16-829	16-829	#27-1257	27-1257	#27-1257	27-1257
		#27-1257	27-1257	#27-1257	27-1257	#27-1257	27-1257	27-1257	#27-1260	27-1260
		#27-1260	27-1260	#27-1260	27-1260	#27-1260	27-1260	#27-1260	27-1260	27-1260
		#27-1261	27-1261	#27-1261	27-1261	#27-1261	27-1261	#27-1261	27-1261	#27-1261
		27-1261	27-1261	#29-1289	29-1289	29-1289	#31-1371	31-1371	31-1371	#31-1374
		31-1374	#31-1374	31-1374	31-1374	#44-1744	44-1744	#44-1744	44-1744	44-1744
		#44-1756	44-1756	44-1756	#44-1766	44-1766	#44-1766	44-1766	#44-1766	44-1766
		44-1766	#50-1928	50-1928	50-1928	#52-2037	52-2037	#52-2037	52-2037	52-2037
		#52-2040	52-2040	#52-2040	52-2040	52-2040	#62-2222	62-2222	#62-2222	62-2222
		62-2222	#62-2230	62-2230	#62-2230	62-2230	62-2230	#113-3882	113-3882	#113-3882
		113-3882	#113-3882	113-3882	#113-3882	113-3882	113-3882	#113-3883	113-3883	#113-3883
		113-3883	#113-3883	113-3883	#113-3883	113-3883	113-3883			
T$CODE	= 001004	#77-2632	77-2632	#77-2632	77-2632	#77-2632	77-2632	#145-4801	145-4801	#145-4801
		145-4801	#145-4801	145-4801	#145-4802	145-4802	#145-4802	145-4802	#145-4802	145-4802
		#145-4803	145-4803	#145-4803	145-4803	#145-4803	145-4803	#145-4804	145-4804	#145-4804
		145-4804	#145-4804	145-4804	#145-4806	145-4806	#145-4806	145-4806	145-4806	#145-4806
		145-4806	#145-4806	145-4806	#147-4842	147-4842	#147-4842	147-4842	#147-4842	147-4842
		#147-4843	147-4843	147-4843	#147-4843	147-4843	147-4843	#147-4843	147-4843	#147-4843
		147-4843	#147-4844	147-4844	#147-4844	147-4844	#147-4844	147-4844	#147-4845	147-4845
		#147-4845	147-4845	#147-4845	147-4845	#147-4846	147-4846	#147-4846	147-4846	#147-4846
		147-4846	#147-4847	147-4847	#147-4847	147-4847	#147-4847	147-4847	#147-4848	147-4848
		#147-4848	147-4848	#147-4848	147-4848	#147-4849	147-4849	#147-4849	147-4849	#147-4849
		147-4849	#147-4850	147-4850	#147-4850	147-4850	#147-4850	147-4850	#147-4851	147-4851
		#147-4851	147-4851	#147-4851	147-4851	#147-4852	147-4852	147-4852	#147-4852	147-4852
		147-4852	#147-4852	147-4852	#147-4852	147-4852	#147-4853	147-4853	#147-4853	147-4853
		#147-4853	147-4853	#147-4854	147-4854	#147-4854	147-4854	#147-4854	147-4854	#147-4855
		147-4855	#147-4855	147-4855	#147-4855	147-4855	#147-4856	147-4856	#147-4856	147-4856
		#147-4856	147-4856	#147-4857	147-4857	#147-4857	147-4857	#147-4857	147-4857	#147-4858
		147-4858	147-4858	#147-4858	147-4858	147-4858	#147-4858	147-4858	#147-4858	147-4858
		#147-4859	147-4859	#147-4859	147-4859	#147-4859	147-4859	#147-4860	147-4860	#147-4860
		147-4860	#147-4860	147-4860	#147-4861	147-4861	#147-4861	147-4861	#147-4861	147-4861
		#147-4862	147-4862	147-4862	#147-4862	147-4862	147-4862	#147-4862	147-4862	#147-4862
		147-4862	#147-4863	147-4863	#147-4863	147-4863	#147-4863	147-4863	#147-4864	147-4864
		#147-4864	147-4864	#147-4864	147-4864	#147-4865	147-4865	#147-4865	147-4865	#147-4865
		147-4865	#147-4866	147-4866	147-4866	#147-4866	147-4866	147-4866	#147-4866	147-4866
		#147-4866	147-4866							
T$ERRN	= 000000	#16-786								
T$EXCP	= 000000	#145-4801	145-4801	#145-4802	145-4802	#145-4803	145-4803	#145-4804	145-4804	#147-4845
		147-4845	#147-4846	147-4846	#147-4847	147-4847	#147-4848	147-4848	#147-4859	147-4859
		#147-4860	147-4860	#147-4863	147-4863	#147-4864	147-4864			
T$FLAG	= 000041	#67-2381	#67-2381	67-2381	67-2381	#145-4806	145-4806	145-4806	#147-4866	147-4866

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SYMBOL	VALUE	REFERENCES
		147-4866
T$FREE	= 040504	151-4949 #151-4965
T$GMAN	= 000000	#16-786
T$HILI	= 000032	#145-4801 145-4801 #145-4802 145-4802 #145-4803 145-4803 #145-4804 145-4804 #147-4845 147-4845 #147-4846 147-4846 #147-4847 147-4847 #147-4848 147-4848 #147-4859 147-4859 #147-4860 147-4860 #147-4863 147-4863 #147-4864 147-4864
T$LAST	= 000001	#16-786 #151-4949 151-4952
T$LOLI	= 000001	#145-4801 145-4801 #145-4802 145-4802 #145-4803 145-4803 #145-4804 145-4804 #147-4845 147-4845 #147-4846 147-4846 #147-4847 147-4847 #147-4848 147-4848 #147-4859 147-4859 #147-4860 147-4860 #147-4863 147-4863 #147-4864 147-4864
T$LSYM	= 010000	#16-786 16-786 18-879 18-912 31-1349 31-1369 38-1650 50-1935 54-2072 56-2132 62-2232 64-2272 67-2352 67-2369 143-4738 145-4813 147-4877
T$LTNO	= 000001	#151-4949
T$NEST	= 177777	#16-786 16-812 #16-812 16-812 18-866 #18-866 18-866 18-879 18-879 18-879 #18-879 18-891 #18-891 18-891 18-912 18-912 18-912 #18-912 18-914 18-914 18-914 #18-914 19-976 #19-976 19-976 31-1348 #31-1348 31-1348 31-1349 31-1349 #31-1349 31-1367 #31-1367 31-1367 31-1369 31-1369 31-1369 #31-1369 37-1553 37-1553 37-1553 #37-1553 38-1606 #38-1606 38-1606 38-1614 #38-1614 38-1614 38-1650 38-1650 38-1650 #38-1650 48-1876 #48-1876 48-1876 48-1880 48-1880 48-1880 #48-1880 50-1891 #50-1891 50-1891 50-1935 50-1935 50-1935 #50-1935 54-2059 #54-2059 54-2059 54-2072 54-2072 54-2072 #54-2072 56-2091 #56-2091 56-2091 56-2132 56-2132 56-2132 #56-2132 62-2212 #62-2212 62-2212 62-2232 62-2232 62-2232 #62-2232 64-2264 #64-2264 64-2264 64-2272 64-2272 64-2272 #64-2272 67-2335 #67-2335 67-2335 67-2337 #67-2337 67-2337 67-2352 67-2352 67-2352 #67-2352 67-2358 #67-2358 67-2358 67-2369 67-2369 67-2369 #67-2369 73-2544 #73-2544 73-2544 73-2580 73-2580 #73-2580 77-2614 #77-2614 77-2614 77-2682 77-2682 77-2682 #77-2682 87-3057 #87-3057 87-3057 87-3116 87-3116 87-3116 #87-3116 143-4738 143-4738 143-4738 #143-4738 145-4799 #145-4799 145-4799 145-4806 145-4806 145-4813 145-4813 145-4813 #145-4813 147-4840 #147-4840 147-4840 147-4843 147-4852 147-4858 147-4862 147-4866 147-4866 147-4877 147-4877 147-4877 #147-4877 151-4950 151-4950 151-4950 #151-4950
T$NS0	= 000000	#16-812 18-914 #19-976 37-1553 #38-1606 151-4950
T$NS1	= 000005	#18-866 18-879 #18-891 18-912 #31-1348 31-1349 #31-1367 31-1369 #38-1614 38-1650 #48-1876 48-1880 #50-1891 50-1935 #54-2059 54-2072 #56-2091 56-2132 #62-2212 62-2232 #64-2264 64-2272 #67-2335 143-4738 #145-4799 145-4806 145-4806 145-4813 #147-4840 147-4843 147-4852 147-4858 147-4862 147-4866 147-4866 147-4877
T$NS2	= 000003	#67-2337 67-2352 #67-2358 67-2369 #73-2544 73-2580 #77-2614 77-2682 #87-3057 87-3116
T$PCNT	= 000000	#151-4952 151-4953 #151-4953 151-4953 151-4959 #151-4959 151-4959
T$PTAB	= 010023	#151-4953 151-4953 151-4953 #151-4959 151-4959
T$PTHV	= 000002	16-829 #151-4965
T$PTNU	= 000002	#16-786 151-4953 #151-4953 151-4959 #151-4959 151-4965 151-4965
T$SAVL	= 177777	#16-786
T$SEGL	= 177777	#16-786 73-2544 #73-2544 73-2544 73-2580 73-2580 73-2580 #73-2580 73-2580 77-2614 #77-2614 77-2614 77-2682 77-2682 77-2682 #77-2682 77-2682 87-3057 #87-3057 87-3057 87-3116 87-3116 87-3116 #87-3116 87-3116
T$SEKO	= 010003	#73-2544 73-2580 #77-2614 77-2682 #87-3057 87-3116
T$SIZE	= 000014	151-4949 #151-4965
T$SUBN	= 000002	#16-786 #67-2335 67-2337 #67-2337 67-2337 67-2358 #67-2358 67-2358
T$TAGL	= 177777	#16-786
T$TAGN	= 010025	#16-786 18-866 18-866 #18-866 18-891 18-891 #18-891 31-1348 31-1348

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SYMBOL	VALUE	REFERENCES								
		#31-1348	31-1367	31-1367	#31-1367	38-1614	38-1614	#38-1614	48-1876	48-1876
		#48-1876	50-1891	50-1891	#50-1891	54-2059	54-2059	#54-2059	56-2091	56-2091
		#56-2091	62-2212	62-2212	#62-2212	64-2264	64-2264	#64-2264	67-2335	67-2335
		#67-2335	67-2337	67-2337	#67-2337	67-2358	67-2358	#67-2358	145-4799	145-4799
		#145-4799	147-4840	147-4840	#147-4840	151-4952	151-4952	#151-4952	151-4953	151-4953
		#151-4953	151-4953	151-4953	#151-4953	151-4959	151-4959	#151-4959	151-4959	151-4959
		#151-4959								
T$TEMP	= 000000	#16-848	16-848	16-848	#16-848	#18-879	18-879	#18-912	18-912	#18-914
		18-914	#31-1349	31-1349	#31-1369	31-1369	#37-1553	37-1553	#38-1650	38-1650
		#48-1880	48-1880	#50-1935	50-1935	#54-2072	54-2072	#56-2132	56-2132	#62-2232
		62-2232	#64-2272	64-2272	#67-2352	67-2352	#67-2369	67-2369	#67-2381	67-2381
		#73-2580	73-2580	#77-2632	77-2632	#77-2632	77-2632	#77-2632	77-2632	#77-2682
		77-2682	#87-3116	87-3116	#143-4738	143-4738	#145-4801	145-4801	#145-4801	145-4801
		#145-4801	145-4801	#145-4802	145-4802	#145-4802	145-4802	#145-4802	145-4802	#145-4803
		145-4803	#145-4803	145-4803	#145-4803	145-4803	#145-4804	145-4804	#145-4804	145-4804
		#145-4804	145-4804	#145-4806	145-4806	#145-4813	145-4813	#147-4842	147-4842	#147-4842
		147-4842	#147-4842	147-4842	#147-4844	147-4844	#147-4844	147-4844	#147-4844	147-4844
		#147-4845	147-4845	#147-4845	147-4845	#147-4845	147-4845	#147-4846	147-4846	#147-4846
		147-4846	#147-4846	147-4846	#147-4847	147-4847	#147-4847	147-4847	#147-4847	147-4847
		#147-4848	147-4848	#147-4848	147-4848	#147-4848	147-4848	#147-4849	147-4849	#147-4849
		147-4849	#147-4849	147-4849	#147-4850	147-4850	#147-4850	147-4850	#147-4850	147-4850
		#147-4851	147-4851	#147-4851	147-4851	#147-4851	147-4851	#147-4853	147-4853	#147-4853
		147-4853	#147-4853	147-4853	#147-4854	147-4854	#147-4854	147-4854	#147-4854	147-4854
		#147-4855	147-4855	#147-4855	147-4855	#147-4855	147-4855	#147-4856	147-4856	#147-4856
		147-4856	#147-4856	147-4856	#147-4857	147-4857	#147-4857	147-4857	#147-4857	147-4857
		#147-4859	147-4859	#147-4859	147-4859	#147-4859	147-4859	#147-4860	147-4860	#147-4860
		147-4860	#147-4860	147-4860	#147-4861	147-4861	#147-4861	147-4861	#147-4861	147-4861
		#147-4863	147-4863	#147-4863	147-4863	#147-4863	147-4863	#147-4864	147-4864	#147-4864
		147-4864	#147-4864	147-4864	#147-4865	147-4865	#147-4865	147-4865	#147-4865	147-4865
		#147-4866	147-4866	#147-4877	147-4877	#151-4950	151-4950			
T$TEST	= 000001	#16-786	67-2335	#67-2335	67-2335	67-2337	67-2358	151-4949		
T$TSTM	= 177777	#16-786	27-1249	27-1257	27-1260	27-1261	29-1289	31-1349	31-1369	31-1371
		31-1374	38-1650	44-1744	44-1756	44-1766	50-1897	50-1898	50-1902	50-1911
		50-1923	50-1928	50-1930	50-1931	50-1934	50-1935	52-2037	52-2038	52-2040
		54-2067	54-2070	54-2071	54-2072	56-2101	56-2104	56-2110	56-2113	56-2124
		56-2127	56-2130	56-2132	58-2155	58-2157	58-2170	62-2222	62-2230	62-2232
		64-2272	67-2337	67-2352	67-2358	67-2368	67-2369	67-2378	67-2380	67-2381
		71-2441	73-2544	73-2580	77-2614	77-2630	77-2632	77-2682	79-2698	79-2706
		87-3057	87-3116	89-3150	95-3381	109-3766	109-3784	113-3882	113-3883	143-4738
T$TSTS	= 000001	#16-786	#67-2335							
T$$AU	= 010012	#64-2264	64-2272							
T$$AUT	= 010010	#56-2091	56-2132							
T$$CLE	= 010007	#54-2059	54-2072							
T$$DAT	= 010024	#151-4953	151-4953	151-4958	#151-4959	151-4959	151-4964			
T$$DU	= 010011	#62-2212	62-2232							
T$$HAR	= 010016	#145-4799	145-4799	145-4806	145-4813					
T$$HW	= 010000	#18-866	18-866	18-879						
T$$INI	= 010006	#50-1891	50-1935							
T$$MSG	= 010003	#31-1348	31-1349	#31-1367	31-1369					
T$$PC	= 000002	#151-4952	151-4965							
T$$PRO	= 010005	#48-1876								
T$$PTA	= 010023	#151-4952	151-4953	#151-4953	151-4959	#151-4959				

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SYMBOL	VALUE		REFERENCES								
T$$RPT	= 010004		#38-1614	38-1650							
T$$SEG	= 010003		#73-2544	73-2544	#73-2580	73-2580	#77-2614	77-2614	#77-2682	77-2682	#87-3057
			87-3057	#87-3116	87-3116						
T$$SOF	= 010017		#147-4840	147-4840	147-4866	147-4877					
T$$SUB	= 010015		#67-2337	67-2352	#67-2358	67-2369					
T$$SW	= 010001		#18-891	18-891	18-912						
T$$TES	= 010013		#67-2335	67-2381	143-4738						
TOMSG	013124		58-2167	#58-2173							
T1	013564	G	16-848	#67-2335							
T1.1	013566		#67-2337								
T1.2	013706		#67-2358								
UAM	= 000200	G	#19-983								
UAU234	025162		#109-3778								
UC00	013752		#67-2370								
UDCRST	027722		119-4077	#121-4201							
UDHDST	027670		119-4103	#121-4186							
UDSFST	030072		119-4101	#123-4230							
UDU234	025156		#109-3776								
UF243	027412		#119-4105								
UG00	013766		67-2357	#67-2374							
UKINT	007404		#48-1839								
UK243	027554		#119-4136								
UNIT	002334		#23-1139	27-1248	27-1257	*35-1522	*50-1915	*50-1920	50-1921	50-1923	52-1969
			52-2034	52-2037	52-2040	*71-2507	*71-2510	*71-2514	*71-2524	*71-2527	*71-2531
			*73-2548	77-2652	79-2697	79-2706	79-2713	*93-3333	113-3882		
UNITDP	013436		*62-2214	62-2217	62-2222	62-2230	#62-2234				
UNITST	005024		*35-1518	#35-1525	87-3051						
UNPKHP	011656		50-1926	#52-1966							
UNT	012330		*52-1967	*52-1986	52-2015	52-2023	#52-2044				
UNTCD	015300		*71-2462	*71-2487	73-2545	73-2549	73-2574	*73-2586	#75-2602	77-2637	77-2642
UNTCNT	015276		*71-2460	*71-2486	*73-2585	73-2587	#75-2601				
UNTCOD	012326		*52-1995	*52-1998	*52-2004	*52-2007	*52-2018	*52-2021	*52-2026	*52-2029	52-2031
			#52-2043								
UPDVST	027230		111-3831	#119-4073							
UPSECT	030216		119-4074	#125-4259							
UTCNT	005412		#38-1653	*40-1663	*40-1670	*40-1690	*40-1697	*42-1720	*42-1730		
UTSCDN	023704		*99-3469	*99-3518	*99-3529	99-3533	#99-3548				
UTTST	005410		#38-1652	*40-1662	40-1664	40-1666	*40-1669	*40-1689	40-1692	*40-1696	*42-1719
			42-1721	*42-1728							
UT00	002336		#23-1140	35-1521	40-1662	40-1689	42-1719	*50-1916	52-2030	56-2094	56-2099
			56-2101	62-2216	71-2508	71-2510	73-2547	93-3332			
UT01	002340		#23-1141	*50-1917	56-2102	56-2104	71-2512	71-2514			
UT10	002342		#23-1142	*50-1918	56-2107	56-2108	56-2110	56-2117	56-2122	56-2124	71-2525
			71-2527								
UT11	002344		#23-1143	*50-1919	56-2111	56-2113	56-2125	56-2127	71-2529	71-2531	
UUT	002234		#21-1099	*87-3051	87-3071	87-3082	93-3307	93-3309	*93-3316	93-3319	*93-3326
			*93-3328	93-3329	95-3349	99-3470	99-3558	101-3581	105-3654	105-3659	115-3943
			117-4046	117-4056	125-4259	135-4557	135-4563				
UUTADR	002236		#21-1100	37-1533	37-1538	37-1540	*77-2668	*95-3351	*95-3353	95-3400	95-3437
			115-3922	115-3929	115-3951	115-3961					
UUTOFF	002240		#21-1101	*35-1520	*93-3331	95-3346	119-4114	119-4125	121-4191	127-4306	127-4313
UOADR	002220		#21-1092	*50-1904	*52-1971	52-1974	56-2092	56-2095	56-2128	71-2444	71-2446

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SYMBOL		VALUE	REFERENCES									
			71-2451	71-2453	71-2455	71-2463	95-3353	143-4687				
U0VECT		002224	#21-1094	*50-1906	50-1931	*52-1972	54-2067					
U1ADR		002222	#21-1093	*50-1905	52-1978	*52-1980	52-1983	56-2115	56-2118	71-2477	71-2479	
			71-2481	71-2483	71-2488	95-3351	143-4694					
U1VECT		002226	#21-1095	*50-1907	50-1932	50-1934	*52-1981	54-2068	54-2070			
VALWD		025030	107-3728	#107-3738								
WATCH		025104	107-3731	#109-3765								
WC		033545	27-1260	#143-4713								
WDCNT		002252	#21-1107	*69-2416	*69-2418	83-2792	95-3345	113-3844				
WDCT		023326	*95-3345	#97-3460	107-3691							
WDOT		023330	*67-2349	*95-3399	*95-3434	#97-3461	107-3680	107-3683	107-3686	107-3688	107-3694	
			107-3703	107-3705	107-3723							
WRDS		025022	*107-3680	*107-3691	*107-3696	*107-3698	*107-3708	*107-3709	*107-3712	*107-3713	*107-3719	
			*107-3728	#107-3735	107-3757							
WRITSC		007334	42-1735	#48-1835								
WRT		007464	#48-1845									
WRTRT		002326	#21-1132	133-4518								
XATDP		012766	56-2112	56-2114	56-2121	56-2129	#56-2131					
XDVTST		022504	87-3102	#95-3345								
XERPRT		003034	#29-1281	131-4430	139-4627							
XERUUT		033544	27-1260	29-1281	29-1283	*29-1290	37-1547	*67-2347	107-3719	*115-3925	119-4107	
			129-4325	#143-4712								
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MACRO CROSS REFERENCE CREF V01

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	147-4861	#147-4862	147-4862	#147-4863	147-4863	#147-4864	147-4864	#147-4865	147-4865	#147-4866
	#147-4866	147-4866	#151-4953	#151-4959	151-4959					
M$XFER	#145-4806	145-4806	#147-4843	147-4843	#147-4852	147-4852	#147-4858	147-4858	#147-4862	147-4862
	#147-4866	147-4866								
POINTE	16-819									
PRINTB	27-1257	31-1371	31-1374	113-3882	113-3883					
PRINTF	50-1928	52-2037	52-2040	62-2222	62-2230					
PRINTS	44-1744	44-1756	44-1766							
PRINTX	27-1260	27-1261	29-1289							
READEF	50-1898	50-1902	50-1911							
RFLAGS	50-1897									
SETPRI	109-3766	109-3784								
SETVEC	50-1931	50-1934	58-2155							
SVC	#16-785	16-786								
XFER	#67-2381	#145-4806	145-4806	#147-4866	147-4866					
XFERF	147-4843	147-4852	147-4858	147-4862						