

RX02

SS PERF EXER
CNRXDAO

AH-T474A-MC
FICHE 1 OF 1

MAY 1983
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IDENTIFICATION

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PRODUCT NAME: CNRXDAO RX02 SS PERF EXER
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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 HIERARCHY 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

	ADDRESS
XXDP+ MONITOR	77777
XXDP+ TTY I/O AREA	72000
DRS	70000
RX02 PERFORMANCE EXERCISER	41000
STACKS	2000
VECTOR AREA	400
	0

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	SID	DRV	DRV	DEL	DSK	DEN	AC	INT	SID	CRC
							OVF	#1	#1	RDY	DAT	DEN	ERR	LOW	DON	RDY
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 LABEL '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	DV1	HD	DVO	X	X	X	LCD
									SEL	DEN	LD	DEN				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 = RANDCM

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 |

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7.0 HISTORY FILE

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

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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 DRIVE 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

PROGRAM HEADER AND TABLES

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```

771      .TITLE PROGRAM HEADER AND TABLES
772      .SBTTL PROGRAM HEADER
806
808      .ENABL ABS,AMA
809      =      2000
811      002000
812      BGNMOD
813
814      :++
815      : THE PROGRAM HEADER IS THE INTERFACE BETWEEN
816      : THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
817      :--
818
819      002000      POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,ERRTBL,BGNSETUP
820
828
829      002000      HEADER CNRXDA0,0,0,2100,1
830
836      :-----
837      002122      DESCRIPT      ^$RX02 SS PERF EXER      $
838      .EVEN
839      :-----
840
841      .SBTTL DISPATCH TABLE
842
843      :++
844      : THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
845      : IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
846      :--
847
848      002152      DISPATCH 1
849

```

PROGRAM HEADER AND TABLES
DEFAULT HARDWARE P-TABLE

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.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.
:--

```

```

      BGNHW  DFPTBL
      .WORD  177170      ;UNIBUS ADDRESS
      .WORD  264         ;VECTOR ADDRESS
      .WORD  0           ;DRIVE #
      .WORD  0           ;FUTURE EXPANSION

```

ENDHW

.SBTTL SOFTWARE P-TABLE

```

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

```

```

      BGNSW  SFPTBL
RXXX:  .WORD  0           ;FUTURE EXPANSION-R.
      .WORD  0           ;P-TABLE CONTROL WORD
TSTN:  .WORD  0           ;TEST #
TSTPAT: .WORD  0         ;TEST PATTERN #
TRKSEQ: .WORD  0         ;TRACK SEQUENCE #
SWREG:  .WORD  21        ;SOFTWARE SWITCH REG
OTDITK: .WORD  0         ;OUTSIDE DIA. TRACK LIMIT
INDITK: .WORD  114       ;INSIDE DIA. TRACK LIMIT
MINSEC: .WORD  1         ;MINIMUM SECTOR LIMIT
MAXSEC: .WORD  32        ;MAXIMUM SECTOR LIMIT
DFTL:  .WORD  1         ;DEVICE FATAL THRESHOLD LVL

```

ENDSW

ENDMOD

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 19
SOFTWARE P-TABLE

927
928
965
975
976 002220
977
978
979
980
981
982
983 002220

.TITLE GLOBAL AREAS
.SBTTL GLOBAL EQUATES SECTION

BGNMOD

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

EQUALS

: BIT DIFINITIONS

100000	BIT15== 100000
040000	BIT14== 40000
020000	BIT13== 20000
010000	BIT12== 10000
004000	BIT11== 4000
002000	BIT10== 2000
001000	BIT09== 1000
000400	BIT08== 400
000200	BIT07== 200
000100	BIT06== 100
000040	BIT05== 40
000020	BIT04== 20
000010	BIT03== 10
000004	BIT02== 4
000002	BIT01== 2
000001	BIT00== 1

001000	BIT9== BIT09
000400	BIT8== BIT08
000200	BIT7== BIT07
000100	BIT6== BIT06
000040	BIT5== BIT05
000020	BIT4== BIT04
000010	BIT3== BIT03
000004	BIT2== BIT02
000002	BIT1== BIT01
000001	BIT0== BIT00

: EVENT FLAG DEFINITIONS

EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION

000040
000037
000036
000035
000034

EF.START==	32.
EF.RESTART==	31.
EF.CONTINUE==	30.
EF.NEW==	29.
EF.PWR==	28.

: BIT POSITION IN SECOND STATUS WORD
: (100000) START COMMAND WAS ISSUED
: (040000) RESTART COMMAND WAS ISSUED
: (020000) CONTINUE COMMAND WAS ISSUED
: (010000) A NEW PASS HAS BEEN STARTED
: (004000) A POWER-FAIL/POWER-UP OCCURRED

: PRIORITY LEVEL DEFINITIONS

000340

PR107== 340

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 19-1
GLOBAL EQUATES SECTION

```
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
```

.; BIT DEFINITIONS

```
984
985
986
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
```

.; EVENT FLAG DEFINITIONS

1015
1016

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 19-2
GLOBAL EQUATES SECTION

```

1017      : EF32:EF17
1018      : EF16:EF01
1019      000040 EF.START== 32.
1020      000037 EF.RESTART== 31.
1021      000036 EF.CONTINUE== 30.
1022      000035 EF.NEW== 29.
1023      000034 EF.PWR== 28.
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
1056      004000 SYSERR==BIT11

```

RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
AVAILABLE FOR PROGRAM USE
; START COMMAND WAS ISSUED.
; RESTART COMMAND WAS ISSUED.
; CONTINUE COMMAND WAS ISSUED.
; A NEW PASS HAS BEEN STARTED.
; A POWER FAIL/POWER-UP OCCURRED

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 21
GLOBAL DATA SECTION

```

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 UOADR: .WORD 0 ;UNIT 0 ADR
1093      002222 000000 UIADR: .WORD 0 ;UNIT 1 ADR
1094      002224 000000 UOUCT: .WORD 0 ;UNIT 0 VECTOR
1095      002226 000000 UIUCT: .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)SEEN/ 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 WTRT: .WORD 0 ;WRITE RETRY COUNT
1133      002330 000000 DDERCT: .WORD 0 ;D.D. ERR RETRY COUNT
1134      ;-----

```

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 23
GLOBAL DATA SECTION

1137
1138 002332 000000
1139 002334 177777
1140 002336 177777
1141 002340 177777
1142 002342 177777
1143 002344 177777

```
-----
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
&         -+-----+-----+-----+-----+
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 - DAT CK CRC SEK
          SET!ITR!DON! ERR!
          -----
ERRSY:    UNR! TO!DEN!DEN!SYS!DAG! - WRONG DON!SID!DRV!NO!DONE! FUNCTION
          ERR!ERR!ERR!ERR!ERR!ERR!SID!DRV! #2!ERR!ERR!FUN!INT! CAUSING
          -----
          -----
RETRY:    CRC!DAT!RD!WRT!SEK
          RT! RT! RT! RT! RT!
          -----
```

NOTE: RXXX IS REFERENCE FOR FURTHER EXPANSION

1178
1179
1180
1181
1182

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 25
GLOBAL TEXT SECTION

```
1198 .SBTTL GLOBAL TEXT SECTION
1199
1200 :++
1201 : THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
1202 : MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
1203 : MORE THAN ONE TEST.
1204 :--
1205
1206 :
1207 : NAMES OF DEVICES SUPPORTED BY PROGRAM
1208 :
1209 002346 DEVTYP <RX02>
1215
1216 :
1217 : FORMAT STATEMENTS USED IN PRINT CALLS
1218 :
1219
1226
1227
```

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 27
GLOBAL ERROR REPORT SECTION

```

1237 .SBTTL GLOBAL ERROR REPORT SECTION
1238
1239 :++
1240 : THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
1241 : THAT ARE USED IN MORE THAN ONE TEST. IT ALSO INCLUDES THE ASCII MESSAGES
1242 : THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
1243 :--
1244
1245 .SBTTL - MOD U.SFT.ERR - ERROR REPORT
1246 -----
1247 002354 012737 004506 002402 ERROR: MOV #NONE,ERRBLK ;SETUP ERROR BLOCK CODE
1248 002362 013737 002334 002074 MOV UNIT,L$LUN ;SETUP LUN FOR PRINT
1249 002370 ERROR
1250 002372 000207 RETURN
1251 -----
1252 002374 ERRIBL
1253 002374 000000 ERRIBL: .WORD 0
1254 002376 000000 ERRIBL: .WORD 0
1255 002400 000000 ERRIBL: .WORD 0
1256 002402 000000 ERRIBL: .WORD 0
1257 -----
1258 .SBTTL - MOD U.PRT.ERR - PRINT ERRORS
1259 -----
1260 002404 PRTER: PRINTB #IDENT1,UNIT,CSRUT,ESRUT,CMD
1261 002444 005737 002272 IFAP: TST PRTECD ;IF ERR CODE FLAG
1262 002450 001452 BEQ ENDUP ;SET, THEN
1263 002452 PRINTX #XER1,<B,XERUT>,<B,WC>,<B,CTK0>,<B,CTK1>
1264 002522 PRINTX #XER2,<B,TTRK>,<B,TSEC>,<B,SFTSTS>,<B,BTRK>
1265 002572 005037 002272 CLR PRTECD ;CLEAR ERR CODE FLAG
1266 002576 005037 002604 ENDUP: CLR ERRREG ;CLEAR ERR REGISTER
1267 002602 000207 RTS PC ;RETURN
1268 -----
1269 002604 000000 ERRREG: 0
1270 -----
1271 002606 045 101 040 IDENT1: .ASCIIZ /% UNIT#%01% RXCSR=%0% RXESR=%0% CMD=%0%N/
1272 002663 045 101 040 XER1: .ASCIIZ /% ERCD=%03% WC=%03% CTRK0=%D2% CTRK1=%D2%./
1273 002744 045 101 040 XER2: .ASCIIZ /% TTRK=%D2% TSEC=%D2% SFTSTAT=%03% BTRK=%D2%.%N/
1274 .EVEN
;MOD U.PRT.ERR ----- END MODULE -----

```

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 29
 - MOD U.PRT.ERR - PRINT ERRORS

```

1277
1278
1279
1280
1281 003034 105737 033544
1282 003040 001424
1283 003042 013701 033544
1284 003046 042701 177400
1285 003052 006201
1286 003054 006201
1287 003056 062701 003114
1288 003062 011137 003114
1289 003066
1290 003106 105037 033544
1291 003112 000207
1292
1293
1294 003114 000000
1295
1296
1297 003116 003170
1298 003120 003236
1299 003122 003304
1300 003124 003332
1301 003126 003400
1302 003130 003451
1303 003132 003477
1304 003134 003555
1305 003136 003603
1306 003140 003660
1307 003142 003714
1308 003144 003773
1309 003146 004021
1310 003150 004107
1311 003152 004153
1312 003154 004207
1313 003156 004254
1314 003160 004311
1315 003162 004360
1316 003164 004413
1317 003166 004442
1318

.SBTTL - MOD U.PRT.EC - PRINT UNIT ERROR CODE
;-----
XERPRT: TSTB XERUUT ;IF ERROR
        BEQ ENDXER ;NOT=0, THEN
        MOV XERUUT,R1 ;SAVE EXTENDED ERR CODE IN TEMP #1
        BIC #177400,R1 ;CLR TOP BYTE
        ASR R1 ;FORMAT E.C.
        ASR R1 ;FORMAT E.C. FOR ADR
        ADD #ECTAB-2,R1 ;FIND ADR OF ERROR MSG
        MOV (R1),EXMSG ;SET ADR OF ERROR MSG FOR PRINT
        PRINTX EXMSG ;PRINT UNIT CODE ERROR MSG
        CLRB XERUUT ;CLEAR ERROR CODE
ENDXER: RTS PC ;RETURN
;-----
EXMSG: 0 ;MSG ADR FOR PRINT
;-----
ECTAB: .WORD EC1
        .WORD EC2
        .WORD EC3
        .WORD EC4
        .WORD EC5
        .WORD EC6
        .WORD EC7
        .WORD EC10
        .WORD EC11
        .WORD EC12
        .WORD EC13
        .WORD EC14
        .WORD EC15
        .WORD EC16
        .WORD EC17
        .WORD EC20
        .WORD EC21
        .WORD EC22
        .WORD EC23
        .WORD EC24
        .WORD EC25
;-----

```

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 31
 - MOD U.PRT.EC - PRINT UNIT ERROR CODE

```

1321
1322 003170      045      101      040 EC1:  .ASCIIZ  /%A  >NO HOME ON INITIALIZE-DRV #0.%N/
1323 003236      045      101      040 EC2:  .ASCIIZ  /%A  >NO HOME ON INITIALIZE-DRV #1.%N/
1324 003304      045      101      040 EC3:  .ASCIIZ  /%A  >ILL ERR CODE.%N/
1325 003332      045      101      040 EC4:  .ASCIIZ  /%A  >TRIED TO ACCESS A TRACK > 76.%N/
1326 003400      045      101      040 EC5:  .ASCIIZ  /%A  >HOME FOUND BEFORE DESIRED TRACK.%N/
1327 003451      045      101      040 EC6:  .ASCIIZ  /%A  >ILL ERR CODE.%N/
1328 003477      045      101      040 EC7:  .ASCIIZ  /%A  >52 HEADERS PASSED & SECTOR NOT FOUND.%N/
1329 003555      045      101      040 EC10: .ASCIIZ  /%A  >ILL ERR CODE.%N/
1330 003603      045      101      040 EC11: .ASCIIZ  /%A  >NO SEPCLOCK SEEN IN 40 MICROSECONDS.%N/
1331 003660      045      101      040 EC12: .ASCIIZ  /%A  >PREAMBLE NOT FOUND.%N/
1332 003714      045      101      040 EC13: .ASCIIZ  /%A  >PREAMBLE FOUND BUT NO ID MARK IN TIME.%N/
1333 003773      045      101      040 EC14: .ASCIIZ  /%A  >ILL ERR CODE.%N/
1334 004021      045      101      040 EC15: .ASCIIZ  /%A  >GOOD TRACK ADDRESS HEADER NOT=SELECTED TRACK.%N/
1335 004107      045      101      040 EC16: .ASCIIZ  /%A  >TOO MANY TRIES FOR AN IDAM.%N/
1336 004153      045      101      040 EC17: .ASCIIZ  /%A  >NO DATA AM IN TIME.%N/
1337 004207      045      101      040 EC20: .ASCIIZ  /%A  >CRC ERROR ON READING SECTOR.%N/
1338 004254      045      101      040 EC21: .ASCIIZ  /%A  >UNASSIGNED ERR CODE.%N/
1339 004311      045      101      040 EC22: .ASCIIZ  /%A  >R-W ELECT. FAILED MAINT. TEST.%N/
1340 004360      045      101      040 EC23: .ASCIIZ  /%A  >WORD CNT OVERFLOW.%N/
1341 004413      045      101      040 EC24: .ASCIIZ  /%A  >DENSITY ERROR.%N/
1342 004442      045      101      040 EC25: .ASCIIZ  /%A  >SET DENSITY WRONG KEY WORD.%N/
1343          .EVEN
1344
1345
1346          .SBTTL -      ERROR PRINT CALLS/MSG CALLS
1347
1348 004506          BGNMSG  NONE
1349 004506          ENDMSG
1350
1351          .
1352          BGNMSG  PRTB1
1353 004510          CALL    PRTB1S
1354 004510 004737 004536
1355 004514          ENDMSG
1356
1357          .
1358 PRTB0S: PRINTB  R1
1359          RETURN
1360
1361          .
1362 PRTB1S: PRINTB  R1,R2
1363          RETURN
1364
1365          .
1366
1367
1368
1369
1370
1371
1372
1373
1374 004536 000207
1375 004556 000207
1376

```

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 33
GLOBAL SUBROUTINES SECTION

1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1395
1401
1408
1414
1421
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.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 -----
RANGEN: MOV #1,R0
ADD RAN1,R0
ADD RAN2,R0
BIC #170000,R0
CLC
ROL R0
ROL R0
MOV R0,RAN1
CLR R0
MOV RAN2,R0
ROR R0
ROR R0
ADD RAN1,R0
BIC #170000,R0
MOV R0,RAN2
MOV R0,RANUM
RTS PC

RAN1: 0
RAN2: 0
RANUM: 0

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 35
 - MOD U.A.1 - CONVERSION UUT CODE --> SUTPTR

```

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      #U100,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 -----

```

GLOBAL AREAS MACRO M1200 15-DEC-82 13:50 PAGE 37
 - MOD U.DEV.REC - DEVICE READ ERROR CODE

```

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,PRTCD      ;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

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 38
 - MOD U.DEV.REC - DEVICE READ ERROR CODE

```

1567      .TITLE MISCELLANEOUS SECTIONS
1568      .SBTTL  REPORT CODING SECTION
1605
1606 005140      BGNMOD
1607
1608      :++
1609      : THE REPORT CODING SECTION CONTAINS THE
1610      : "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
1611      :--
1612
1613      :-----
1614 005140      BGNRPT
1615 005140      000240      REPORT: NOP
1616 005142      012737      006074      005504      MOV      #PT20SP,PRT1      :SETUP CTR HDR
1617 005150      012737      006274      005506      MOV      #PTUNT2,PRT2
1618 005156      004737      005414      CALL      PRTHDR      :PRINT HEADER
1619 005162      004737      005646      CALL      PRTCTR      :PRINT SEQ CTR
1620 005166      012737      006105      005504      MOV      #PT19SP,PRT1      :SETUP REPORT HEADER PART 1
1621 005174      012737      006253      005506      MOV      #PTUNT1,PRT2
1622 005202      004737      005414      CALL      PRTHDR      :PRINT HEADER
1623 005206      000240      NOP      :SETUP DATA PART 1
1624 005210      005037      005636      CLR      LINECT      :ZERO LINE COUNTER
1625 005214      005037      005644      CLR      PRNUM      :CLEAR PRINT MODE
1626 005220      012702      007354      MOV      #CKSML,R2      :SET BEGIN ADR OF DATA-PART 1
1627 005224      012701      006360      MOV      #PRIDXX,R1      :SET BEGIN ADR OF TABLE LABLES-PART 1
1628 005230      012737      000023      005640      MOV      #19.,LINES      :SET # OF LINES TO PRINT
1629 005236      004737      005510      CALL      PRDAT      :PRINT DATA
1630 005242      012737      006200      005504      MOV      #PTEC,PRT1      :SETUP HEADER PART 2
1631 005250      012737      006253      005506      MOV      #PTUNT1,PRT2
1632 005256      004737      005414      CALL      PRTHDR      :PRINT HEADER
1633 005262      000240      NOP      :SETUP DATA PART 2
1634 005264      012737      000001      005636      MOV      #1,LINECT      :SET LINE COUNTER=1
1635 005272      012737      000001      005644      MOV      #1,PRNUM      :SET PRINT MODE=1
1636 005300      012702      007604      MOV      #ECLOG,R2      :SET BEGIN ADR ERROR CODE DATA-PART 2
1637 005304      012701      006327      MOV      #PTECN,R1      :SET ERROR CODE PRINT-FORMATED MSG-PART 2
1638 005310      012737      000027      005640      MOV      #23.,LINES      :SET # OF LINES TO PRINT
1639 005316      012737      006327      005642      MOV      #PTECN,LINTYP
1640 005324      004737      005510      CALL      PRDAT      :PRINT DATA
1641 005330      012737      006225      005504      MOV      #PTTK,PRT1      :SETUP HEADER PART 3
1642 005336      012737      006253      005506      MOV      #PTUNT1,PRT2
1643 005344      004737      005414      CALL      PRTHDR      :PRINT HEADER
1644 005350      005037      005636      CLR      LINECT
1645 005354      012737      000001      005644      MOV      #1,PRNUM
1646 005362      012702      010070      MOV      #TKXX,R2      :SETUP DATA PART 3
1647 005366      012737      000115      005640      MOV      #77.,LINES
1648 005374      012737      006343      005642      MOV      #PTKN,LINTYP
1649 005402      004737      005510      CALL      PRDAT      :PRINT DATA PART 3
1650 005406      ENDRPT: ENDRPT
1651      :-----
1652 005410      000000      UTTST: 0      :UNIT #
1653 005412      000000      UTCNT: 0      :UNIT COUNT
1654      :-----

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 40
- PRINT REPORT HEADER

```

1657 .SBTTL - PRINT REPORT HEADER
1658 -----
1659 005414 005003 PRTHDR: CLR R3 ;
1660 005416 013705 005504 MOV PRT1,R5 ;SETUP 1ST PART OF HEADER PRINT
1661 005422 004737 006030 CALL PREPT2 ;PRINT 1ST PART
1662 005426 012737 002336 005410 MOV #UT00,UTTST ;GET BEGIN ADR OF UNITS-->TESTED FLAGS
1663 005434 012737 000004 005412 MOV #4,UTCNT ;SET UNIT COUNTER
1664 005442 005777 177742 1$: TST @UTTST ;IF UNIT TESTED FLAG
1665 005446 100407 BMI 2$ ;NOT=-1, THEN
1666 005450 017737 177734 006026 MOV @UTTST,PAR ;SET UNIT TESTED # FOR PRINT
1667 005456 013705 005506 MOV PRT2,R5 ;SET UNIT MSG
1668 005462 004737 006002 CALL PREPT1 ;PRINT UNIT #
1669 005466 062737 000002 005410 2$: ADD #2,UTTST ;ADVANCE ADR OF UNIT TESTED FLAG
1670 005474 005337 005412 DEC UTCNT ;DECREMENT UNIT COUNT
1671 005500 001360 BNE 1$ ;IF UNIT COUNT=0, THEN
1672 005507 000207 RTS PC ;RETURN
1673 -----
1674 005500 000000 PRT1: 0 ;
1675 005506 000000 PRT2: 0 ;
1676 -----
1677 .SBTTL - PRINT REPORT DATA
1678 -----
1679 PRDAT: NOP ;
1680 005510 000240 1$: TST PRNUM ;IF MODE
1681 005512 005737 005644 BEQ 2$ ;
1682 005516 001410 MOV LINECT,PAR ;SETUP LINE # TO PRINT
1683 005520 013737 005636 006026 MOV LINTYP,R5 ;SETUP LINE TYPE TO PRINT
1684 005526 013705 005642 CALL PREPT1 ;PRINT LINE #
1685 005532 004737 006002 BR 3$ ;
1686 005536 000403 2$: MOV (R1)+,R5 ;SETUP LOG TITLE ADR
1687 005540 012105 CALL PREPT2 ;PRINT LOG TITLES
1688 005542 004737 006030 3$: MOV #UT00,UTTST ;GET UNIT # FOR PRINT
1689 005546 012737 002336 005410 MOV #4,UTCNT ;SETUP UNIT COUNT
1690 005554 012737 000004 005412 4$: MOV (R2)+,PAR ;SETUP DATA TO PRINT
1691 005562 012237 006026 TST @UTTST ;IF UNIT # NOT = -1
1692 005566 005777 177616 BMI 5$ ;THEN
1693 005572 100404 MOV #PTDAT1,R5 ;SETUP TO PRINT
1694 005574 012705 CALL PREPT1 ;PRINT DATA
1695 005600 004737 006002 5$: ADD #2,UTTST ;SETUP TO CK NEXT UNIT
1696 005604 062737 000002 005410 DEC UTCNT ;DECREMENT UNIT COUNT
1697 005612 005337 005412 BNE 4$ ;IF DONE ALL UNITS THEN
1698 005616 001361 INC LINECT ;INCREMENT LINE COUNT
1699 005620 005237 005636 005636 CMP LINES,LINECT ;IF DONE ALL
1700 005624 023737 005640 1$ BHI 1$ ;LINES, THEN
1701 005632 101327 RTS PC ;RETURN
1702 005634 000207 -----
1703 LINECT: 0 ;LINE COUNTER
1704 005636 000000 LINES: 0 ;# OF LINES TO PRINT
1705 005640 000000 LINTYP: 0 ;LINE PRINT TYPE.
1706 005642 000000 PRNUM: 0 ;PRINT MODE
1707 005644 000000 -----
1708 ;

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 42
- PRINT READ/WRITE SECTOR COUNTERS

```

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      ;-----

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 44
- PRINT REPORT TYPE 1

1742					.SBTTL - PRINT REPORT TYPE 1
1743					-----
1744	006002				PREPT1: PRINTS R5,PAR
1745	006024	000207			RTS PC ;
1746					-----
1747	006026	000000			PAR: 0 ;
1748					-----
1749					
1750					
1751					
1752					
1753					
1754					.SBTTL - PRINT REPORT TYPE 2
1755					-----
1756	006030				PREPT2: PRINTS R5
1757	006046	000207			RTS PC
1758					-----
1759					
1760					
1761					
1762					
1763					
1764					.SBTTL - PRINT REPORT TYPE 3
1765					-----
1766	006050				PREPT3: PRINTS R5,R4,R3
1767	006072	000207			RETURN
1768					-----
1769	006074	045	116	045	PT20SP: .ASCIZ /XNXNS20/
1770	006105	045	116	045	PT19SP: .ASCIZ /XNXNS19/
1771	006116	045	116	045	PTRDSC: .ASCIZ /XNXA# SECTOR READS (8)=/
1772	006147	045	116	045	PTWTSC: .ASCIZ /XNXA# SECTOR WRITES (8)=/
1773	006200	045	116	045	PTEC: .ASCIZ /XNXNZAERRXNXACODE# /
1774	006225	045	116	045	PTTK: .ASCIZ /XNXNZATRACK# /
1775	006243	045	101	040	PTDAT1: .ASCIZ /XA XD6/
1776	006253	045	123	061	PTUNT1: .ASCIZ /XS1XAUNIT#XD1XS1/
1777	006274	045	123	062	PTUNT2: .ASCIZ /XS2XAUNIT#XD1XS5/
1778	006315	045	123	062	PTFMN1: .ASCIZ /XS2X06X05/
1779	006327	045	116	045	PTECN: .ASCIZ /XNX02XA0XS3/
1780	006343	045	116	045	PTTKN: .ASCIZ /XNXS1XD2XS3/
1781					.EVEN
1782					-----

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 46
 PRINT REPORT TYPE 3

```

1785
1786 006360 006426
1787 006362 006455
1788 006364 006504
1789 006366 006533
1790 006370 006562
1791 006372 006611
1792 006374 006640
1793 006376 006667
1794 006400 006716
1795 006402 006745
1796 006404 006774
1797 006406 007023
1798 006410 007052
1799 006412 007101
1800 006414 007130
1801 006416 007157
1802 006420 007206
1803 006422 007235
1804 006424 007264
1805
1806
1807
1808 006426 045 116 045
1809 006455 045 116 045
1810 006504 045 116 045
1811 006533 045 116 045
1812 006562 045 116 045
1813 006611 045 116 045
1814 006640 045 116 045
1815 006667 045 116 045
1816 006716 045 116 045
1817 006745 045 116 045
1818 006774 045 116 045
1819 007023 045 116 045
1820 007052 045 116 045
1821 007101 045 116 045
1822 007130 045 116 045
1823 007157 045 116 045
1824 007206 045 116 045
1825 007235 045 116 045
1826 007264 045 116 045
1827
1828

```

```

-----
PRIDXX: .WORD PRID01
        .WORD PRID02
        .WORD PRID03
        .WORD PRID04
        .WORD PRID05
        .WORD PRID06
        .WORD PRID07
        .WORD PRID08
        .WORD PRID09
        .WORD PRID10
        .WORD PRID11
        .WORD PRID12
        .WORD PRID13
        .WORD PRID14
        .WORD PRID15
        .WORD PRID16
        .WORD PRID17
        .WORD PRID18
        .WORD PRID19
-----
PRID01: .ASCII /%ZACHECK SUM: /
PRID02: .ASCII /%ZAFILL-EMP BUFF LOG:/
PRID03: .ASCII /%ZANO ERR BIT: /
PRID04: .ASCII /%ZAIINTER-NO DONE ERR:/
PRID05: .ASCII /%ZAIINTERRUPT ERR: /
PRID06: .ASCII /%ZASEEK: /
PRID07: .ASCII /%ZACRC ERR: /
PRID08: .ASCII /%ZACRC BAD: /
PRID09: .ASCII /%ZAREAD ERR: /
PRID10: .ASCII /%ZAWRITE ERR: /
PRID11: .ASCII /%ZADATA ERR: /
PRID12: .ASCII /%ZADEL. DATA ERR: /
PRID13: .ASCII /%ZAHRD SEEK: /
PRID14: .ASCII /%ZAHRD CRC ERR: /
PRID15: .ASCII /%ZAHRD CRC BAD: /
PRID16: .ASCII /%ZAHRD READ: /
PRID17: .ASCII /%ZAHRD WRITE: /
PRID18: .ASCII /%ZAHRD DATA: /
PRID19: .ASCII /%ZAHRD DEL. DATA ERR:/
        .EVEN
-----

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 48
- STATISTICAL TABLES

```

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      .EVEN
1872
1873      .SBTTL LOAD DEVICE PROTECTION
1874      ;-----
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      ;-----

```

MISCELLANEOUS SECTIONS
LOAD DEVICE PROTECTION

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```

1884
1885
1886 .SBTTL INITIALIZE SECTION
1887 :*****
1888 : THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
1889 : AT THE BEGINNING OF EACH PASS. PRI07 HAS BEEN CHANGED TO PRI06
1890 : TO MAKE THIS DIAGNOSTIC SBC-11/21 PROCESSOR SPECIFIC.
1891 :-----
1891 011250          BGNINIT
1892 011250 005037 002266 INIT: CLR     FLAGS           ;CLEAR ALL FLAGS
1897 011254          RFLAGS  FLGDRS       ;GET 'DRS' FLAGS
1898 011262          READEF  #EF.PWR      ;IF POWER FAIL FLAG IS
1899 011270          BNCOMPLETE 1$        ;SET, THEN
1900 011272 052737 000001 002266 BIS     #POWERF,FLAGS ;SET POWER FAIL FLAG
1901 011300 000507          BR      FIN    ;BR TO 'FIN'
1902 011302          READEF  #EF.START    ;IF START FLAG
1903 011310          BNCOMPLETE 2$        ;SET, THEN
1904 011312 005037 002220 CLR     U0ADR    ;CLEAR SYS U0 ADDRESS
1905 011316 005037 002222 CLR     U1ADR    ;CLEAR SYS U1 ADDRESS
1906 011322 005037 002224 CLR     U0VECT  ;CLEAR SYS U0 VECTOR
1907 011326 005037 002226 CLR     U1VECT  ;CLEAR SYS U1 VECTOR
1908 011332 005037 002232 CLR     SUT     ;CLEAR SYS UNDER TST WORD
1909 011336 023727 002012 000004 CMP     LSUNIT,#4    ;IF 4 UNITS OR LESS SELECTED
1910 011344 003051          BGT     INITER  ;THEN
1911 011346          READEF  #EF.RESTART  ;IF RESTART FLAG
1912 011354          BNCOMPLETE SETUP    ;SET, THEN
1913 011356 052737 000002 002266 BIS     #RESTART,FLAGS ;SET RESTART FLAG
1914 011364 005037 002270          CLR     ABORT    ;CLEAR ABORT FLAG
1915 011370 012737 177777 002334 MOV     #-1,UNIT  ;RESTORE UNIT # CTR
1916 011376 012737 177777 002336 MOV     #-1,U00    ;RESET UNIT#1
1917 011404 012737 177777 002340 MOV     #-1,U01    ;RESET UNIT#2
1918 011412 012737 177777 002342 MOV     #-1,U10    ;RESET UNIT#3
1919 011420 012737 177777 002344 MOV     #-1,U11    ;RESET UNIT#4
1920 011426 062737 000001 002334 1$: ADD     #1,UNIT  ;INCREMENT TO NEXT UNIT
1921 011434 023737 002012 002334 CMP     LSUNIT,UNIT ;IF LOGICAL UNIT & UNIT
1922 011442 001426          BEQ     FIN      ;NOT YET EQUAL, THEN
1923 011444          GPHARD  UNIT,PLOC    ;GET HARDWARE P-TABLE
1924 011456          BNCOMPLETE 1$        ;IF P-TABLE AVAILABLE, THEN
1925 011460 000240          NOP            ;
1926 011462 004737 011656 JSR     PC,UNPKHP ;CALL UNPACK HARDWARE P-TABLE
1927 011466 000757          BR      1$      ;BR TO BEGIN DO
1928 011470          INITER: PRINTF  #INTER1 ;PRINT 'TOO MANY UNITS'
1929 011510 012737 000001 002270 MOV     #1,ABORT ;SET ABORT
1930 011516          DOCLN          ;DO CLEAN UP
1931 011520          FIN: SETVEC  U0VECT,#INTH0,#PRI06 ;SET SYS U0 VECTOR
1932 011546 005737 002226 TST     U1VECT  ;IF SYS U1 VECTOR
1933 011552 001413          BEQ     2$      ;NOT=0, THEN
1934 011554          1$: SETVEC  U1VECT,#INTH1,#PRI06 ;SET SYS U1 VECTOR
1935 011602          2$: ENDINIT
1955
1956 011604 000000 PLOC: .WORD 0
1957
1958 011606 045 116 045 INTER1: .ASCIIZ /%N%ONLY FOUR UNITS ALLOWED, START OVER/
1959 .EVEN
1960
;-----

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 52
 - MOD I.1 - UNPACK HARDWARE P-TABLES

```

1963      .SBTTL - MOD I.1 - UNPACK HARDWARE P-TABLES
1964      ;-----
1965
1966 011656 000240 UNPKHP: NOP      ;
1967 011660 005037 012330 CLR      ;CLEAR UNIT
1968 011664 013701 011604 MOV      ;SAVE P-TABLE LOCATION
1969 011670 005737 002334 IFAI1: TST  UNIT  ;IF UNIT
1970 011674 001005      BNE      ;IS ZERO
1971 011676 012137 002220 MOV      ;LOAD UNIT #0 ADR
1972 011702 012137 002224 MOV      ;LOAD UNIT #0 VECTOR
1973 011706 000426      BR      ;BR TO END IF 'A'
1974 011710 021137 002220 IFBI1: CMP  (R1),UOADR ;IF THIS ADR
1975 011714 001003      BNE      ;EQUALS UNIT #0 ADR
1976 011716 062701 000004 ADD      ;INCREMENT TEMP #1 BY 4
1977 011722 000420      BR      ;BR TO END IF 'A'
1978 011724 005737 002222 IFCI1: TST  U1ADR  ;IF U1 ADDRESS
1979 011730 001005      BNE      ;NOT LOADED PREVIOUSLY
1980 011732 012137 002222 MOV      ;LOAD UNIT#1 ADR
1981 011736 012137 002226 MOV      ;LOAD UNIT #1 VECTOR
1982 011742 000405      BR      ;BR TO END IF 'C'
1983 011744 021137 002222 IFDI1: CMP  (R1),U1ADR ;IF UNIT ADR
1984 011750 001153      BNE      ;EQUALS UNIT #1 ADR
1985 011752 062701 000004 ADD      ;THEN ADD 4 TO TEMP #1
1986 011756 012737 000001 012330 EICI1: MOV  #1,UNT ;SET UNT=1
1987 011764 005737 002172 IFEI1: TST  RXXX  ;IF RXXX
1988 011770 001445      BEQ      ;THEN
1989 011772 005711      IFFI1: TST  (R1)  ;IF DRIVE #0
1990 011774 001021      BNE      ;THEN
1991 011776 062701 000002 IFGI1: ADD  #2,R1  ;ADD 2 TO TEMP #1
1992 012002 005711      TST  (R1)  ;IF SIDE #0 SELECTED
1993 012004 001006      BNE      ;THEN
1994 012006 052737 000001 002232 BIS  #BIT0,SUT ;SET SIDE #0, DRIVE #0
1995 012014 005037 012326 CLR      ;CLEAR UNIT CODE
1996 012020 000501      BR      ;BR TO END IF 'F'
1997 012022 052737 000004 002232 ELGI1: BIS  #BIT2,SUT ;SET SIDE #1, DRIVE #0
1998 012030 012737 000002 012326 MOV  #2,UNTCOD ;SET UNIT CODE = 10
1999 012036 000472      BR      ;BR TO END IF 'F'
2000 012040 062701 000002 IFHI1: ADD  #2,R1  ;ADD 2 TO TEMP #1
2001 012044 005711      TST  (R1)  ;IF SIDE #0 SELECTED
2002 012046 001007      BNE      ;THEN
2003 012050 052737 000002 002232 BIS  #BIT1,SUT ;SET SIDE #0, DRIVE #1
2004 012056 012737 000001 012326 MOV  #1,UNTCOD ;SET UNIT CODE = 01
2005 012064 000457      BR      ;BR TO END IF 'F'
2006 012066 052737 000010 002232 ELHI1: BIS  #BIT3,SUT ;SET SIDE #1, DRIVE #1
2007 012074 012737 000003 012326 MOV  #3,UNTCOD ;SET UNIT CODE = 11
2008 012102 000450      BR      ;BR TO END IF 'F'
2009 012104 062701 000002 IFJI1: ADD  #2,R1  ;ADD 2 TO R1
2010 012110 005711      TST  (R1)  ;IF SIDE
2011 012112 001056      BNE      ;EQUALS 0, THEN
2012 012114 162701 000002 IFJ11: SUB  #2,R1  ;SUBTRACT 2 FROM TEMP #1
2013 012120 005711      TST  (R1)  ;IF DRIVE
2014 012122 001020      BNE      ;EQUALS ZERO, THEN
2015 012124 005737 012330 IFKI1: TST  UNT  ;IF UNIT
2016 012130 001006      BNE      ;EQUALS ZERO
2017 012132 052737 000001 002232 BIS  #BIT0,SUT ;SET UNIT #0, DRIVE #0
2018 012140 005037 012326 CLR      ;CLEAR UNIT CODE
2019 012144 000427      BR      ;BR TO END IF 'F'

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 52-1
 - MOD 1.1 - UNPACK HARDWARE P-TABLES

```

2020 012146 052737 000004 002232 ELK11: BIS #BIT2,SUT ;SET UNIT #1, DRIVE #0
2021 012154 012737 000002 012326      MOV #2,UNTCOD ;SET UNIT CODE = 10
2022 012162 000420      BR EIF11 ;BR TO END IF 'F'
2023 012164 005737 012330      IFL11: TST UNT ;IF UNIT
2024 012170 001007      BNE ELL11 ;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 EIF11 ;BR TO END IF 'F'
2028 012210 052737 000010 002232 ELL11: BIS #BIT3,SUT ;SET UNIT #1, DRIVE #1
2029 012216 012737 000003 012326      MOV #3,UNTCOD ;SET UNIT CODE = 11
2030 012224 012701 002336      EIF11: MOV #UT00,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: 5
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 END11 ;BR TO END MOD
2037 012250      ELI11: PRINTF #INMSG2,UNIT ;PRINT "MUST SELECT RXXX TO SEL SIDE"
2038 012274      DOCLN
2039 012276 000412      BR END11 ;BR TO END MOD
2040 012300      ELD11: PRINTF #INMSG3,UNIT ;PRINT "NOT SCHEDULED-TWO BUS ADR ONLY"
2041 012324 000207      END11: 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: .ASCII /%N%AUNIT#%D1%A ANS RXXX EXPANSION TO SELECT SIDE #1->START OVER/
2047 012432 045 116 045 INMSG3: .ASCII /%N%AUNIT#%D1%A NOT SCHEDULED-TWO BUS ADDRESSES ONLY%N/
2048      .EVEN
2049      :MOD 1.1 ----- END MODULE -----

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 54
CLEANUP CODING SECTION

```
2052      .SBTTL  CLEANUP CODING SECTION
2053
2054      :++
2055      : THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
2056      : AT THE END OF EACH PASS.
2057      :--
2058
2059 012522      BGNCLN
2060 012522      NOP
2061      000240
2062      012524      CLRVEC  UOJECT
2063      012532      TST      U1JECT
2064      005737      BEQ      2$
2065      012536      CLRVEC  U1JECT
2066      001403      BRESET
2067      012540      2$:
2068      012546      ENDCLN
2069      012550
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086      .EVEN
```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 56
 AUTO DROP SECTION

```

2089      .SBTTL 'AUTO DROP SECTION
2090      ;-----
2091      BGNAUTO
2092      012552 005737 002220 IAATDP: TST    UOADR      ; 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    UOADR,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 UNIT 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    UOADR      ; 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      ;-----

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 58
- TEST 0: ADDRESSING TEST

```

2136 .SBTTL - TEST 0: ADDRESSING TEST
2137 -----
2138 BGNSUB
2139 IF FUNCTION TEST
2140 : THEN-SETUP TEST
2141 : SETUP BUS TRAPS
2142 : READ RXCSR
2143 : RESET BUS TRAPS
2144 : IF TRAP
2145 : : THEN-SET SYSTEM FATAL FLAG
2146 : : CALL FUNCTION TEST ERROR
2147 : : REPORT BUS TRAP ON RXCSR
2148 : ENDIF
2149 ENDIF
2150 ENDSUB
2151 -----
2152
2153 012774 000240 ADRTST: NOP ;
2154 012776 005037 002270 CLR ABORT ;CLEAR ABORT FLAG
2155 013002 SETVEC #BTRP4,#TRAP,#PRI06
2156 013030 011201 MOV (R2),R1 ;READ RXCSR
2157 013032 CLRVEC #BTRP4
2158 013040 005737 002270 TST ABORT ;IF ABORT FLAG
2159 013044 001426 BEQ 2$ ;SET, THEN
2160 013046 012701 013144 MOV #TRPMS1,R1 ;SET TRAP MESSAGE
2161 013052 012337 002074 MOV (R3)+,L$LUN ;IF UNIT
2162 013056 100005 BPL 1$ ;NOT SELECTED, THEN
2163 013060 011337 002074 MOV (R3),L$LUN ;IF NEXT UNIT
2164 013064 100002 BPL 1$ ;NOT SELECTED, THEN
2165 013066 005037 002074 CLR L$LUN ;CLEAR UNIT
2166 013072 012737 000620 002376 1$: MOV #400,ERRNBR ;SETUP ERR NBR = ADR ERR
2167 013100 012737 013124 002400 MOV #TOMSG,ERRMSG ;SETUP ERROR MSG
2168 013106 012737 004510 002402 MOV #PRTB1,ERRBLK ;SETUP ERROR BLK
2169 013114 005037 002374 CLR ERRTP ;SETUP ERR TYP = SYS FTL
2170 013120 ERROR ;CALL ERROR
2171 013122 000207 2$: RETURN ;RETURN
2172 -----
2173 013124 101 104 104 TOMSG: .ASCIIZ /ADDRESSING TEST/
2174 013144 045 101 040 TRPMS1: .ASCII /%A BUS TRAP AT ADDRESS:%06%N/
2175 013200 045 101 040 .ASCIIZ /%A INTERFACE BAD OR NOT SET TO ABOVE ADDRESS%N/
2176 .EVEN

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 60
 - MOD U.SFT.TRP - BUS TRAP HANDLER

```

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      ;-----

```

MISCEL NF'S SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 62
DROP UNIT SECTION

```

2199          .SBTTL  DROP UNIT SECTION
2200
2201          :++
2202          : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
2203          : TO NO LONGER BE TESTED.
2204          :--
2205
2211
2212 013274          BGNDU
2213
2214 013274 010037 013436      MOV      R0,UNITDP      ;GET LOGICAL UNIT #
2215 013300 005002           CLR      R2              ;LET R2=UNIT CODE# & UNIT COUNT /CLEAR IT!
2216 013302 012701 002336      MOV      #UT00,R1      ;GET BEGIN UNIT CODE ADRESS
2217 013306 023721 013436      1$:      CMP      UNITDP,(R1)+  ;IF USER UNIT#
2218 013312 001417           BEQ      2$              ;IS = UNIT CODE - UNIT#
2219 013314 005202           INC      R2              ;INCREMENT UNIT CODE# & UNIT COUNT
2220 013316 022702 000005      CMP      #5,R2          ;IF MAX # OF UNITS
2221 013322 101371           BHI      1$              ;EXCEEDED, THEN
2222 013324           PRINTF  #DMSG2,UNITDP      ;PRINT UNIT# NOT FOUND
2223 013350 000431           BR       3$              ;BR TO EXIT
2224 013352 012741 177777      2$:      MOV      #-1,-(R1)  ;DESELECT UNIT
2225 013356 010237 004752      MOV      R2,CVUNIT      ;SET UNIT CODE FOR CONVERSION
2226 013362 004737 004654      CALL     CVUTST          ;CALL MOD U.A.1 CONVERT UNIT# TO SUT CODE
2227 013366 013737 004754 013440      MOV      SUTCV,SUTDRP  ;SET SUT DROP CODE = SUT CONVERTED CODE
2228 013374 043737 013440 002232      BIC      SUTDRP,SUT      ;DROP UNIT SPEC IN SUTDRP
2229 013402 043737 013440 002230      BIC      SUTDRP,SDD      ;CLEAR UNIT SPEC IN SUT DROP
2230 013410      PRINTF  #DMSG1,UNITDP
2231
2232 013434      3$:      ENDDU
2233
2234 013436 000000      UNITDP: 0          ;UNIT TO BE DROPPED
2235 013440 000000      SUTDRP: 0         ;SYS UNDER TST, DROP BIT
2236
2237 013442      045      116      045      DMSG1: .ASCIIZ  /%NZA DROP UNIT#%D1ZA FROM TESTZN/
2238 013503      045      116      045      DMSG2: .ASCIIZ  /%NZA COULD NOT DROP UNIT#%D1ZA -NOT SELECTEDZN/
2239
2240
2252          .EVEN
2253

```

MISCELLANEOUS SECTIONS MACRO M1200 15-DEC-82 13:50 PAGE 64
ADD UNIT SECTION

```
2256      .SBTTL  ADD UNIT SECTION
2257
2258      :++
2259      : THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
2260      : TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
2261      : "EF.AUNIT" IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
2262      :--
2263
2264 013562      BGNAU
2265
2271
2272 013562      ENDAU
2273
2285
2286      .EVEN
```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 66
ADD UNIT SECTION

```

2289 .TITLE HARDWARE TESTS
2290 .SBTTL TEST 1: RX02 SS PERF EXERCISER
2291 ++
2292 .TEST TO EXERCISE RX02/XX SYSTEM
2293 --
2294 .SBTTL MOD 0.0 - EXERCISE A SYSTEM
2295 -----
2296 BGNST
2297 BGND0
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 : : BGND0
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 : : ENDF
2325 : DO UNTIL SWREG BIT#15 NOT SET
2326 : IF ABORT=1
2327 : : THEN-
2328 : : DO CLEAN UP
2329 : : ELSE-
2330 : : DO REPORT
2331 : ENDF
2332 .ENDTST
2333 -----

```

HARDWARE TESTS MALFO M1200 15-DEC-82 13:50 PAGE 67
MOD 0.0 - EXERCISE A SYSTEM

```

2335 013564          BGNTST
2336 013564 000240    CONTRL: NOP
2337 013566          BG00: BGNSUB
2338 013570 005037 014020    CLR EXCMP
2339 013574 005037 002270    CLR ABORT
2340 013600 012737 000001 014016 MOV #1,INITL
2341 013606 005037 002304    CLR RETRY
2342 013612 005037 002230    CLR SDD
2343 013616 005037 002274    CLR ERRSY
2344 013622 005037 002276    CLR ERRTY
2345 013626 005037 002246    CLR CSRUUT
2346 013632 005037 002250    CLR ESRUUT
2347 013636 005037 033544    CLR XERUUT
2348 013642 005037 002332    CLR CMD
2349 013646 005037 023330    CLR WDOT
2350 013652 012737 000001 021426 MOV #1,SUTPTR
2351 013660 004737 014022    CALL GTSYEX
2352 013664          ENDSUB
2353 013666 005737 002274    IA00: TST ERRSY
2354 013672 001402          BEQ IB00
2355 013674 004737 032466    CALL OTSYER
2356 013700 005737 002270    IB00: TST ABORT
2357 013704 001030          BNE UG00
2358 013706          BC00: BGNSUB
2359 013710 004737 020676    CALL SCSYEX
2360 013714 005737 002274    ID00: TST ERRSY
2361 013720 001410          BEQ LD00
2362 013722 004737 032466    CALL OTSYER
2363 013726 005737 002270    IE00: TST ABORT
2364 013732 001005          BNE ED00
2365 013734 004737 032444    CALL OTEXCM
2366 013740 000402          BR ED00
2367 013742 004737 032444    LD00: CALL OTEXCM
2368 013746          ED00: CKLOOP
2369 013750          ENDSUB
2370 013752 005737 002270    UC00: TST ABORT
2371 013756 001007          BNE IF00
2372 013760 005737 014020    TST EXCMP
2373 013764 001750          BEQ BC00
2374 013766 032737 100000 002204 UG00: BIT #100000,SWREG
2375 013774 001274          BNE BG00
2376 013776 005737 002270    IF00: TST ABORT
2377 014002 001402          BEQ LF00
2378 014004          DOCLN
2379 014006 000401          BR ENDOO
2380 014010          LF00: DORPT
2381 014012          ENDOO: EXIT TST
2382          -----
2383 014016 000000          INITL: 0
2384 014020 000000          EXCMP: 0
2385          ;MOD 0.0 ----- END MODULE -----

```

```

;BEGIN SUB TEST
;CLEAR EXERCISE COMPLETE
;CLEAR ABORT FLAG
;SET INITIALIZE FLAG
;CLEAR RETRY FLAGS
;CLEAR SYS DRIVES DONE
;CLEAR SYSTEM ERROR FLAGS
;CLEAR DEVICE ERROR FLAGS
;CLEAR UUT CSR
;CLEAR UUT ESR
;CLEAR UUT TEST ERROR REG
;CLEAR COMMAND PRINT WORD
;CLEAR COMMAND WORD
;PRESET SYS UNDER TST PTR
;CALL MOD 1.0 GET SYS EXER.
;END SUB TEST
;IF ERR SYS
;NOT=0, THEN
;CALL MOD 4.0 - O/P SYSTEM ERROR
;IF ABORT
;NOT SET, THEN
;BEGIN SUB TEST
;CALL MOD 2.0 - SCHEDULE SYSTEM EXERCISE
;IF ERR SYSTEM
;NOT=0, THEN
;CALL MOD 4.0 - O/P SYSTEM ERROR
;IF ABORT
;NOT SET, THEN
;CALL MOD 3.0 - O/P SYSTEM EXERCISE COMPLETE
;BR TO END 'D'
;CALL MOD 3.0 - O/P SYSTEM EXERCISE COMPLETE
;CHECK LOOP ON ERROR
;END SUB TEST
;DUNTIL ABORT
;OR
;EXERCISE COMPLETE
;SET
;DUNTIL SWREG BIT#15
;NOT SET
;IF ABORT
;SET, THEN
;DO CLEAN UP
;BR TO END
;DO REPORT
;EXIT TEST

```

```

;INITIALIZE POINTERS FLAG
;EXERCISE COMPLETE FLAG

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 69
MOD 0.0 - EXERCISE A SYSTEM

```

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,91
2392 014022 000240
2393 014024 032737 000001 002266
2394 014032 001002
2395 014034 004737 014076
2396 014040 032737 040000 002204
2397 014046 001002
2398 014050 004737 014216
2399 014054 004737 017302
2400 014060 042737 040000 002274
2401 014066 005037 014074
2402 014072 000207
2403
2404 014074 000001
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2413 014076 000240
2414 014100 032737 000001 002204
2415 014106 001404
2416 014110 012737 000200 002252
2417 014116 000403
2418 014120 012737 000100 002252
2419 014126 013737 002206 020650
2420 014134 013737 002210 020652
2421 014142 032737 000002 002204
2422 014150 001404
2423 014152 012737 000010 002244
2424 014160 000402
2425 014162 005037 002244
2426 014166 032737 000001 002204
2427 014174 001404
2428 014176 012737 000400 002242
2429 014204 000402
2430 014206 005037 002242
2431 014212 000240
2432 014214 000207
2433

.SBTTL MOD 1.0 - GET SYSTEM EXERCISE
-----
GTSYEX: NOP
IFB10: BIT #POWERF,FLAGS ;IF POWER FLAG
      BNE IFA10 ;NOT SET, THEN
      JSR PC,GTEXCD ;CALL GET EXERCISE CONDITION
IFA10: BIT #40000,SWREG ;IF NO INITIALIZE
      BNE ELA10 ;NOT SET, THEN
      JSR PC,GTSYS ;CALL GET SYSTEM TO EXERCISE
      JSR PC,GTEX ;CALL GET EXERCISE
      BIC #BIT14,ERRSY ;CLEAR ANY TIME OUT ERRORS ALREADY REPORTED
      CLR FIRST ;CLEAR FIRST PASS FLAG
      RTS PC ;RETURN
-----
FIRST: 1 ;FIRST PASS FLAG
;MOD 1.0 ----- END MODULE -----

.SBTTL MOD 1.1 - GET EXERCISE CONDITIONS
-----
GTEXCD: NOP
IFA11: BIT #1,SWREG ;IF SET FOR DOUBLE DENSITY
      BEQ ELA11 ;THEN
      MOV #200,WD CNT ;SET WORD COUNT=256 BYTES
      BR EIA11 ;BR TO END IF 'A'
ELA11: MOV #100,WD CNT ;SET WORD COUNT=128 BYTES
EIA11: MOV OI DITK,OD ;SET OUTSIDE TRACK ADR. (FROM SOFTW P-TAB)
      MOV IN DITK,ID ;SET INSIDE TRACK ADR. (FROM SOFT P-TAB)
      BIT #2,SWREG ;IF DEL DATA SET
      BEQ ELB11 ;THEN
      MOV #10,DEL DAT ;SET DEL DATA MODE
      BR IFC11 ;BR TO END IF 'B'
ELB11: CLR DEL DAT ;CLEAR DEL DATA MODE
IFC11: BIT #1,SWREG ;IF DOUBLE DEN IS SET IN SOFT SWREG
      BEQ ELC11 ;THEN
      MOV #400,DEN ;SET DEN=DOUBLE
      BR EIC11 ;BR TO END IF 'C'
ELC11: CLR DEN ;SET DEN=SINGLE
EIC11: NOP
      RTS PC ;RETURN
;MOD 1.1 ----- END MODULE -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 71
MOD 1.1 - GET EXERCISE CONDITIONS

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014216
014220
014224
014232
014240
014244
014252
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014262
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014270
014276
014304
014312
014316
014324
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014334
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014342
014350
014356
014362
014366
014372
014374
014400
014402
014410
014412
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014452
014454
014462
014470
014476
014502
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012737
013737
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032777
001006
012737
004737
000442
012777
012737
013737
004737
032777
001006
012737
004737
000415
012737
012737
005037
013704
004737
000412
005737
001404
042737
000403
042737
005737
001401
000463
032737
001457
004737
032777
001441
012777
012737
013737
004737
032777
001416
012737
012737
012737
013704
004737
000414
012737
000403

014626
000040
002220
025230
000040
016167
016016
040000
000040
002220
025230
000040
016235
016016
000002
000001
015300
002220
014742
002172
000017
000003
002172
000014
014702
000040
040000
000040
002222
025230
000040
001416
000004
000002
000002
002222
014742
016235
016130

025330
025332
165746
016130
165722
025330
025332
165674
016130
015276
015302
015300
002220
014742
002172
002232
002232
002172
002232
002232
000014
165550
165540
025330
025332
165512
015302
015276
015300
002222
014742
016235
016130

.SBTTL MOD 1.2 - GET SYSTEM TO EXERCISE

```

GTSYS: BRESET          ;ISSUE BUS RESET
        CALL GPSUN0     ;CALL GET PRINTABLE SYSTEM 0 UNIT #
        MOV #DNBIT, RDYWD ;SET READY WORD = DONE
        MOV UOADR, CSRADR ;SET ADDRESS
        CALL DELAY       ;CALL MOD - DELAY FOR DONE
IFA12:  BIT #DNBIT, @UOADR ;IF UNIT #0 DONE BIT
        BNE ELA12        ;NOT SET THEN
        MOV #INTER2, ITMSG ;SET PRINT MSG#
        CALL ITERR       ;INITIALIZE ERR-U0-NO DONE BIT
        BR EIA12         ;BR TO END IF 'A'
ELA12:  MOV #40000, @UOADR ;ELSE-ISSUE PROG INIT TO UO
        MOV #DNBIT, RDYWD ;SET READY WORD = DONE
        MOV UOADR, CSRADR ;SET TEST ADDRESS
        CALL DELAY       ;CALL MOD - DELAY FOR DONE
IFB12:  BIT #DNBIT, @UOADR ;IF UNIT #0 DONE BIT
        BNE ELB12        ;NOT SET THEN
        MOV #INTER3, ITMSG ;SET PRINT MSG#
        CALL ITERR       ;INITIALIZE ERR-U0, NO DONE BIT
        BR EIA12         ;BR TO END IF 'A'
ELB12:  MOV #2, UNTCNT    ;SET # DRVS TO CK
        MOV #1, SUTPOS    ;SET POSITION IN SUT TO TEST = 1
        CLR UNTCO         ;SET UUT CODE = 0
        MOV UOADR, R4      ;SET TEMP #4 = UO ADDRESS
        CALL CKDVAV       ;CALL MOD 1.2.1 - CK DRIVE STATUS
        BR IFC12         ;BR TO IF 'C'
EIA12:  TST RXX          ;IF RXX
IFH12:  BEQ ELH12        ;THEN
        BIC #17, SUT      ;CLEAR RXX UO SELECTED DRIVES
        BR IFC12         ;BR TO IF 'C'
ELH12:  BIC #3, SUT      ;CLEAR RX02 UO SELECTED DRIVES
IFC12:  TST RXX          ;IF RXX
        BEQ IFD12        ;THEN
        BR IFG12         ;BR TO IF 'G'
IFD12:  BIT #14, SUT     ;IF U1
        BEQ IFG12        ;SELECTED THEN
        CALL GPSUN1     ;CALL GET PRINTABLE SYSTEM 1 UNIT #
IFE12:  BIT #DNBIT, @U1ADR ;IF U1 DONE BIT
        BEQ ELE12        ;SET THEN
        MOV #40000, @U1ADR ;INITIALIZE DEVICE U1
        MOV #DNBIT, RDYWD ;SET READY WORD = DONE BIT
        MOV U1ADR, CSRADR ;SET TEST ADR
        CALL DELAY       ;CALL MOD - WAIT FOR DONE
IFF12:  BIT #DNBIT, @U1ADR ;IF U1 DONE BIT
        BEQ ELF12        ;SET THEN
        MOV #4, SUTPOS    ;SET POSITION IN SUT = 4
        MOV #2, UNTCNT    ;SET # DRVS TO CK = 2
        MOV #2, UNTCO     ;SET UUT CODE = 2
        MOV U1ADR, R4      ;SET TEMP #4 = U1 ADR
        CALL CKDVAV       ;CALL MOD 1.2.1 - CK DRIVE STATUS
        BR IFG12         ;BR TO IF 'G'
ELF12:  MOV #INTER3, ITMSG ;SET MSG#-U1-'NO DONE BIT-PROG INT'
        BR EIE12        ;BR TO END IF 'E'

```

HARDWARE TESTS MACRO M'200 15-DEC-82 13:50 PAGE 71-1
MOD 1.2 - GET SYSTEM TO EXERCISE

```

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          ;-----

```

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MOD 1.2.1 - CK DRIVE AVAILABLE

```

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     REFDIV      ;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      -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 75
MOD 1.2.1 - CK DRIVE AVAILABLE

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

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MOD 1.2.1.1 - REFORMAT DRIVE DENSITY

```

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          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,UNTCO      ;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,UNTCO      ;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 I11211: BIT      #40,@ITCSAD    ;IF DONE BIT
2664 015670 001420          BEQ      L11211      ;SET, THEN

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MOD 1.2.1.1 - REFORMAT DRIVE DENSITY

```

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          ;-----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 79
 - MOD 1.2.U.3 - INITIALIZE ERROR

```

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,LSLUN ;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#XD1/
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% 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 - REFORMAT/
2735 016753 045 101 040 ITMSG9: .ASCIZ /%A UNIT#XD1%-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      ;-----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 81
 - MOD 1.2.U.5 - INITIALIZE PRINT

```

2744
2745
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 -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 83
MOD 1.3.1 - SET DATA PATTERN

```

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 BYTE: 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

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 83-1
MOD 1.3.1 - SET DATA PATTERN

```

2822 017576 000241          CLC
2823 017600 005702          TST      R2          ;IS R2 NONZERO
2824 017602 001401          BEQ      3$
2825 017604 000261          SEC
2826 017606 106137 017746  3$:  ROLB    DATBYT    ;YES, SET THE 'C' BIT
2827 017612 000761          BR      1$
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 017746 RANDAT: JSR    PC,RANGEN    ;GET RANDOM NUMBER
2843 017662 113737 004652          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      ENDL    ;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          ENDL    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 -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 85
MOD 1.3.1 - SET DATA PATTERN

```

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2884 017752 005037 020634
2885 017756 005037 020642
2886 017762 005037 020640
2887 017766 112737 000177 020642
2888 017774 113737 020650 020640
2889 020002 005037 020646
2890 020006 113737 020652 020646
2891 020014 005037 020644
2892 020020 113737 020650 020644
2893 020026 013737 020646 020636
2894 020034 163737 020644 020636
2895 020042 005237 020636
2896 020046 002005
2897 020050 012737 100000 002274
2898 020056 000137 020632
2899 020062 013737 002202 020654
2900 020070 142737 000377 020126
2901 020076 005737 020654
2902 020102 001003
2903 020104 012737 000007 020654
2904 020112 013704 020654
2905 020116 005304
2906 020120 006304
2907 020122 150437 020126
2908 020126 000777
2909 020130 000137 020164
2910 020134 000137 020220
2911 020140 000137 020254
2912 020144 000137 020272
2913 020150 000137 020340
2914 020154 000137 020422
2915 020160 000137 020476
2916
2917 020164 123737 020646 020642
2918 020172 001004
2919 020174 012737 177777 020640
2920 020202 000405
2921 020204 113737 020644 020640
2922 020212 005237 020644
2923 020216 000565
2924
2925 020220 123737 020644 020642
2926 020226 001004

      SBTTL MOD 1.3.2 - SET TRACK SEQUENCE
      -----
      SEQ # SEQUENCE
      -----
      0 NO SEQUENCE SPECIFIED (DEFAULT TO SEQ /)
      1 INCREMENT FROM OD TO ID
      2 DECREMENT FROM ID TO OD
      3 INCREMENT THEN DECREMENT TRACKS
      4 BOUNCE BETWEEN ID AND OD
      5 BOUNCE BETWEEN DECREASING ID & INCREASING OD
      6 STROBE BETWEEN OD AND DECREMENTING ID
      7 RANDOM TRACK SELECTION
      -----
      STKSEQ: CLR TKTBPTR ; CLEAR TRK TBL PTR
              CLR PRESTK ; CLEAR PRESENT TRK
              CLR TARGET ; CLEAR TARGET TRK
              MOV #177,PRESTK ; INIT PRESENT TRK TO HANDLE TRK #0
              MOV OD,TARGET ; INIT OD AS TARGET TRACK
              CLR XID ; INIT WORDING ID AND OD LOCATIONS
              MOV ID,XID ; SAVE INSIDE DIA. IN TEMP INSIDE DIA.
              CLR XOD ; CLEAR TEMP OUTSIDE DIA
              MOV OD,XOD ; SAVE OUTSIDE DIA. IN TEMP OUTSIDE DIA.
              MOV XID,TRKCN ; SET UP NUMBER OF TRACK MOVEMENTS
              SUB XOD,TRKCN ;
              INC TRKCN ; INCREMENT # OF TRACKS
              BGE GTTK ; IF # OF TRACKS IS NEGATIVE, THEN
              MOV #100000,ERRSY ; SET SYSTEM ERROR
              JMP ENDTKS ; EXIT
      GTTK: MOV TRKSEQ,SEQUEN ; GET TRACK SEQUENCE #
              BICB #377,#BRONTK ; CLEAR OUT BRANCH OFFSET
              TST SEQUEN ; IF TRACK SEQUENCE
              BNE 1$ ; EQUALS ZERO, THEN
              MOV #7,SEQUEN ; FORCE SEQ #7-RANDOM
              MOV SEQUEN,R4 ; GET SEQUENCE BITS
              DEC R4 ; ADJUST FOR CORRECT OFFSET
              ASL R4 ;
              BISB R4,#BRONTK ; THIS BR INST. IS MODIFIED SELECTED TRACK SEQUENCE
      BRONTK: BR ; BRANCH TO SELECTED TRACK SEQUENCE
              JMP SEQ1 ;
              JMP SEQ2 ;
              JMP SEQ3 ;
              JMP SEQ4 ; BOUNCE ID TO OD
              JMP SEQ5 ; DECREASING BOUNCE
              JMP SEQ6 ; STROBE
              JMP SEQ7 ; RANDOM
      -----
      SEQ1: CMPB XID,PRESTK ; IF PRESENT TRACK=ID
              BNE 1$ ; THEN
              MOV #-1,TARGET ; TERMINATE TABLE
              BR 2$ ; END SEQ1
              MOV XOD,TARGET ; ELSE SET NEW TRACK-OUTSIDE DIA
              INC XOD ; INCREMENT OUTSIDE DIA
              BR 2$ ; END SEQ1
      2$: BR NEWTRK ;
      -----
      SEQ2: CMPB XOD,PRESTK ;
              BNE 1$ ;

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 85-1
MOD 1.3.2 - SET TRACK SEQUENCE

```

2927 020230 012737 177777 020640      MOV    #-1,TARGET      ;TERMINATE TABLE
2928 020236 000405                BR      2$              ;END SEQ2
2929 020240 013737 020646 020640 1$:    MOV    XID,TARGET      ;SET NEXT TRACK=INSIDIA
2930 020246 005337 020646                DEC    XID              ;DECREMENT INSIDE DIA
2931 020252 000547                BR      NEWTRK
2932
2933 020254 005701                SEQ3:  TST     R1              ;IF MODE
2934 020256 001402                BEQ     1$              ;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$:    MOVB   XID,TARGET      ;ELSE SET NEXT TRACK=INSIDE DIA
2946 020316 012701 000001      MOV    #1,R1              ;TERMINATE TABLE
2947 020322 005337 020636      DEC    TRK CNT
2948 020326 001003                BNE     3$
2949 020330 012737 177777 020640      MOV    #-1,TARGET      ;TERMINATE TABLE
2950 020336 000515                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$:    MOV    #-1,TARGET      ;TERMINATE TABLE
2965 020420 000464                BR      NEWTRK
2966
2967 020422 123737 020646 020644 SEQ6:  CMPB   XID,XOD          ;
2968 020430 001416                BEQ     1$              ;
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                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

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 85-2
MOD 1.3.2 - SET TRACK SEQUENCE

```

2984 020522 000765          BR      SEQ7          ;BR TO GET ANOTHER RANDOM NUMBER
2985 020524 123737 004652 020644 ODCOMP: CMPB    RANUM,XOD      ;IF RANUM SMALLER THAN OD ADDRESS
2986 020532 002001          BGE     PRESCK          ;THEN
2987 020534 000760          BR      SEQ7          ;BR TO GET ANOTHER RANDOM NUMBER
2988 020536 123737 004652 020642 PRESCK: CMPB    RANUM,PRESK     ;IF RANUM EQUALS PRESENT TRACK
2989 020544 001754          BEQ     SEQ7          ;GET ANOTHER RANDOM NUMBER
2990 020546 013737 004652 020640      MOV     RANUM,TARGET    ;RANUM OK PUT IT IN TARGET TRACK
2991 020554 005337 020636      DEC     TRKCNT
2992 020560 001003          BNE     1$
2993 020562 012737 177777 020640      MOV     #-1,TARGET      ;TERMINATE TABLE
2994 020570 000400          1$:  BR      NEWTRK

```

```

2995          ;-----
2996 020572 012702 033553      NEWTRK: MOV     #TRKTBL-1,R2
2997 020576 005237 020634      INC     TKTBP
2998 020602 063702 020634      ADC     TKTBP,R2
2999 020606 113712 020640      MOVB    TARGET,(R2)
3000 020612 005737 020640      1ST     TARGET
3001 020616 100405          BMI     ENDTKS
3002 020620 113737 020640 020642      MOVB    TARGET,PRESK
3003 020626 000137 020126      JMP     BRONTK
3004 020632 000207      ENDTKS: RTS     PC

```

```

3005          ;-----
3006 020634 000000      TKTBP: 0          ;TRACK TABLE POINTER
3007 020636 000000      TRKCNT: 0         ;TRACK COUNT
3008 020640 000000      TARGET: 0         ;TARGET TRACK
3009 020642 000000      PRESK: 0          ;PRESENT TRACK
3010 020644 000000      XOD: 0            ;X OUTSIDE DIA.
3011 020646 000000      XID: 0            ;X INSIDE DIA.
3012 020650 000000      OD: 0             ;OUTSIDE DIA.
3013 020652 000000      ID: 0             ;INSIDE DIA.
3014 020654 000000      SEQUEN: 0         ;SEQUENCE #
3015          ;MOD 1.3.2 ----- END MODULE -----

```

```

3016
3017
3018
3019
3020          .SBTTL MOD 1.3.3 - CLEAR STATISTICAL TABLES
3021          ;-----

```

```

3022
3023 020656 012701 007314      CLRSTA: MOV     #READSC,R1      ;SET UP BEGINNING ADDRESS
3024 020662 012702 011240      MOV     #ENDST,R2        ;SET UP TABLE LENGTH
3025 020666 005021      BDA133: CLR     (R1)+          ;CLEAR ADDRESSED LOCATION
3026 020670 020102          CMP     R1,R2
3027 020672 001375          BNE     BDA133
3028 020674 000207      END133: RTS     PC              ;DO UNTIL LAST ADDRESS DONE
3029          ;MOD 1.3.3 ----- END MODULE -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 87
MOD 1.3.3 - CLEAR STATISTICAL TABLES

```

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 INCRK 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

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 87-1
MOD 2.0 - SCHEDULE SYSTEM EXERCISE

```

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    DRVON   ;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,DRVST  ;PASS DRIVE TEST
3102 021312 004737 022504          CALL   XDVST   ;CALL MOD 2.3 - EXECUTE DRIVE TEST
3103 021316 013737 023324 025410          MOV    DRVST,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 -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 89
MOD 2.1 - GET A TEST

```

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      BNCOMPLET 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 1 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

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 89-1
MOD 2.1 - GET A TEST

```

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,TSVCT ;SET TEST ADV COUNT=3
3204 022026 000433      BR       E1I21      ;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,TSVCT ;SET TEST ADV COUNT=1
3210 022062 000415      BR       E1I21      ;BR TO END IF 'I'
3211 022064 005337 022162      ELJ21: DEC      TSVCT ;DECREMENT TEST ADV COUNT
3212 022070 062737 000002 022152      ADD      #2,TSTPTR ;ADV TEST POINTER 1 CMD
3213 022076 005737 022162      IF021: TST      TSVCT ;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      E1I21: CLR      TBPRCT ;CLEAR TABLE PAIR CNT
3219 022122 0137C3 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      E1E21      ;EQUALS -1, THEN
3224 022142 005037 022152      CLR      TSTPTR ;RESET TEST PTR
3225 022146 000240      E1E21: 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      TSVCT:  .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

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HARDWARE TESTS MACRO '11200 15-DEC-82 13:50 PAGE 91
- EXERCISE/TEST TABLE

3245	.SBTTL - EXERCISE/TEST TABLE		
3246	-----		
3247 022204 177777	EX1: .WORD -1		
3248 022206 000000	.WORD 0	:-, / FILL BUFFER	
3249 022210 044002	.WORD 44002	:DCK,ADVTRK / WRITE SECTOR	
3250 022212 000777	.WORD 777	:NXTUNT, / -1	
3251 022214 177777	EX2: .WORD -1		
3252 022216 000000	.WORD 0	:-, / FILL BUFFER	
3253 022220 000002	.WORD 2	:-, / WRITE SECTOR	
3254 022222 000003	.WORD 3	:-, / READ SECTOR	
3255 022224 154001	.WORD 154001	:4CMD,DCK,ADVTRK,RAW, / EMPTY BUFFER	
3256 022226 000777	.WORD 777	:NXTUNT, / -1	
3257 022230 177777	EX3: .WORD -1		
3258 022232 000000	.WORD 0	:-, / FILL BUFFER	
3259 022234 000002	.WORD 2	:-, / WRITE SECTOR	
3260 022236 000003	.WORD 3	:-, / READ SECTOR	
3261 022240 174001	.WORD 174001	:4CMD,DCK,ADVTRK,DACK,RAW/ EMPTY BUFFER	
3262 022242 000777	.WORD 777	:NXTUNT, / -1	
3263 022244 177777	EX4: .WORD -1		
3264 022246 000003	.WORD 3	:-, / READ SECTOR	
3265 022250 064001	.WORD 64001	:DCK,ADVTRK,DATAACK, / EMPTY BUFFER	
3266 022252 000777	.WORD 777	:NXTUNT, / -1	
3267 022254 177777	EX5: .WORD -1		
3268 022256 000003	.WORD 3	:-, / READ SECTOR	
3269 022260 044001	.WORD 44001	:DCK,ADVTRK, / EMPTY BUFFER	
3270 022262 000777	.WORD 777	:NXTUNT, / -1	
3271 022264 177777	EX6: .WORD -1		
3272 022266 000000	.WORD 0	:-, / FILL BUFFER	
3273 022270 000002	.WORD 2	:-, / WRITE SECTOR	
3274 022272 000003	.WORD 3	:-, / READ SECTOR	
3275 022274 170001	.WORD 170001	:4CMD,DCK,DATAACK, RAW, / EMPTY BUFFER	
3276 022276 004777	.WORD 4777	:ADVTRK, NXTUNT, / -1	
3277 022300 177777	EX7: .WORD -1		
3278 022302 000000	.WORD 0	:-, / FILL BUFFER	
3279 022304 000002	.WORD 2	:-, / WRITE SECTOR	
3280 022306 000003	.WORD 3	:-, / READ SECTOR	
3281 022310 172001	.WORD 172001	:4CMD,DCK,DACK,RAW,INCTK/ EMPTY BUFFER	
3282 022312 000003	.WORD 3	:-, / READ SECTOR	
3283 022314 064001	.WORD 64001	:DCK,DATAACK,ADVTRK, / EMPTY BUFFER	
3284 022316 001777	.WORD 1777	:DDCHK, NXTUNT, / -1	
3285	-----		
3286	BIT#	NUMONIC	FUNCTION
3287	----	-----	-----
3288			
3289	15	4CMD	4 COMMAND SEQUENCE
3290	14	DCK	DONE CHECK
3291	13	DATAACK	DO DATA CHECK
3292	12	RAW	READ AFTER WRITE FLAG
3293	11	ADVTRK	ADVANCE TRACK MODE
3294	10	INCTK	INCREMENT TRACK MODE
3295	09	DDCHK	DEL. DATA CHECK
3296	08	NXTUNT	GET NEXT UNIT, IF DONE LAST UNIT
3297			
3298	:MOD 2.1 ----- END MODULE -----		

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 93
- EXERCISE/TEST TABLE

```

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 #U00,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 -----

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HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 95
MOD 2.2 - GET A DRIVE

```

3340
3341
3342      .SBTTL  MOD 2.3 - EXECUTE DRIVE TEST
3343      ;-----
3344
3345 022504 013737 002252 023326 XDVTST: MOV      WDCNT,WDCNT      ;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      IF123      ;BR TO END IF 'A'
3353 022544 013737 002220 002236 1$: MOV      U0ADR,UUTADR      ;GET UNIT #0 UNIBUS ADR
3354 022552 005737 021450          IF123: TST      RESTK      ;IF RESET TRK
3355 022556 001413          BEQ      IFB23      ;IF SET, THEN
3356 022560 113705 021450          MOV      RESTK,R5      ;GET UUT OFFSET
3357 022564 006305          ASL      R5      ;DOUBLE OFFSET
3358 022566 062705 023306          ADD      #CTRK,R5      ;ADD TRK TABLE ADR
3359 022572 013715 002206          MOV      OTDITK,(R5)      ;RESET TO MIN TRK
3360 022576 005037 002262          CLR      SECDN      ;CLEAR SEC DONE FLAG
3361 022602 005037 021450          CLR      RESTK      ;CLEAR RESET TRK FLAG
3362 022606 005737 014016          IFB23: TST      INITL      ;IF INITIALIZE IS
3363 022612 001415          BEQ      E1B23      ;SET, THEN
3364 022614 012705 023276          MOV      #CSEC,R5      ;GET START OF CUR TRK & SEC TBL
3365 022620 012704 000004          MOV      #4,R4      ;SET TBL LENGTH
3366 022624 005025          1$: CLR      (R5)+      ;CLEAR TABLES
3367 022626 005304          DEC      R4      ;DECR TBL LENGTH
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          E1B23: 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      E1J23      ;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 1FD23: 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      E1D23      ;BR TO END IF 'D'

```

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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 DRVIST,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          IFH23: TST INCRTRK ;IF INCR TRK FLAGS
3415 023076 001414          BEQ ELE23 ;ARE SET ,THEN
3416 023100 013737 021436 024236          MOV INCRTRK,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,DRVIST ;IF DRIVE TST
3426 023162 001006          BNE EIJ23 ;IS 'FILL BUFF' ,THEN
3427 023164 012701 034006          MOV #DATA PAT,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 DRVIST,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
34'2

```

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MOD 2.3 - EXECUTE DRIVE TEST

```

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 -----

```

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MOD 2.3.1 - GET A SECTOR

```

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      E1I231      ;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      E1I231: 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           BHI$      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

```

Address	Offset	Value	Label	Operation	Comments
3523	023602	010213			
3524	023604	010204			
3525	023606	000415			
3526	023610	012737	000001 023662	ELD231: MOV	R2,(R3) ;SET DRV NXT SEC = DRV START SEC
3527	023616	000411		BR	END231 ;SAVE DRV NXT SEC
3528	023620	000410		ELC231: BR	END231 ;BR TO END
3529	023622	012737	000001 023704	ELB231: MOV	#1,UTSCDN ;SET START SEC FLAG
3530	023630	004737	023712	CALL	STSCDN ;BRANCH TO END GET SECTOR
3531	023634	005037	023660	CLR	SCPSCT ;SET DRIVE SECTOR DONE FLAG
3532	023640	005011		CLR	(R1) ;CALL MOD 2.3.1.A - SET DRIVE SECTOR DONE FLAG
3533	023642	013737	023704 002262	END231: MOV	UTSCDN,SECDN ;CLEAR SEC PASS CNT
3534	023650	010437	023656	MOV	R4,NXSCSA ;CLEAR UUT STARTING SECTOR
3535	023654	000207		RTS	PC ;PASSUP UNIT SECTOR DONE
3536					;MOD 2.3.1 ----- REGISTERS & TABLES -----
3537	023656	000000		NXSCSA: 0	
3538	023660	000000		SCPSCT: 0	
3539	023662	000000		STSCFG: 0	
3540	023664	000000		SSEC: 0	
3541	023666	000000			
3542	023670	000000			
3543	023672	000000			
3544	023674	000000		NSEC: 0	
3545	023676	000000			
3546	023700	000000			
3547	023702	000000			
3548	023704	000000		UTSCDN: 0	
3549	023706	000003		INTLV: 3	
3550	023710	000000		CURSEC: 0	
3551					;MOD 2.3.1 ----- END MODULE -----
3552					
3553					
3554					
3555					
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 -----

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MOD 2.3.2 - GET A TRACK

```

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      INITRK      ;IF INITIALIZE TRK IS
3573 023762 001413      BEQ      EIH232      ;SET, THEN
3574 023764 005037 024252      CLR      INITRK      ;RESE: 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.)
3619 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      ;-----

```

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MOD 2.3.2 - GET A TRACK

```
3625  
3626 024230 000000  
3627 024232 000000  
3628 024234 000000  
3629 024236 000000  
3630 024240 000000  
3631 024242 000000  
3632 024244 000000  
3633 024246 000000  
3634 024250 000000  
3635 024252 000000  
3636  
-----  
TRKDNF: .WORD 0 ; TRACK DONE FLAG  
MINTRK: .WORD 0 ; MINIMUM TRACK - O.D.  
MAXTRK: .WORD 0 ; MAXIMUM TRACK - I.D.  
TRKINC: .WORD 0 ; INCREMENT TRK FLAG  
CURTRK: .WORD 0 ; CURRENT TRACK  
TKTL: .WORD 0 ; DRV TRK TABLE LOCATOR  
      .WORD 0  
      .WORD 0  
      .WORD 0  
INITTK: .WORD 0 ; INITIALIZE TRK FLAG  
;MOD 2.3.2 ----- END MODULE -----
```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 105
MOD 2.3.3 - GET A DRIVE FUNCTION

```

3639      .SBTTL MOD 2.3.3 - GET A DRIVE FUNCTION
3640      ;-----
3641
3642 024254 005001      GTDVFN: CLR      R1      ;CLEAR REG #1
3643 024256 013701 024404      MOV      DVTST,R1      ;GET DRIVE TEST
3644 024262 032701 040000      IFA233: BIT      #40000,R1      ;IF NOT INITIALIZE
3645 024266 001012      BNE      IFB233      ;THEN
3646 024270 042701 177700      BIC      #177700,R1      ;CLEAR TOP BYTE OF R1
3647 024274 006301      ASL      R1      ;FORMAT FUNCTION
3648 024276 052701 000001      BIS      #1,R1      ;SET GO BIT
3649 024302 020127 000005      IFE233: CMP      R1,#5      ;IF WRT FUNCT
3650 024306 001002      BNE      IFB233      ;THEN
3651 024310 053701 002244      BIS      DELDAT,R1      ;SET DEL DAT WRT (IF SET)
3652 024314 005737 002172      IFB233: TST      RXXX      ;IF DRIVE IS RXXX
3653 024320 001411      BEQ      IFD233      ;THEN
3654 024322 032737 000002 002234      IFC233: BIT      #2,UUT      ;IF SIDE #1 IS SELECTED
3655 024330 001403      BEQ      ELC233      ;THEN
3656 024332 052701 001000      BIS      #1000,R1      ;SET SIDE #1 BIT
3657 024336 000402      BR      IFD233      ;BRANCH TO IF 'D'
3658 024340 042701 001000      ELC233: BIC      #1000,R1      ;SET FOR SIDE #0
3659 024344 032737 000001 002234      IFD233: BIT      #1,UUT      ;IF UNIT UNDER TEST IS
3660 024352 001403      BEQ      ELD233      ;DRIVE #1
3661 024354 052701 000020      BIS      #20,R1      ;THEN SET DRIVE #1 SELECT BIT
3662 024360 000402      BR      EID233      ;BRANCH TO IF 'D'
3663 024362 042701 000020      ELD233: BIC      #20,R1      ;ELSE CLEAR DRIVE #1 SELECT BIT
3664 024366 053701 002242      EID233: BIS      DEN,R1      ;SET DENSITY BIT
3665 024372 052701 000100      BIS      #100,R1      ;SET INTERRUPT BIT
3666 024376 010137 023332      MOV      R1,DRVFN      ;PASS UP FUNCTION WORD
3667 024402 000207      END233: RTS      PC      ;RETURN
3668      ;-----
3669 024404 000000      DVTST: 0      ;DRIVE TEST WORD
3670      ;MOD 2.3.3 ----- END MODULE -----

```

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MOD 2.3.4 - OUTPUT DRIVE FUNCTION

```

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 WDOT,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      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 #XERRUT,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

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 107-1
MOD 2.3.4 - OUTPUT DRIVE FUNCTION

```

3730 025006 004737 025042
3731 025012 004737 025104
3732 025016 000240
3733 025020 000207
3734
3735 025022 000000
3736 025024 000000
3737 025026 000000
3738 025030 000111
3739 025032 000000
3740 025034 000000
3741 025036 000000
3742 025040 000000
3743
3744
3745
3746
3747
3748
3749
3750
3751 025042 000240
3752 025044 013737 025034 025332
3753 025052 013737 025330 025330
3754 025060 004737 025230
3755 025064 033777 025330 177742
3756 025072 001403
3757 025074 013777 025022 177722
3758 025102 000207
3759

EIB234: JSR    PC,OUTSWD      ;OUTPUT VALIDATION WORD
END234: CALL   WATCH         ;CALL MOD U.2 -WATCH DOG
        NOP                    ;
        RTS     PC           ;RETURN TO MOD 2.3
;-----
WRDS:    0                    ;MODULE 2.3.4.1 OUTPUT WORD
ADRS:    0                    ;MODULE 2.3.4.1 OUTPUT ADDRESS
ERSTAT:  0                    ;MODULE 0.0 ERR STATUS READ FLAG
VALWD:   111                  ;EXTERNAL, VALIDATION WD (SET DENS-ASCII 'I')
DBADR:    0                    ;RX DATA BUFFER ADDRESS
CSADR:    0                    ;RX CONT/STATUS ADDRESS
TRKADR:   0                    ;TRACK ADDRESS
SECADR:   0                    ;SECTOR ADDRESS
;MOD 2.3.4 ----- END MODULE -----

.SBTTL MOD 2.3.4.1 - OUTPUT SINGLE WORD
;-----
OUTSWD:  NOP
        MOV     CSADR,CSRADR   ;SET C&S REG ADR
        MOV     RDYWD,RDYWD    ;OUTPUT READY WORD (PASS TO DELAY)
        JSR     PC,DELAY       ;DELAY FOR READY DO DELAY
        BIT     RDYWD,@CSADR   ;IF READY,
        BEQ     ED2341         ;THEN
        MOV     WRDS,@ADRS     ;MOV WORD TO ADDRESS
        RTS     PC             ;RETURN TO MOD 2.3.4
ED2341:  RTS     PC
;MOD 2.3.4.1 ----- END MODULE -----

```

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MOD U.2.3.4 - WATCH DOG TIMER

```

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 05737 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 UNTIL 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,CSRUT ;GET UUT CBS REG
3808 025306 062737 000002 025332 ADD #2,CSRADR ;SET CSRADR TO DB REG
3809 025314 017737 000012 002250 MOV @CSRADR,ESRUUT ;GET UUT EBS 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 ;CBS REG OF UNIT- WAITING FOR
3816          ;MOD U.2.3.4 ----- END MODULE -----

```

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MOD U.2.3/4 DELAY

```

3819
3820
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 -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 113
MOD 2.4.1 - EVALUATE DATA

```

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      IF A241: CMPB      (R2),(R3)      ;IF CHECK SUMS
3852 025460 001407      BEQ      ELA241          ;NOT= THEN
3853 025462 032737 000002 021452 IF I241: 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 IF C241: CMP      BYTNUM,#2      ;IF BYTE #0 OR #1
3869 025566 002006      BGE      IF E241          ;THEN
3870 025570 005737 026052      IF D241: TST      BYTNUM      ;IF BYTE #0
3871 025574 001003      BNE      IF E241          ;THEN
3872 025576 052737 000001 026046      BIS      #1,SEEKCK      ;SET SEEK ERR-ERR TYPE
3873 025604 023727 026054 000012 IF E241: CMP      DAERCT,#12      ;IF OVER 10 DATA ERRORS
3874 025612 103404      BLO      THF241          ;THEN
3875 025614 032737 000020 002204 IF F241: 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      ;IF PRINT HEADER
3878 025630 111237 026060      MOVB      (R2),DATAWS      ;OK, THEN
3879 025634 005737 026062      IF M241: TST      PTHEAD      ;CLEAR PRINT HEADER
3880 025640 001420      BEQ      EIM241          ;
3881 025642 005037 026062      CLR      PTHEAD      ;
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      IF J241: TST      SEEKCK      ;IF DISK SEEK ERR
3890 025766 001413      BEQ      END241          ;IS SET AND
3891 025770 032737 000010 002276 IF K241: BIT      #10,ERRTY      ;IF DATA ERR
3892 025776 001007      BNE      END241          ;NOT SET AND
3893 026000 032737 000002 021452 IF L241: BIT      #2,ERTSAV    ;IF CRC ERR
3894 026006 001003      BNE      END241          ;NOT SET

```

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MOD 2.4.1 - EVALUATE DATA

```

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% UNIT#%01% TRK#%D3% SEC#%D2%N% 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 -----

```

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MOD 2.4.2 - EVALUATE DRIVE STATE

```

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 ;IF DRV#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 ;BR 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

```

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MOD 2.4.2 - EVALUATE DRIVE STATE

```

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          IF0242: 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 -----

```

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MOD 2.4.2 - EVALUATE DRIVE STATE

```

4036
4037
4038
4039
4040 027076 013701 025410
4041 027102 042701 177771
4042 027106 032701 000006
4043 027112 001445
4044 027114 005737 002172
4045 027120 001421
4046 027122 032737 000002 002234
4047 027130 001403
4048 027132 012701 001000
4049 027136 000401
4050 027140 005001
4051 027142 013702 002250
4052 027146 042702 176777
4053 027152 020102
4054 027154 001403
4055 027156 052737 001000 002274
4056 027164 032737 000001 002234
4057 027172 001403
4058 027174 012701 000400
4059 027200 000401
4060 027202 005001
4061 027204 013702 002250
4062 027210 042702 177377
4063 027214 020102
4064 027216 001403
4065 027220 052737 000400 002274
4066 027226 000207
4067

      .SBTTL MOD 2.4.2.1 - EVALUATE DRIVE RESPONSE
      -----
EVDVRE: MOV      TSTEV,R1      ;GET TEST FUNCTION
          BIC      #177771,R1   ;CLEAR BITS
          BIT      #6,R1        ;IF NOT FILL/EMPTY BUFFER
          BEQ      6$           ;THEN
          TST      RXXX         ;IF RXXX
          BEQ      1$           ;AND
          BIT      #2,UUT       ;SIDE # SELECTED
          BEQ      2$           ;THEN
          MOV      #1000,R1      ;SET R1 TO TEST SIDE #1 SELECT
          BR       3$           ;BR TO TEST RESPONSE
2$:      CLR      R1            ;SET R1 TO TEST SIDE #0 SELECT
3$:      MOV      ESRUUT,R2     ;GET ESR UNIT UNDER TEST
          BIC      #176777,R2   ;CLEAR ALL BITS BUT SIDE SELECT
          CMP      R1,R2        ;IF SIDE SELECT
          BEQ      1$           ;NOT=SIDE RESPONDING THEN
          BIS      #1000,ERRSY   ;SET WRONG SIDE RESPONDING SYS ERR
          BIT      #1,UUT       ;IF DRIVE #1 SELECTED
          BEQ      4$           ;THEN
          MOV      #400,R1      ;SET R1 TO TEST DRIVE #1 SEL
          BR       5$           ;BR TO TEST RESPONSE
4$:      CLR      R1            ;SET R1 TO TEST DRIVE #0 SEL
5$:      MOV      ESRUUT,R2     ;GET ESR UNIT UNDER TEST
          BIC      #177377,R2   ;CLEAR ALL BITS BUT DRIVE RESPONDING
          CMP      R1,R2        ;
          BEQ      6$           ;
          BIS      #400,ERRSY   ;SET WRONG DRIVE RESPONDING SYS ERR
          RTS      PC           ;
6$:      MOD 2.4.2.1 ----- END MODULE -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 119
MOD 2.4.3 - UPDATE DRIVE STATISTICS

```

4070          .SBTTL MOD 2.4.3 - UPDATE DRIVE STATISTICS
4071          :-----
4072
4073 027230 013737 027626 030342 UPDVST: MOV    TSTCK,FUNTY ;PASS TEST FUNCTION TO UPDATE SEC CTR
4074 027236 004737 030216          CALL    UPSECT  ;CALL UP DATE SECTOR CONTENTS
4075 027242 032737 000002 027606 1A243: BIT    #2,ETSAV ;IF ERRTY SAVE
4076 027250 001405          BEQ    EA243  ;HAS CRC ERR BIT SET, THEN
4077 027252 004737 027722          CALL    UDCRST  ;CALL UPDATE CRC STATISTICS
4078 027256 005037 027606          CLR    ETSAV  ;CLEAR ERR TYPE SAVE
4079 027262 000457          BR     IG243  ;BR TO IF 'G'
4080 027264 013737 002276 027606 EA243: MOV    ERRTY,ETSAV ;SAVE ERR TYP --> ETSAV
4081 027272 013737 002276 027614          MOV    ERRTY,STERRG ;GET ERR TYP --> STAT ERR REG
4082 027300 005037 027616          CLR    STCNTR ;ZERO STAT COUNTER
4083 027304 032737 000002 027614 1D243: BIT    #2,STERRG ;IF ERR IS
4084 027312 001403          BEQ    BF243  ;CRC, THEN
4085 027314 042737 006002 027614          BIC    #6002,STERRG ;CLEAR CRC, RD, & WRT ERR BITS OF STAT ERR REG
4086 027322 000241          BFC    BF243  ;CLEAR CARRY BIT
4087 027324 006037 027614          ROR    STERRG ;ROTATE RIGHT STAT ERROR REG
4088 027330 103026          IB243: BCC    EB243  ;IF CARRY BIT SET, THEN
4089 027332 013701 027616          MOV    STCNTR,R1 ;GET STAT COUNTER
4090 027336 006301          ASL    R1 ;& DOUBLE FOR WORD ADDRESSING
4091 027340 062701 027630          ADD    #ETTAB,R1 ;CAL. CLASSIFICATION WORD-ADDRESS
4092 027344 011137 027620          MOV    (R1),CLASWD ;GET CLASSIFICATION WORD
4093 027350 011102          MOV    (R1),R2 ;GET CLASSIFICATION WORD-TO FIND LOG OFFSET
4094 027352 000302          SWAB   R2 ;GET CLASSIFICATION WORD UPPER BYTE
4095 027354 006302          ASL    R2 ;--SHIFT LEFT TO GET LOG REG OFFSET (LAST 6 BITS)
4096 027356 006302          ASL    R2 ;--SHIFT LEFT AGAIN
4097 027360 042702 177004          BIC    #177004,R2 ;CLEAR UNWANTED BITS
4098 027364 010237 027622          MOV    R2,LOGOFF ;SAVE ERROR LOG OFFSET
4099 027370 005711          IC243: TST    (R1) ;IF ERR TYP CLASSIFICATION WORD
4100 027372 100403          BMI    LC243  ;TYPE=SOFT, THEN
4101 027374 004737 030072          CALL    UDSFST  ;CALL UPDATE SOFT ERRGR STATISTICS
4102 027400 000402          BR     EB243  ;BR TO END 'B'
4103 027402 004737 027670          LC243: CALL    UDHDST  ;CALL UPDATE HARD ERROR STATISTICS
4104 027406 005237 027616          EB243: INC    STCNTR ;INCREMENT STAT COUNTER
4105 027412 022737 000020 027616 UF243: CMP    #16,STCNTR ;DO UNTIL ALL 16
4106 027420 101340          BMI    BF243  ;BITS ARE DONE
4107 027422 013703 033544          IG243: MOV    XERUUT,R3 ;GET EXTENDED ERROR CODE
4108 027426 042703 177400          BIC    #177400,R3 ;CLEAR UPPER BYTE
4109 027432 005703          TST    R3 ;IF EXTENDED ERROR CODE
4110 027434 001410          BEQ    IH243  ;NOT=0, THEN
4111 027436 162703 000010          SUB    #10,R3 ;ADJ ERROR CODE # FOR LOGGING
4112 027442 012702 007604          MOV    #ECLOG,R2 ;GET LOC OF ERR CODE LOG
4113 027446 060302          ADD    R3,R2 ;ADD ERR CODE TO LOC ERR CODE LOG
4114 027450 063702 002240          ADD    UUTOFF,R2 ;FIND LOC ERR REG THIS UNIT
4115 027454 005212          INC    (R2) ;INCREMENT UNIT ERR REG
4116 027456 013703 002276          IH243: MOV    ERRTY,R3 ;GET ERR TYPE
4117 027462 042703 171774          BIC    #171774,R3 ;CLEAR ALL ERRS BUT RD, WT, CRC, SEEK
4118 027466 005703          TST    R3 ;IF ONE OF THESE ERRORS
4119 027470 001412          BEQ    I1243  ;THEN
4120 027472 013702 002254          MOV    TRACK,R2 ;GET TRACK ADR
4121 027476 006302          ASL    R2 ;DOUBLE TRACK ADR FOR WORD ADDRESSING
4122 027500 006302          ASL    R2 ;ADJ TRK
4123 027502 006302          ASL    R2 ;FOR ADR.
4124 027504 062702 010070          ADD    #TKXX,R2 ;ADD TRACK LOG LOCATION
4125 027510 063702 002240          ADD    UUTOFF,R2 ;FIND LOC ERR REG THIS UNIT
4126 027514 005212          INC    (R2) ;INCREMENT UNIT ERR REG

```

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MOD 2.4.3 - UPDATE DRIVE STATISTICS

```

4127 027516 005737 027610      11243: TST      ERRSAV      ;IF ERR SAVE HAS
4128 027522 001023              BNE      L1243      ;NO ERROR SET, THEN
4129 027524 005237 027612      INC      ERSVCT      ;INCREMENT ERROR SAVE COUNTER
4130 027530 022737 000004 027612 1J243: CMP      #4,ERSVCT ;IF ERROR SAVE COUNTER
4131 027536 101017              BHI      E1243      ;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       E1243      ;BR TO END '1'
4141 027572 005037 027612      L1243: CLR      ERSVCT      ;CLEAR ERROR SAVE COUNT
4142 027576 013737 002276 027610 E1243: 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
4155      ;MOD 2.4.3 ----- END MODULE -----
4156
4157      :----- ERROR TYPE CLASSIFICATION & OFFSETS TABLE -----
4158      :TYPE/LOG-OFF/RT-OFF/CLASS /BIT#
4159      :-----/-----/-----/-----/-----
4160      ETTAB: .WORD 005001      ;SFT /SEEK /SEEK /SK-RTMSK/ 0
4161      .WORD 006005      ;SFT /CRC /CRC /CRC / 1
4162      .WORD 100407      ;HRD /CKSML / - /HD / 2
4163      .WORD 012106      ;SFT /DATA /DATA /DT-RTMSK/ 3
4164      .WORD 154400      ;HRD / - / - / - / 4
4165      .WORD 113227      ;HRD /DDUNX /DD /HD / 5
4166      .WORD 113227      ;HRD /DDMIS /DD /HD / 6
4167      .WORD 154400      ;HRD / - / - / - / 7
4168      .WORD 154400      ;HRD /UNK / - / - / 8
4169      .WORD 101407      ;HRD /FIL-EMP/ - /HD / 9
4170      .WORD 010164      ;SFT /RD /RD /RD-RTMSK/ 10
4171      .WORD 011202      ;SFT /WRT /WT /WT-RTMSK/ 11
4172      .WORD 103407      ;HRD /INTR-ND/ - /HD / 12
4173      .WORD 104407      ;HRD /D-NINTR/ - /HD / 13
4174      .WORD 102407      ;HRD /ER-NSET/ - /HD / 14
4175      .WORD 154407      ;HRD /ERR BIT/ - /HD / 15
4176
4177      :
4178      :-----<CLASSIFICATION (SEEK=1/CRC=5/DATA=6/WRITE=2/READ=4)
4179      :-----<RETRY COUNTER OFFSET
4180      :-----<LOG REGISTER OFFSET-(FROM CKSML ADDRESS)
      :-----<TYPE (SOFT=0/HARD=1)
      :-----

```

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MOD 2.4.3.1 - UPDATE HARD ERROR STATISTICS

```

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 -----

```

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MOD 2.4.3.3 - UPDATE SOFT ERROR STATISTICS

```

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 -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 125
MOD 2.4.3.3 - UPDATE SOFT ERROR STATISTICS

```

4255
4256
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

```

- MOD 2.4.U.1 - SOFT ERROR LOGGER

```

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 -----

```

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MOD 2.4.4 - EVALUATE UNIT ERROR CODE

```

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      ;OR 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 -----

```

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MOD 2.5 - OUTPUT ERROR TYPE

```

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 MOV (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 HDRCT ;INCREMENT HARD ERROR CTR
4420 031074 023737 002302 002216 IFE25: CMP HDRCT,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 HDRCT ;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 PRTER ;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 -----

```

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MOD 2.5 - OUTPUT ERROR TYPE

```

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
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
4473
4474 031656      001      ETCLAS: .BYTE  1      :ERROR
4475 031657      001      .BYTE  1      :SEEK
4476 031660      002      .BYTE  2      :CRC
4477 031661      001      .BYTE  1      :CKSUM
4478 031662      000      .BYTE  0      :DATA
4479 031663      002      .BYTE  2      :UNASSIGNED
4480 031664      002      .BYTE  2      :DEL. DATA UNEX
4481 031665      000      .BYTE  0      :DEL. DATA MISSING
4482 031666      002      .BYTE  2      :UNASSIGNED
4483 031667      002      .BYTE  2      :UNK ERR
4484 031670      001      .BYTE  1      :FILL/EMPTY BUFFER
4485 031671      001      .BYTE  1      :READ
4486 031672      002      .BYTE  2      :WRITE
4487 031673      002      .BYTE  2      :INTER-BUT NO DONE
4488 031674      002      .BYTE  2      :DONE-BUT NO INTER
4489 031675      002      .BYTE  2      :ERR-BUT NO ERR BIT
4490      .EVEN      :ERR BIT SET
4491

```

;MOD 2.5 ----- END MODULE -----

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MOD 2.5 - OUTPUT ERROR TYPE

```

4494
4495
4496
4497
4498 031676 000240
4499 031700 005737 002304
4500 031704 001500
4501 031706 032737 000001 002304
4502 031714 001405
4503 031716 013702 002306
4504 031722 012701 032110
4505 031726 000465
4506 031730 032737 000002 002304
4507 031736 001427
4508 031740 032737 000030 002304
4509 031746 001416
4510 031750 032737 000010 002304
4511 031756 001405
4512 031760 013702 002316
4513 031764 012701 032134
4514 031770 000444
4515 031772 013702 002314
4516 031776 012701 032270
4517 032002 000437
4518 032004 013702 002326
4519 032010 012701 032166
4520 032014 000432
4521 032016 032737 000004 002304
4522 032024 001430
4523 032026 032737 000030 002304
4524 032034 001416
4525 032036 032737 000010 002304
4526 032044 001405
4527 032046 013702 002316
4528 032052 012701 032213
4529 032056 000411
4530 032060 013702 002314
4531 032064 012701 032321
4532 032070 000404
4533 032072 013702 002324
4534 032076 012701 032244
4535 032102 004737 004536
4536 032106 000207
4537
4538 032110 045 101 040
4539 032134 045 101 040
4540 032166 045 101 040
4541 032213 045 101 040
4542 032244 045 101 040
4543 032270 045 101 040
4544 032321 045 101 040
4545
4546

```

.SBTTL MOD 2.5.1 - PRINT RETRY

 PTRTY: NOP
 IFA251: TST RETRY
 BEQ END251
 IFB251: BIT #1, RETRY
 BEQ IFC251
 MOV SEEKRT, R2
 MOV #MSKRT, R1
 BR EIB251
 IFC251: BIT #2, RETRY
 BEQ IFE251
 IFD251: BIT #30, RETRY
 BEQ ELD251
 IFG251: BIT #10, RETRY
 BEQ ELG251
 MOV DATART, R2
 MOV #MDWTRT, R1
 BR EIB251
 ELG251: MOV CRCRT, R2
 MOV #MCWTRT, R1
 BR EIB251
 ELD251: MOV WTRT, R2
 MOV #MWTRT, R1
 BR EIB251
 IFE251: BIT #4, RETRY
 BEQ END251
 IFF251: BIT #30, RETRY
 BEQ ELF251
 IFH251: BIT #10, RETRY
 BEQ ELH251
 MOV DATART, R2
 MOV #MDRDRT, R1
 BR EIB251
 ELH251: MOV CRCRT, R2
 MOV #MCRDRT, R1
 BR EIB251
 ELF251: MOV READRT, R2
 MOV #MRDRT, R1
 EIB251: CALL PRTB15
 END251: RTS PC

 MSKRT: .ASCIZ /%A SEEK RETRY#%D2%N/
 MDWTRT: .ASCIZ /%A DATA WRITE RETRY#%D2%N/
 MWTRT: .ASCIZ /%A WRITE RETRY#%D2%N/
 MDRDRT: .ASCIZ /%A DATA READ RETRY#%D2%N/
 MRDRT: .ASCIZ /%A READ RETRY#%D2%N/
 MCWTRT: .ASCIZ /%A CRC WRITE RETRY#%D2%N/
 MCRDRT: .ASCIZ /%A CRC READ RETRY#%D2%N/
 .EVEN
 :MOD 2.5.1 ----- END MODULE -----

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MOD 2.6 - SET DRIVES DONE

```

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
4565 032426 006101      BDA26: ROL      R1      ; SET CARRY BIT
4566 032430 005303      DEC      R3      ; MOVE DRV BIT
4567 032432 005703      TST      R3      ; DECREMENT UNIT UNDER TEST
4568 032434 002374      DUA26: BGE      BDA26      ; DO UNTIL UNIT UNDER TST
4569 032436 050137 021444      BIS      R1,DRVDN      ; EQUALS -1
4570 032442 000207      END26: RTS      PC      ; THEN SET THIS DRV DONE
4571      ;MOD 2.6 ---- END MODULE -----

```

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MOD 3.0 - OUTPUT EXERCISE COMPLETE

```
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 -----
```

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MOD 4.0 - OUTPUT SYSTEM ERROR

```

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      -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 141
MOD 4.0 - OUTPUT SYSTEM ERROR

```

4634
4635
4636 032700      040      116      117
4637 032733      040      116      117
4638 032764      040      116      117
4639 033010      040      116      117
4640 033033      040      116      117
4641 033072      040      127      122
4642 033122      040      127      122
4643 033151      040      125      116
4644 033161      040      125      116
4645 033171      040      104      111
4646 033225      040      104      105
4647 033242      040      124      111
4648 033302      040      125      116
4649 033335      045      116      045
4650 033363      045      116      045
4651
4652 033416 032700      SE1:      .EVEN
4653 033420 032733      .WORD      SYSE4
4654 033422 032764      .WORD      SYSE5
4655 033424 033010      .WORD      SYSE6
4656 033426 033033      .WORD      SYSE7
4657 033430 033072      .WORD      SYSE8
4658 033432 033122      .WORD      SYSE9
4659 033434 033151      .WORD      SYSE10
4660 033436 033161      .WORD      SYSE11
4661 033440 033171      .WORD      SYSE12
4662 033442 033225      .WORD      SYSE13
4663 033444 033242      .WORD      SYSE14
4664 033446 033302      .WORD      SYSE15
4665
4666
4667
4668 033450      004
4669 033451      002
4670 033452      002
4671 033453      002
4672 033454      004
4673 033455      004
4674 033456      000
4675 033457      000
4676 033460      002
4677 033461      002
4678 033462      004
4679 033463      004
4680 033464      004
4681
4682

```

```

SYSE4: .ASCIZ / NO DONE BIT ON INITIALIZE/
SYSE5: .ASCIZ / NO DONE BIT ON FUNCTION/
SYSE6: .ASCIZ / NO DRIVE READY BIT/
SYSE7: .ASCIZ / NO SIDE READY BIT/
SYSE8: .ASCIZ / NO DONE BIT AFTER READ STATUS/
SYSE9: .ASCIZ / WRONG DRIVE RESPONDING/
SYSE10: .ASCIZ / WRONG SIDE RESPONDING/
SYSE11: .ASCIZ / UNUSED/
SYSE12: .ASCIZ / UNUSED/
SYSE13: .ASCIZ / DISKETTE WRONG DENSITY ERR/
SYSE14: .ASCIZ / DENSITY ERR/
SYSE15: .ASCIZ / TIME OUT ON "TR" OR "DONE" BIT/
SYSE16: .ASCIZ / UNCLASSIFIED SYSTEM ERROR/
FUNCT: .ASCIZ /%N%AFUNCTION CODE:%03/
ERRORS: .ASCIZ /%N%ASYSTEM ERROR REG=%B%N/

```

```

SE1:      .WORD      SYSE4
          .WORD      SYSE5
          .WORD      SYSE6
          .WORD      SYSE7
          .WORD      SYSE8
          .WORD      SYSE9
          .WORD      SYSE10
          .WORD      SYSE11
          .WORD      SYSE12
          .WORD      SYSE13
          .WORD      SYSE14
          .WORD      SYSE15
          .WORD      SYSE16

```

```

;-----
;ERROR      - CLASS      -ERR#
;-----
;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
;UNUSED               - 0
;UNUSED               - 0
;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

```

```

;MOD 4.0 ----- END MODULE -----

```

HARDWARE TESTS MACRO M1200 15-DEC-82 13:50 PAGE 143
 - MOD INTR.1 - INTERRUPT HANDLER #0

```

4685 .SBTTL - MOD INTR.1 - INTERRUPT HANDLER #0
4686 -----
4687 033466 013737 002220 033542 INTH0: MOV UOADR,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

PARAMETER CODING
- DATA BUFFERS

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4741
4752
4753
4789
4790
4791
4792
4793
4794
4795
4796
4797
4798
4799 035010
4800
4801 035012
4802 035022
4803 035032
4804 035044
4805
4806 035056
4807
4813 035060
4814
4815 035060 122 130 040
4816 035073 126 105 103
4817 035106 104 122 111
4818 035121 105 130 120
4819
4820

.TITLE PARAMETER CODING

.SBTTL HARDWARE PARAMETER CODING SECTION

```

:++
: THE HARDWARE 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.
:--

```

BGNHRD

```

GPRMA MSG1,0,0,0,177777,YES
GPRMA MSG2,2,0,0,177777,YES
GPRMD MSG3,4,0,177777,0.,1.,YES
GPRMD MSG4,6,0,177777,0.,1.,YES

```

EXIT HRD

ENDHRD

```

:-----
MSG1: .ASCIZ /RX BUS ADR/
MSG2: .ASCIZ /VECTOR ADR/
MSG3: .ASCIZ /DRIVE # /
MSG4: .ASCIZ /EXP WRD-CR/
:-----

```

.EVEN

PARAMETER CODING MACRO M1200 15-DEC-82 13:50 PAGE 147
SOFTWARE PARAMETER CODING SECTION

4829
4830
4831
4832
4833
4834
4835
4836
4837
4838
4839
4840 035134
4841
4842 035136
4843 035144
4844 035146
4845 035154
4846 035166
4847 035200
4848 035212
4849 035224
4850 035232
4851 035240
4852 035246
4853 035250
4854 035256
4855 035264
4856 035272
4857 035300
4858 035306
4859 035310
4860 035322
4861 035334
4862 035342
4863 035344
4864 035356
4865 035370
4866 035376
4867
4874
4875
4876
4877 035400

.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.
:--

BGNSFT

GPRML MSG6,2,1,YES
XFERF 1\$
GPRML MSG7,2,2,YES
1\$: GPRMD MSG8,4,0,177777,0,6,YES
GPRMD MSG11,6,0,177777,0,6,YES
GPRMD MSG14,10,0,177777,0,6,YES
GPRMD MSG9,24,0,177777,1,10000,YES
GPRML MSG15,12,1,YES
GPRML MSG16,12,2,YES
GPRML MSG17,2,100,YES
XFERF 4\$
GPRML MSG18,12,4,YES
GPRML MSG19,12,10,YES
GPRML MSG20,12,20,YES
GPRML MSG21,12,40,YES
4\$: GPRML MSG22,2,200,YES
XFERF 5\$
GPRMD MSG23,14,D,177777,0,76,YES
GPRMD MSG24,16,D,177777,0,76,YES
5\$: GPRML MSG25,2,400,YES
XFERF 6\$
GPRMD MSG26,20,D,177777,1,26,YES
GPRMD MSG27,22,D,177777,1,26,YES
6\$: GPRML MSG5,0,177777,YES
EXIT SFT

.EVEN

ENDSFT

PARAMETER CODING MACRO M1200 15-DEC-82 13:50 PAGE 149
SOFTWARE PARAMETER CODING SECTION

```

4880
4881      000015      ;-----
4882      000012      CR==15      :CARRIAGE RETURN
4883 035400      122      130      130 MSG5: .ASCIIZ /RXXX EXPANSION TYPE <CR> /
4884 035432      110      105      114 MSG6: .ASCIIZ /HELP TEST SETUP /
4885 035453      105      130      105 MSG7: .ASCIIZ /EXERCISE OPTIONS/<CR><LF>
4886 035475      040      040      040 .ASCII / 0 = WRITE-READ-DATA CK & READ-DATA CK/<CR><LF>
4887 035547      040      040      040 .ASCII / 1 = WRITE ONLY/<CR><LF>
4888 035572      040      040      040 .ASCII / 2 = WRITE-READ/<CR><LF>
4889 035615      040      040      040 .ASCII / 3 = WRITE-READ-DATA CHECK/<CR><LF>
4890 035653      040      040      040 .ASCII / 4 = READ-DATA CHECK ONLY/<CR><LF>
4891 035710      040      040      040 .ASCII / 5 = READ ONLY (CRC CHECK)/<CR><LF>
4892 035746      040      040      040 .ASCII / 6 = WRITE-READ-DATA CHECK ON ALTERNATE DRIVES/<CR><LF>
4893 036030      104      101      124 .ASCII /DATA PATTERN OPTIONS/<CR><LF>
4894 036056      040      040      040 .ASCII / 0 = RANDOM/<CR><LF>
4895 036075      040      040      040 .ASCII / 1 = ZEROS/<CR><LF>
4896 036113      040      040      040 .ASCII / 2 = ONES/<CR><LF>
4897 036130      040      040      040 .ASCII / 3 = FLOATING ZERO/<CR><LF>
4898 036156      040      040      040 .ASCII / 4 = FLOATING ONE/<CR><LF>
4899 036203      040      040      040 .ASCII / 5 = 125/<CR><LF>
4900 036217      040      040      040 .ASCII / 6 = 333/<CR><LF>
4901 036233      124      122      101 .ASCII /TRACK SEQUENCE OPTIONS/<CR><LF>
4902 036263      040      040      040 .ASCII / 0 = RANDOM/<CR><LF>
4903 036302      040      040      040 .ASCII / 1 = INCREMENT O.D./<CR><LF>
4904 036331      040      040      040 .ASCII / 2 = DECREMENT I.D./<CR><LF>
4905 036360      040      040      040 .ASCII / 3 = INCREMENT O.D.-DECREMENT I.D./<CR><LF>
4906 036426      040      040      040 .ASCII / 4 = BOUNCE BETWEEN I.D. & O.D./<CR><LF>
4907 036471      040      040      040 .ASCII / 5 = BOUNCE BETWEEN INCR. O.D. & DECR. I.D./<CR><LF>
4908 036550      040      040      040 .ASCII / 6 = BOUNCE BETWEEN O.D. & DECR. I.D./<CR><LF>
4909 036621      040      040      040 .ASCII / (O.D. = OUTSIDE DIA. & I.D. = INSIDE DIA.)/<CR><LF>
4910 036703      055      076      104 .ASCII /->DEVICE FATAL THRESHOLD LVL=NO. OF HARD ERRS THAT CAUSE DEVICE FATAL ERR/<
4911 037016      040      040      111 .ASCII / IF DRS 'EVL' FLAG IS SET, BUT HARD ERR WILL STILL LOG AS A HARD ERR./<CR>
4912 037126      040      040      124 .ASCII / THE 'EVL' FLAG WILL CAUSE 10 RETRIED SOFT ERRS TO BECOME A HARD ERR/<CR><
4913 037235      124      131      120 .ASCIIZ /TYPE 'CR' TO CONTINUE/
4914 037263      105      130      105 MSG8: .ASCIIZ /EXERCISE # (0-6)/
4915 037312      104      101      124 MSG11: .ASCIIZ /DATA PATTERN # (0-6)/
4916 037341      124      122      101 MSG14: .ASCIIZ /TRACK SEQUENCE # (0-6)/
4917 037370      104      105      126 MSG9: .ASCIIZ /DEVICE FATAL THRESHOLD LEVEL/
4918 037425      122      125      116 MSG15: .ASCIIZ /RUN TEST IN DOUBLE DENSITY /
4919 037463      122      125      116 MSG16: .ASCIIZ /RUN TEST IN DELETED DATA MODE/
4920 037521      101      116      131 MSG17: .ASCIIZ /ANY PROGRAM CONTROL FLAGS /
4921 037557      040      040      040 MSG18: .ASCIIZ / RETRY ON ERROR, LOG SOFT & HARD ERRS/
4922 037627      040      040      040 MSG19: .ASCIIZ / RECALIBRATE ON SEEK ERRORS /
4923 037677      040      040      040 MSG20: .ASCIIZ / PRINT ONLY 10 DATA ERRORS & CONTINUE/
4924 037747      040      040      040 MSG21: .ASCIIZ / CLEAR STATISTICAL TABLES NEXT PASS /
4925 040017      115      117      104 MSG22: .ASCIIZ /MODIFY TRACK ADDRESS LIMITS /
4926 040055      040      040      040 MSG23: .ASCIIZ / OUTER DIAMETER ADR #/
4927 040105      040      040      040 MSG24: .ASCIIZ / INNER DIAMETER ADR #/
4928 040135      115      117      104 MSG25: .ASCIIZ /MODIFY SECTOR ADDRESS LIMITS /
4929 040173      040      040      040 MSG26: .ASCIIZ / MIN. SECTOR ADR #/
4930 040220      040      040      040 MSG27: .ASCIIZ / MAX. SECTOR ADR #/
4931
4932      ;-----
      .EVEN

```

PARAMETER CODING
- PATCH AREA

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4935
4936
4937 040246 000000
4938 040450
4939
4940
4947
4948
4949 040450
040454
4950 040454
4951
4952 040454
4953 040454
4954 040460 177170
4955 040462 000264
4956 040464 000000
4957 040466 000000
4958 040470
4959 040470
4960 040474 177170
4961 040476 000264
4962 040500 000001
4963 040502 000000
4964 040504
4965 040504
4966 000001

.SBTTL - PATCH AREA

PATCH: 0 ;PATCH AREA

.=.+200

L\$LAST:: LASTAD

ENDMOD

BGNSETUP

2

BGNPTAB

177170

264

0

0

ENDPTAB

BGNPTAB

177170

264

1

0

ENDPTAB

ENDSETUP

.END

PARAMETER CODING
SYMBOL TABLE

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ABORT	002270	BYTNUM	026052	C\$GPHR=	000042	DUC20	021000	EF09	=	000011	G
ADR	= 000020	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	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	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	
BDSVCD	021434	CSREV	027072	C\$RFLA=	000021	EC10	003555	EIB23		022646	
BF243	027322	CSRUUT	002246	C\$RPT =	000025	EC11	003603	EIB234		025012	
BG00	013566	CTK0	033546	C\$SEFG=	000046	EC12	003660	EIB251		032102	
BIT0	= 000001	CTK1	033547	C\$SPRI=	000041	EC13	003717	EIB26		032416	
BIT00	= 000001	CTRK	023306	C\$SVEC=	000037	EC14	003775	EIC11		011756	
BIT01	= 000002	CURSEC	023710	C\$TPRI=	000013	EC15	004021	EIC11		014212	
BIT02	= 000004	CURTRK	024240	DAERCT	026054	EC16	004107	EIC121		015212	
BIT03	= 000010	CVSTUT	004756	DARDRT	002320	EC17	004153	EIC20		021106	
BIT04	= 000020	CVUNIT	004752	DATA	007474	EC2	003236	EIC25		031126	
BIT05	= 000040	CVUTST	004654	DATART	002316	EC20	004207	EIC40		032652	
BIT06	= 000100	C\$AU =	000052	DATASB	026056	EC21	004254	EID121		015226	
BIT07	= 000200	C\$AUTO=	000061	DATAWS	026060	EC22	004311	EID23		023032	
BIT08	= 000400	C\$BRK =	000022	DATA0	017520	EC23	004360	EID232		024162	
BIT09	= 001000	C\$BSEG=	000004	DATA1	017536	EC24	004413	EID233		024366	
BIT1	= 000002	C\$BSUB=	000002	DATBUF	034406	EC2432	030064	EIE12		014564	
BIT10	= 002000	C\$CEFG=	000045	DATBYT	017746	EC25	004442	EIE21		022146	
BIT11	= 004000	C\$CLCK=	000062	DATPAT	034006	EC3	003304	EIE22		022456	
BIT12	= 010000	C\$CLEA=	000012	DAWTRT	002322	EC4	003332	EIE23		023134	
BIT13	= 020000	C\$CLOS=	000035	DBADR	025032	EC5	003400	EIF11		012224	
BIT14	= 040000	C\$CLP1=	000006	DDERCT	002330	EC6	003451	EIF20		021154	
BIT15	= 000040	C\$CVEC=	000036	DELAY	025230	EC7	003477	EIF21		022122	
BIT2	= 000004	C\$DCLN=	000044	DE DAT	002244	EDB241	026042	EIF241		025742	
BIT3	= 000010	C\$DODU=	000051	DEN	002242	EDC20	021404	EIF25		031116	
BIT4	= 000020	C\$DRPT=	000024	DFPTBL	002160	ED00	013746	EIH20		021232	
BIT5	= 000040	C\$DU =	000053	DFTL	002216	ED1211	016000	EIH232		024012	
BIT6	= 000100	C\$EDIT=	000003	DIAGMC=	000000	ED2341	025102	EIH234		024712	
BIT7	= 000200	C\$ERDF=	000055	DLDTER	007504	EF.CON=	000036	EII21		022116	
BIT8	= 000400	C\$ERHR=	000056	DLY	025224	EF.NEW=	000035	EII231		023370	
BIT9	= 001000	C\$ERRO=	000060	DMSG1	026064	EF.PWR=	000034	EIJ23		023200	
BK243	027550	C\$ERSF=	000054	DMSG2	026161	EF.RES=	000037	EIK234		024560	
BOE	= 000400	C\$ERSO=	000057	DNBIT =	000040	EF.STA=	000040	EIM241		025702	
BRONPT	017462	C\$ESCA=	000010	DNFLAG	025226	EF01	= 000001	EI243		027576	
BRONTK	020126	C\$ESEG=	000005	DRIVEN	015270	EF02	= 000002	ELA10		014054	
BTHDRV	021432	C\$ESUB=	000003	DRVDN	021444	EF03	= 000003	ELA11		014120	
BTRK	033553	C\$ETST=	000001	DRVFN	023332	EF04	= 000004	ELA12		014270	
BTRP4	= 000004	C\$EXIT=	000032	DRVTST	023324	EF05	= 000005	ELA20		020774	
BTRP6	= 000004	C\$GETB=	000026	DUA121	015246	EF06	= 000006	ELA231		023462	
BUFERL	007364	C\$GETW=	000027	DUA26	032434	EF07	= 000007	ELA241		025500	
BYTCNT	026050	C\$GMAN=	000043	DUB20	021370	EF08	= 000010	ELA25		030740	

PARAMETER CODING
SYMBOL TABLE

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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	GTDFVN	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\$CNT0=	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	013711
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\$OFFS1=	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	IFA11	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
ELG11	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
ELH11	012066	ERT11	031423	F\$BGN=	000040	HELP	= 000000	IFA232	024024
ELH12	014412	ERT12	031435	F\$CLEA=	000007	HOE	= 100000 G	IFA233	024262
ELH20	021224	ERT13	031450	F\$DU	= 000016	HRD	007544	IFA234	024450
ELH231	023452	ERT14	031507	F\$END	= 000041	HSEK	007514	IFA24	025360
ELH234	024622	ERT15	031546	F\$HARD=	000004	HWRT	007554	IFA241	025456
ELH251	032060	ERT16	031601	F\$HW	= 000013	IAATDP	012552	IFA242	026232
ELI11	012250	ERT2	031210	F\$INIT=	000006	IA00	005112	IFA244	030506
ELJ21	022064	ERT3	031221	F\$JMP	= 000050	IA1211	015324	IFA25	030720
ELK11	012146	ERT4	031235	F\$MOD	= 000000	IA24U1	030360	IFA251	031700
ELK20	020744	ERT5	031247	F\$MSG	= 000011	IA243	027242	IFA26	032354
ELK234	024552	ERT6	031263	F\$PROT=	000021	IA2431	027672	IFA40	032510
ELL11	012210	ERT7	031315	F\$PWR	= 000017	IA2432	027724	IFB11	011710
ELL20	021270	ERT8	031344	F\$RPT	= 000012	IA2433	030114	IFB10	014024
ELM242	026650	ERT9	031360	F\$SEG	= 000003	IA2434	030234	IFB12	014316
ELN21	021704	ESCLAS	033450	F\$SOFT=	000005	IBATDP	012574	IFB121	015010
ENDCVT	004750	ESREV	027074	F\$SRV	= 000010	IBE	= 010000 G	IFB13	017342
ENDI1	012324	ESRUUT	002250	F\$SUB	= 000002	IBU234	025126	IFB20	021036
ENDLD	017742	ETCLAS	031656	F\$SW	= 000014	IB00	013700	IFB21	021546
ENDRPT	005406	ETSAV	027606	F\$TEST=	000001			IFB22	022332

PARAMETER CODING
SYMBOL TABLE

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IFB23	022606	IFE251	022016	IFM20	021356	ITER2	017116	LOE	=	040000	G	
IFB231	023504	IF11	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	LSACP		002110	G	
IFB242	026326	IFF20	021122	IFN21	021664	ITMSG2	016357	LSAPT		002036	G	
IFB244	030524	IFF21	021510	IFN242	026702	ITMSG3	016401	LSAU		013562	G	
IFB25	030770	IFF23	023072	IFO21	022076	ITMSG4	016454	LSAUT		002070	G	
IFB251	031706	IFF231	023552	IFO242	026742	ITMSG5	016521	LSAUTO		012552	G	
IFB26	032370	IFF232	024064	IFP242	026750	ITMSG6	016576	LSCCP		002106	G	
IFB40	032554	IFF241	025614	IFQ242	026770	ITMSG7	016652	LSCLEA		012522	G	
IFC11	011724	IFF242	026722	IFR242	027006	ITMSG8	016704	LSCO		002032	G	
IFC11	014166	IFF25	031060	IFS242	027050	ITMSG9	016753	LSDEPO		002011	G	
IFC12	014420	IFF251	032026	IFU242	027024	ITPRNT	016102	LSDESC		002122	G	
IFC121	015116	IFG11	011776	IFV242	027032	IXE	=	004000	G	LSDESP	002076	G
IFC13	017350	IFG12	014576	IFX242	026424	ISAU	=	000041		LSDEVP	002060	G
IFC20	021052	IFG20	021142	IF00	013776	ISAUTO	=	000041		LSDISP	002154	G
IFC21	021570	IFG21	021714	IF1211	015464	ISCLN	=	000041		LSDLY	002116	G
IFC22	022360	IFG23	023040	IGATDP	012602	ISDU	=	000041		LSDTP	002040	G
IFC23	022714	IFG231	023422	IG1211	015502	ISHRD	=	000041		LSDTYP	002034	G
IFC231	023526	IFG232	024102	IG243	027422	ISINIT	=	000041		LSDU	013274	G
IFC232	024136	IFG242	026506	IHATDP	012616	ISMOD	=	000041		LSDUT	002072	G
IFC233	024322	IFG251	031750	IH1211	015554	ISMSG	=	000041		LSDVTY	002346	G
IFC234	024602	IFH11	012040	IH243	027456	ISPROT	=	000040		LSEF	002052	G
IFC241	025560	IFH12	014400	IIATDP	012644	ISPTAB	=	000041		LSENV1	002044	G
IFC242	026266	IFH121	015076	II1211	015662	ISPR	=	000041		LSERRT	002374	G
IFC244	030536	IFH20	021210	II243	027516	ISRPT	=	000041		LSETP	002102	G
IFC25	031030	IFH21	021752	IJATDP	012660	ISSEG	=	000041		LSEXP1	002046	G
IFC251	031730	IFH23	023154	IJ1211	015672	ISSETU	=	000041		LSEXP4	002064	G
IFC40	032614	IFH231	023432	IJ243	027530	ISSFT	=	000041		LSEXP5	002066	G
IFD11	011744	IFH232	023756	IKATDP	012726	ISSRV	=	000041		LSHARD	035012	G
IFD12	014430	IFH234	024474	ILATDP	012742	ISSUB	=	000041		LSHIME	002120	G
IFD121	015156	IFH242	026536	INCSAD	033542	ISTST	=	000041		LSHPCP	002016	G
IFD21	021622	IFH251	032036	INCTRK	021436	JSJMP	=	000167		LSHPTP	002022	G
IFD22	022402	IFI11	012104	INDITK	002210	LAREC		005130		LSHW	002160	G
IFD23	022742	IFI121	015136	INIT	011250	LA2432		030006		LSICP	002104	G
IFD231	023544	IFI20	021064	INITER	011470	LA2433		030176		LSINIT	011250	G
IFD232	024146	IFI21	021774	INITL	014016	LBU234		025154		LSLADP	002026	G
IFD233	024344	IFI23	022552	INITTK	024252	LB1211		015366		LSLAST	040454	G
IFD234	024612	IFI231	023346	INMSG2	012332	LB24U1		030424		LSLOAD	002100	G
IFD241	025570	IFI241	025462	INMSG3	012432	LB2432		027762		LSLUN	002074	G
IFD242	026444	IFI242	026516	INTCMD	015266	LB2433		030152		LSMREV	002050	G
IFD244	030544	IFJ11	012114	INTER	007414	LB2434		030270		LSNAME	002000	G
IFD25	031156	IFJ21	022030	INTER1	011606	LC243		027402		LSPRIO	002042	G
IFD251	031740	IFJ23	022706	INTER2	016167	LC2432		030050		LSPROT	011242	G
IFE11	011764	IFJ241	025762	INTER3	016235	LD00		013742		LSPT	002112	G
IFE12	014444	IFJ242	026546	INTER4	016305	LD1211		015772		LSREPP	002062	G
IFE121	015164	IFK11	012124	INTH0	033466	LEU234		025204		LSREV	002010	G
IFE21	022136	IFK20	020700	INTH1	033502	LE1211		015762		LSRPT	005140	G
IFE22	022430	IFK21	021576	INTLV	023706	LF	=	000012	G	LSOFT	035136	G
IFE23	023064	IFK234	024532	ISR	=	000100	G	LF00		LSOFT	035136	G
IFE232	024170	IFK241	025770	ITCSAD	015272	LH1211		015742		LSOFT	035136	G
IFE233	024302	IFK242	026574	ITDBAD	015274	LINECT		005636		LSOFT	035136	G
IFE234	024744	IFL11	012164	ITDROP	016064	LINES		005640		LSOFT	035136	G
IFE241	025604	IFL20	021246	ITERMG	016132	LINTYP		005642		LSOFT	035136	G
IFE242	026460	IFL21	021476	ITERR	016016	LI1211		015732		LSOFT	035136	G
IFE244	030564	IFL241	026000	ITERUT	016153	LI243		027572		LSOFT	035136	G
IFE25	031074	IFL242	026656	ITER1	017032	LOAD		017704		LSOFT	035136	G

PARAMETER CODING
SYMBOL TABLE

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L10000	002170	NSEC	023674	PRI02 =	000100	G	SDD	002230	SYSE8	033033	
L10001	002220	NXSCSA	023656	PRI03 =	000140	G	SECADR	025040	SYSE9	033072	
L10002	004506	OD	020650	PRI04 =	000200	G	SECDN	002262	S\$LSYM=	010000	
L10003	004514	ODCOMP	020524	PRI05 =	000240	G	SECTOR	002256	TARGET	020640	
L10004	005406	ONEFIL=	000001	PRI06 =	000300	G	SEEK	023322	TEPRCT	022160	
L10006	011602	OTDITK	002206	PRI07 =	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	OSAPTS=	000000	PRTDAT	005510		SEQ3	020254	THE22	022440	
L10015	013750	OSAU =	000001	PRTECD	002272		SEQ4	020272	THE234	024754	
L10016	035060	OSBGNR=	000001	PRTECD	002272		SEQ5	020340	THF231	023560	
L10017	035400	OSBGNS=	000001	PRTECD	002404		SEQ6	020422	THF241	025624	
L10020	040460	OSDU =	000001	PRTHDR	005414		SEQ7	020476	TKTBPT	020634	
L10021	040474	OSERRT=	000001	PRT1	005504		SETUP	011364	TKTL	024242	
L10022	040470	OSGNSW=	000001	PRT2	005506		SE1	033416	TKXX	010070	
L10024	040504	OSPOIN=	000001	PTDAT1	006243		SFERLG	030344	TRACK	002254	
MAXSEC	002214	OSSETU=	000001	PTEC	006200		SFERR	021446	TRAP	013260	
MAXTRK	024234	PAR	006026	PTECN	006327		SFPTBL	002172	TRBIT =	000200	G
MCRDRT	032321	PAT	017750	PTFMN1	006315		SFTSTS	033552	TRKADR	025036	
MCWTRT	032270	PATCH	040246	PTHEAD	026062		SOFT =	000003	TRKCNT	020636	
MDRDRT	032213	PAT125	017622	PTRDSC	006116		SSEC	023664	TRKDN	002260	
MDWTRT	032134	PAT333	017646	PTRTY	031676		STCNTR	027616	TRKDNF	024230	
MINSEC	002212	PG	017524	PTTK	006225		STDVDN	032352	TRKINC	024236	
MINTRK	024232	PLOC	011604	PTTKN	006343		STERRG	027614	TRKSEQ	002202	
MRDRT	032244	PNT =	001000	PTUNT1	006253		STKSEQ	017752	TRKTBL	033554	
MSG1	035060	POWERF=	000001	PTUNT2	006274		STSCDN	023712	TRPMS1	013144	
MSG11	037312	PREPT1	006002	PTWTSC	006147		STSCFG	023662	TSVCT	022162	
MSG14	037341	PREPT2	006030	PT19SP	006105		STSTPA	017376	TSEC	033551	
MSG15	037425	PREPT3	006050	PT20SP	006074		SUM	017744	TST	021422	
MSG16	037463	PRESCK	020536	RANDAT	017656		SUT	002232	TSTCK	027626	
MSG17	037521	PRESTK	020642	RANGEN	004560		SUTCV	004754	TSTEV	025410	
MSG18	037557	PRI =	002000	RANUM	004652		SUTDRP	013440	TSTN	002176	
MSG19	037627	PRIDXX	006360	RAN1	004646		SUTPOS	015302	TSTPAT	002200	
MSG2	035073	PRID01	006426	RAN2	004650		SUTPTR	021426	TSTPTR	022152	
MSG20	037677	PRID02	006455	RD	007454		SVCGBL=	000000	TSTSUT	022502	
MSG21	037747	PRID03	006504	RDERCD	005026		SVCINS=	177777	TSTWD	022156	
MSG22	040017	PRID04	006533	RDYWD	025330		SVCSUB=	177777	TTRK	033550	
MSG23	040055	PRID05	006562	READRT	002324		SVCTAG=	177777	TSARGC=	000004	
MSG24	040105	PRID06	006611	READSC	007314		SVCTST=	177777	TSCODE=	001004	
MSG25	040135	PRID07	006640	RECCMD	005136		SVUTRG	033516	TSERRN=	000000	
MSG26	040173	PRID08	006667	REFCMD	015264		SWREG	002204	TSEXCP=	000000	
MSG27	040220	PRID09	006716	REFDRV	015306		SYFT =	000000	TSFLAG=	000041	
MSG3	035106	PRID10	006745	REPORT	005140		SYSE10	033122	TSFREE=	040504	
MSG4	035121	PRID11	006774	RESTAR=	000002	G	SYSE11	033151	TS\$GMAN=	000000	
MSG5	035400	PRID12	007023	RETRY	002304		SYSE12	033161	TS\$HIL1=	000032	
MSG6	035432	PRID13	007052	RTMASK	030474		SYSE13	033171	TS\$LAST=	000001	
MSG7	035453	PRID14	007101	RTOFF	027624		SYSE14	033225	TS\$LOLI=	000001	
MSG8	037263	PRID15	007130	RXXX	002172		SYSE15	033242	TS\$LSYM=	010000	
MSG9	037370	PRID16	007157	KX2BIT=	004000	G	SYSE16	033302	TS\$LTNO=	000001	
MSKRT	032110	PRID17	007206	RYDLY	025326		SYSE4	032700	TS\$NEST=	177777	
MWTRT	032166	PRID18	007235	RYDX	025324		SYSE5	032733	TS\$NS0 =	000000	
NEWTRK	020572	PRID19	007264	SAVDLY	016014		SYSE6	032764	TS\$NS1 =	000005	
NOERL	007374	PRI00 =	000000	SCPSCI	023660		SYSE7	033010	TS\$NS2 =	000003	
NONE	004506	PRI01 =	000040	SCSYEX	020676				TS\$PCNT=	000000	

PARAMETER CODING
SYMBOL TABLE

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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	UOADR 002220	XOD 020644
T\$SEKO= 010003	T\$\$RPT= 010004	UNIT 002334	UOJECT 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	XJPSC 030340
T\$TEMP= 000000	T\$\$TES= 010013	UNTC0 015300	WC 033545	XU23 025322
T\$TEST= 000001	TOMSG 013124	UNTCNT 015276	WDCNT 002252	XU234 025212
T\$TSTM= 177777	T1 013564 G	UNTCOD 012326	WDC 023326	XXPG 017630
T\$TSTS= 000001	T1.1 013566	UPDVST 027230	WDOT 023530	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	WRTT 002326	X1211 016012
T\$\$DU = 010011	UDCRST 027722	UT00 002336	XATDP 012766	X24U1 030470
T\$\$HAR= 010016	UDHDST 027670	UT01 002340	XDVST 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	CREF	V01							
SYMBOL	CROSS REFERENCE	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	#19-1062	58-2155	58-2157								
BTRP6	=	000006	#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	#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									
			#48-1842										
CRC		007434	#48-1843										
CRCBAD		007444	#21-1126										
CRCBRT		002312	#21-1127	133-4515	133-4530								
CRCERT		002314	*95-3400	*95-3437	107-3676	107-3681	#107-3740	107-3752	107-3755	109-3771	109-3779		
CSADR		025034	95-3364	95-3377	#97-3447								
CSEC		023276	*37-1540	*71-2444	*71-2453	*71-2481	*73-2557	*77-2646	*77-2655	*107-3752	109-3800		
CSRADR		025332	109-3807	*109-3808	109-3809	#109-3815	*115-3929	*115-3951					
			*115-3923	115-3926	115-3969	115-3973	115-4024	#115-4031					
CSREV		027072	#21-1104	27-1257	*67-2345	*77-2661	*109-3807	115-3923	*143-4703				
CSRUUT		002246	27-1260	#143-4714									
CTKO		033546	27-1260	#143-4715									
CTK1		033547	95-3358	95-3373	#97-3451								
CTRK		023306	*95-3380	*95-3422	95-3424	*99-3487	*99-3499	#99-3550					
CURSEC		023710	*95-3376	95-3418	*101-3580	*101-3593	101-3600	*101-3602	101-3603	101-3605	*101-3613		
CURTRK		024240	*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			

CNRXDA		CREATED BY	MACRO ON 15-DEC-82 AT 13:51		PAGE 3								
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES		CREF	V01							
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										
DARTAT		002316	#21-1128	133-4512	133-4527								
DATASB		026056	*113-3877	113-3883	#113-3910								
DATAWS		026060	*113-3878	113-3883	#113-3911								
DATAO		017520	83-2797	#83-2805									
DATAI		017536	83-2798	#83-2811									
DATBUF		034406	107-3698	113-3848	113-3860	113-3898	#143-4734	*83-2832	*83-2836	*83-2839	*83-2843		
DATBYI		017746	*83-2805	*83-2811	*83-2814	*83-2826	*83-2829						
			83-2853	83-2854	#83-2865								
DATPAT		034006	83-2791	83-2794	95-3427	107-3696	113-3847	113-3859	#143-4731				

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE VALUE	MACRO ON 15-DEC-82 AT 13:51	PAGE 4 CREF	V01						
DAWTRT	002322	#21-1130								
DBADR	025032	*107-3678	107-3692	107-3700	107-3710	107-3715	107-3720	107-3729	#107-3739	
ORDERCT	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	#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	#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						
DRVON	021444	*87-3045	*87-3069	87-3080	*87-3091	#87-3131	*135-4569			
DRVEN	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	#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							

CNRXDA		CREATED BY	MACRO	ON 15-DEC-82 AT 13:51	PAGE 5					
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES		CREF	V01				
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						
EF.NEW	=	000035	G	#19-983						
EF.PWR	=	000034	G	#19-983				50-1898		
EF.RES	=	000037	G	#19-983				50-1911		
EF.STA	=	000040	G	#19-983				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						

CNRXDA	CREATED BY	MACRO	ON	15-DEC-82	AT	13:51	PAGE 6						
SYMBOL	CROSS REFERENCE						CREF	V01					
SYMBOL	VALUE	REFERENCES											
E1C11	014212	69-2429	#69-2431										
E1C121	015212	73-2563	73-2567	73-2571	#73-2579								
E1C20	021106	87-3066	#87-3071										
E1C25	031126	131-4410	131-4412	#131-4426									
E1C40	032652	139-4616	139-4618	#139-4625									
E1D121	015226	73-2573	73-2575	73-2577	#73-2583								
E1D23	023032	95-3396	#95-3403										
E1D232	024162	101-3609	#101-3613										
E1D233	024366	105-3662	#105-3664										
E1E12	014564	71-2492	#71-2494										
E1E21	022146	89-3223	#89-3225										
E1E22	022456	93-3317	93-3327	#93-3329									
E1E23	023134	95-3420	#95-3422										
E1F11	012224	52-1996	52-1999	52-2005	52-2008	52-2019	52-2022	52-2027	#52-2030				
E1F20	021154	87-3075	#87-3080										
E1F21	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									
E1F241	025742	113-3876	#113-3884										
E1F25	031116	131-4418	131-4421	#131-4424									
E1H20	021232	87-3089	#87-3091										
E1H232	024012	101-3573	#101-3581										
E1H234	024712	107-3702	#107-3717										
E1I21	022116	89-3204	89-3210	#89-3218									
E1I231	023370	99-3473	#99-3479										
E1J23	023200	95-3383	95-3404	95-3426	#95-3430								
E1K234	024560	107-3697	#107-3699										
E1M241	025702	113-3880	#113-3883										
E1243	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										

CNRXDA		CREATED BY	MACRO ON 15-DEC-82 AT 13:51		PAGE 7		
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES		REF	V01	
ELD11		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			
ELG11		012022	52-1993	#52-1997			
ELG12		014622	71-2497	#71-2501			
ELG21		021736	89-3187	#89-3191			
ELG251		031772	133-4511	#133-4515			
ELH11		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			
ELK11		012146	52-2016	#52-2020			
ELK20		020744	87-3039	#87-3047			
ELK234		024552	107-3695	#107-3698			
ELI11		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				
FNDST		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

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE	MACRO ON 15-DEC-82 AT 13:51	PAGE 8 CREF	V01						
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	*27-1247 #27-1252 *58-2168 *79-2695								
ERRMSG	002400	*27-1252 *58-2167 *79-2694 *131-4407 *131-4415 *139-4613 *139-4622								
ERRNBR	002376	*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	*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								

[illegible]

CNRXDA CREATED BY MACRO ON 15-DEC-82 AT 13:51 PAGE 10
 SYMBOL CROSS REFERENCE CREF V01
 SYMBOL VALUE REFERENCES

F\$HW	= 000013	#16-786 18-866 18-879
F\$INIT	= 000006	#16-786 50-1891 50-1935
F\$JMP	= 000050	#16-786 67-2381 145-4806 147-4866
F\$MOD	= 000000	#16-786 16-812 18-914 19-976 37-1553 38-1606 151-4950
F\$MSG	= 000011	#16-786 31-1348 31-1349 31-1367 31-1369
F\$PROT	= 000021	#16-786 48-1876 48-1880
F\$PWP	= 000017	#16-786
F\$RP	= 000012	#16-786 38-1614 38-1650
F\$SEG	= 000003	#16-786 73-2544 73-2580 77-2614 77-2682 87-3057 87-3116
F\$SOFT	= 000005	#16-786 147-4840 147-4843 147-4852 147-4858 147-4862 147-4866 147-4866 147-4866 147-4877
F\$SRV	= 000010	#16-786
F\$SUB	= 000002	#16-786 67-2337 67-2352 67-2358 67-2369
F\$SW	= 000014	#16-786 18-891 18-912
F\$TEST	= 000001	#16-786 67-2335 143-4738
GETSEC	023334	95-3423 #99-3469
GETTRK	023742	95-3417 #101-3570
GETTST	021454	87-3059 #89-3141
GPSUNO	014626	71-2442 #71-2507
GPSUN1	014702	71-2476 71-2518 #71-2524
GTD RV	022320	87-3098 #93-3306
GTD VFN	024254	95-3398 95-3432 #105-3642
GTEX	017302	69-2399 #81-2748
GTEXCD	014076	69-2395 #69-2413
GTSYEX	014022	67-2351 #69-2392
GTSYS	014216	69-2398 #71-2441
GTTK	020062	85-2896 #85-2899
G\$CNT0	= 000200	#16-786
G\$DELM	= 000372	#16-786
G\$DISP	= 000003	#16-786
G\$EXCP	= 000400	#16-786
G\$HILI	= 000002	#16-786
G\$LOLI	= 000001	#16-786
G\$NO	= 000000	#16-786
G\$OFFS	= 000400	#16-786 77-2632 145-4801 145-4802 145-4803 145-4804 147-4842 147-4844 147-4845
		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
G\$OFFSI	= 000376	#16-786 77-2632 145-4801 145-4802 145-4803 145-4804 147-4842 147-4844 147-4845
		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
G\$PRMA	= 000001	#16-786 145-4801 145-4802
G\$PRMD	= 000002	#16-786 145-4803 145-4804 147-4845 147-4846 147-4847 147-4848 147-4859 147-4860
		147-4863 147-4864
G\$PRML	= 000000	#16-786 77-2632 147-4842 147-4844 147-4849 147-4850 147-4851 147-4853 147-4854
		147-4855 147-4856 147-4857 147-4861 147-4865
G\$RADA	= 000140	#16-786
G\$RADB	= 000000	#16-786
G\$RADD	= 000040	#16-786 147-4848 147-4859 147-4860 147-4863 147-4864
G\$RADL	= 000120	#16-786 77-2632 147-4842 147-4844 147-4849 147-4850 147-4851 147-4853 147-4854
		147-4855 147-4856 147-4857 147-4861 147-4865
G\$RADO	= 000020	#16-786 145-4801 145-4802 145-4803 145-4804 147-4845 147-4846 147-4847
G\$XFER	= 000004	#16-786 145-4806 147-4843 147-4852 147-4858 147-4862 147-4866
G\$YES	= 000010	#16-786 77-2632 145-4801 145-4802 145-4803 145-4804 147-4842 147-4844 147-4845

CNRXDA SYMBOL SYMBOL	CREATED BY CROSS REFERENCE VALUE	MACRO ON 15-DEC-82 AT 13:51	PAGE 11 CREF V01								
		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							
HURT	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</										

CNRXDA CREATED BY MACRO ON 15-DEC-82 AT 13:51 PAGE 12
 SYMBOL CROSS REFERENCE CREF V01
 SYMBOL VALUE REFERENCES

IEATDP	012720	#56-2120		
IER	= 020000	#19-983		
IEU234	025164	#109-3779		
IE00	013726	#67-2363		
IE1211	015444	#77-2633		
IFA11	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		
IFA25	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		

CNRYDA		CREATED BY	MACRO	ON 15-DEC-82 AT 13:51	PAGE 13
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES		REF V01
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		

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE VALUE	MACRO ON 15-DEC-82 AT 13:51 REFERENCES	PAGE 14 CREF V01
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	

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE	MACRO ON 15-DEC-82 AT 13:51	PAGE 15 CREF V01						
IFN242	026702	115-3964	115-3974	115-3995	#115-3998				
IFO21	022076	#89-3213							
IFO242	026742	#115-4007							
IFP242	026750	#115-4009							
IFO242	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							
INTER	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	#19-983							
ITCSAD	015272	*73-2538	73-2556	73-2557	73-2568	#75-2599	77-2645	77-2646	77-2655
		77-2663	77-2665	77-2668					
ITDBAD	015274	*73-2540	73-2560	73-2564	73-2576	#75-2600	77-2617	77-2624	77-2651
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						

(NRXDA		CREATED BY	MACRO	ON 15-DEC-82 AT 13:51	PAGE 16						
SYMBOL		CROSS REFERENCE			REF	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	
			*77-2627	*77-2670	*77-2672	*77-2674	*77-2678	*77-2680	79-2716	#79-2720	
										*77-2619	
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							
ISAU	=	000041	#16-786	#64-2264	#64-2272						
ISAUTO	=	000041	#16-786	#56-2091	#56-2132						
ISCLN	=	000041	#16-786	#54-2059	#54-2072						
ISDU	=	000041	#16-786	#62-2212	#62-2232						
ISHRD	=	000041	#145-4799	#145-4813							
ISINIT	=	000041	#16-786	#50-1891	#50-1935						
ISMOD	=	000041	#16-786	16-812	#16-812	18-914	#18-914	19-976	#19-976	37-1553	
			38-1606	#38-1606	151-4950	#151-4950				#37-1553	
ISMSG	=	000041	#16-786	#31-1348	#31-1349	#31-1367	#31-1369				
ISPROT	=	000040	#16-786	#48-1876							
ISPTAB	=	000041	#16-786	151-4953	#151-4953	151-4958	#151-4958	151-4959	#151-4959	151-4964	
ISPR	=	000041	#16-786							#151-4964	
ISRPT	=	000041	#16-786	#38-1614	#38-1650						
ISSEG	=	000041	#16-786	67-2335	67-2337	67-2358	#73-2544	#73-2580	#77-2614	#77-2682	
			#87-3116							#87-3057	
ISSETU	=	000041	#16-786	151-4952	#151-4952	151-4953	151-4959	151-4965	#151-4965		
ISSFT	=	000041	#147-4840	#147-4877							
ISSRV	=	000041	#16-786								
ISSUB	=	000041	#16-786	67-2335	67-2337	#67-2337	67-2352	#67-2352	#67-2352	67-2358	
			67-2369	#67-2369	#67-2369					#67-2358	
ISTST	=	000041	#16-786	67-2335	#67-2335	67-2337	67-2358	67-2381	143-4738	#143-4738	
JSJMP	=	000167	#16-786							#143-4738	
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							

CNRXDA	CREATED BY	MACRO	ON 15-DEC-82 AT 13:51	PAGE 17						
SYMBOL	CROSS REFERENCE			REF	V01					
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							
LF00	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								
LGT	= 000010 G	#19-983								
LSACP	002110 G	#16-829								
LSAPT	002036 G	#16-829								
LSAU	013562 G	16-829	#64-2264							
LSAUT	002070 G	#16-829								
LSAUTO	012552 G	16-829	#56-2091							
LSCCP	002106 G	#16-829								
LSCLEA	012522 G	16-829	#54-2059							
LSCO	002032 G	#16-829								
LSDEPO	002011 G	#16-829								
LSDESC	002122 G	16-829	#16-837							
LSDESP	002076 G	#16-829								
LSDEVP	002060 G	#16-829								
LSDISP	002154 G	16-829	#16-848							
LSDLV	002116 G	#16-829								
LSDTP	002040 G	#16-829								
LSDTYP	002034 G	#16-829								
LSDU	013274 G	16-829	#62-2212							
LSDUT	002072 G	#16-829								
LSDVTY	002346 G	16-829	#25-1209							
LSF	002052 G	#16-829								
LSENVI	002044 G	#16-829								
LSERRT	002374 G	16-829	#27-1252							
LSFTP	002102 G	#16-829								
LSEXP1	002046 G	#16-829								
LSEXP4	002064 G	#16-829								
LSEXP5	002066 G	#16-829								
LSHARD	035012 G	16-829	145-4799	#145-4799						
LSHIME	002120 G	#16-829								
LSHPCP	002016 G	#16-829								
LSHPTP	002022 G	#16-829								
LSHW	002160 G	16-829	18-866	#18-866						
LSICP	002104 G	#16-829								
LSINIT	011250 G	16-829	#50-1891							
LSLADP	002026 G	#16-829								
LSLAST	040454 G	16-829	#151-4949	151-4965						

CNRXDA	CREATED BY	MACRO	ON 15-DEC-82 AT 13:51	PAGE 18				
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	REF	V01			
LSLOAD	002100	G	#16-829					
LSLUN	002074	G	#16-829	*27-1248	*58-2161	*58-2163	*58-2165	*79-2697
LSMREV	002050	G	#16-829					
LSNAME	002000	G	#16-829					
LSPRIO	002042	G	#16-829					
LSPROT	011242	G	16-829	#48-1876				
LSPRT	002112	G	#16-829					
LSREPP	002062	G	#16-829					
LSREV	002010	G	#16-829					
LSRPT	005140	G	16-829	#38-1614				
LSOFT	035136	G	16-829	147-4840	#147-4840			
LSSPC	002056	G	#16-829					
LSSPCP	002020	G	#16-829					
LSSTP	002024	G	#16-829					
LSSTA	002030	G	#16-829					
LSW	002172	G	16-8	18-891	#18-891			
LSTEST	002114	G	#16-829					
LSIML	002014	G	#16-829					
LSUNIT	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	#151-4950				
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				

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE	MACRO	ON 15-DEC-82 AT 13:51	PAGE 19 CREF	V01							
SYMBOL	VALUE	REFERENCES										
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	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								
OTS YER	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			
OSAPTS	= 000000	#16-786	16-829									
OSAU	= 000001	#16-786	#16-819	16-829								
OSBGNR	= 000001	#16-786	#16-819	16-829								
OSBGNS	= 000001	#16-786	#16-819	16-829								
OSDU	= 000001	#16-786	#16-819	16-829								
GSERRT	= 000001	#16-786	#16-819	16-829								
OSGNSW	= 000001	#16-786	#16-819	16-829								
OSPOIN	= 000001	#16-786	#16-819	#16-819	#16-819	#16-819	#16-819	#16-819	#16-819	16-819		
		16-829										
OSSETU	= 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								

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE	MAJOR ON 15-DEC-82 AT 13:51	PAGE 20 CREF V01						
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							
PRIO0	= 000000 G	#19-983 #19-1051 109-3766							
PRIO1	= 000040 G	#19-983 #19-1050							
PRIO2	= 000100 G	#19-983 #19-1049							
PRIO3	= 000140 G	#19-983 #19-1048							
PRIO4	= 000200 G	#19-983 #19-1047							
PRIO5	= 000240 G	#19-983 #19-1046							
PRIO6	= 000300 G	#19-983 #19-1045 50-1931 50-1934 58-2155 109-3784							
PRIO7	= 000340 G	#19-983 #19-1044							
PRNUM	005644	*38-1625 *38-1635 *38-1645 40-1681 #40-1707							
PRIBOS	004516	#31-1371 71-2499 79-2717							
PRIB1	004510 G	#31-1367 58-2168							
PRIB1S	004536	31-1368 #31-1374 77-2654 79-2715 133-4535							
PRICTR	005646	38-1619 #42-1714							
PRIDAT	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							

CNRXDA		CREATED BY	MACRO ON 15-DEC-82 AT 13:51	PAGE 21
SYMBOL		CROSS REFERENCE		REF V01
SUBROUTINE NAME	VALUE	REFERENCES		
PTHEAD	026062	*113-3843	113-3879 *113-3881 #113-3912	
PTRDSC	006116	42-1717	#44-1771	
PIRTY	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	
		#21-1131	133-4533	
READRT	002324	42-1716	#48-1834 85-3023 *125-4274 *125-4276 *125-4278 *125-4280 *125-4282	
READSC	007314	*37-1535	*37-1536 37-1537 #37-1550	
RECCMD	005136	#75-2596	*77-2621 *77-2629 *77-2636 *77-2639 *77-2644 77-2645 77-2667	
REFCMD	015264	73-2583	#77-2611	
REFDRV	015306	#38-1615		
REPORT	005140	#19-1064	50-1913	
RESTAR =	000002 G	*87-3071	*87-3072 *87-3082 *87-3083 #87-3133 95-3354 95-3356 *95-3361	
RESTK	021450	#21-1123	*67-2341 89-3153 89-3194 89-3196 89-3199 *89-3202 89-3205 *89-3208	
RETRY	002304	*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	
RYDLV	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	
SCPSCI	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	
SEFKRI	002306	#21-1124	119-4132 127-4294 133-4503	
SEX	007424	#48-1841	127-4312	
SEQUEN	020654	*81-2750	*85-2899 85-2901 *85-2903 85-2904 #85-3014	
SEQI	020164	85-2909	#85-2917 85-2938	

[illegible]

PAGE 23
CREF V01

[illegible]

CNRXDA SYMBOL SYMBOL	CREATED BY CROSS REFERENCE VALUE	MACRO ON 15-DEC-82 AT 13:51	PAGE 24 CREF V01	REFERENCES	95-3386	95-3393	113-3875	127-4295							
SYFT	= 000000	G		#19-1061	139-4623										
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									
				*89-3162	89-3166	*89-3169	89-3186	*89-3188	*89-3191	*89-3216	*89-3218	#89-3231			
TBPRCT	022160			107-3684	#107-3686										
TMA234	024464			131-4391	#131-4398										
TMA25	030756			139-4599	#139-4605										
TMA40	032544			#99-3505											
TMB231	023514			81-2755	#81-2759										
TMC13	017366			95-3394	#95-3397										
TMD23	022772			93-3318	#93-3326										
TME22	022440			#107-3725											
TME234	024754			99-3489	#99-3518										
TMF231	023560			113-3874	#113-3877</										

CNRXDA		CREATED BY	MACRO	ON 15-DEC-82 AT 13:51	PAGE 25						
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES		REF	V01					
TSTEV		025410	*87-3103	111-3823	111-3825	111-3827	111-3830	#111-3834	115-3975	115-3981	115-3987
			115-4002	117-4040							
TSTIN		002176	#18-895	87-3058							
TSTPAT		002200	#18-896	81-2748							
TSTPIR		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	#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
			#27-1260	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	#113-3882	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	#145-4803	145-4803	#145-4803
			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	#147-4844	147-4844
			#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	#147-4847	147-4847
			#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	#147-4850	147-4850
			#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	#147-4854
			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	#147-4857
			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	#147-4863	147-4863
			#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

CNRXDA SYMBOL SYMBOL	CREATED BY CROSS REFERENCE VALUE	MACRO REFERENCES	ON 15-DEC-82 AT 13.51	PAGE 26 CREF V01						
T\$FREE	= 040504	147-4866								
T\$GMAN	= 000000	151-4949	#151-4965							
T\$HILI	= 000032	#16-786								
		#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	#31-1349	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	#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\$NSO	= 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		

CNRXDA SYMBOL	CREATED BY CROSS REFERENCE VALUE	MACRO	ON 15-DEC-82 AT 13:51	PAGE 27 CREF V01					
		REFERENCES							
		#31-1348	31-1367	31-1367	#31-1367	38-1614	38-1614	#38-1614	48-1876
		#48-1876	50-1891	50-1891	#50-1891	54-2059	54-2059	#54-2059	56-2091
		#56-2091	62-2212	62-2212	#62-2212	64-2264	64-2264	#64-2264	67-2335
		#67-2335	67-2337	67-2337	#67-2337	67-2358	67-2358	#67-2358	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	151-4959	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	#31-1349	31-1349	#31-1369	31-1369	#37-1553	37-1553	#38-1650
		#48-1880	48-1880	#50-1935	50-1935	#54-2072	54-2072	#56-2132	56-2132
		62-2232	#64-2272	64-2272	#67-2352	67-2352	#67-2369	67-2369	#67-2381
		#73-2580	73-2580	#77-2632	77-2632	#77-2632	77-2632	#77-2632	77-2632
		77-2682	#87-3116	87-3116	#143-4738	143-4738	#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	#145-4804	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	#147-4844	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	#147-4847	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	#147-4850	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	#147-4854	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	#147-4857	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	#147-4861	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	#147-4865	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
		31-1374	38-1650	44-1744	44-1756	44-1766	50-1897	50-1898	50-1902
		50-1923	50-1928	50-1930	50-1931	50-1934	50-1935	52-2037	52-2038
		54-2067	54-2070	54-2071	54-2072	56-2101	56-2104	56-2110	56-2113
		56-2127	56-2130	56-2132	58-2155	58-2157	58-2170	62-2222	62-2230
		64-2272	67-2337	67-2352	67-2358	67-2368	67-2369	67-2378	67-2380
		71-2441	73-2544	73-2580	77-2614	77-2630	77-2632	77-2682	79-2698
		87-3057	87-3116	89-3150	95-3381	109-3766	109-3784	113-3882	113-3883
T\$TSTS	= 000001	#16-786	#67-2335						
T\$SAU	= 010012	#64-2264	64-2272						
T\$SAUT	= 010010	#56-2091	56-2132						
T\$SCLE	= 010007	#54-2059	54-2072						
T\$SDAT	= 010024	#151-4953	151-4953	151-4958	#151-4959	151-4959	151-4964		
T\$SDU	= 010011	#62-2212	62-2232						
T\$SHAR	= 010016	#145-4799	145-4799	145-4806	145-4813				
T\$SHW	= 010000	#18-866	18-866	18-879					
T\$SINI	= 010006	#50-1891	50-1935						
T\$MSG	= 010003	#31-1348	31-1349	#31-1367	31-1369				
T\$SPC	= 000002	#151-4952	151-4965						
T\$SPRO	= 010005	#48-1876							
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SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01						
TSSRPT	=	010004	#38-1614	38-1650							
TSSSEG	=	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						
TSSSOF	=	010017	#147-4840	147-4840	147-4866	147-4877					
TSSSUB	=	010015	#67-2337	67-2352	#67-2358	67-2369					
TSSSW	=	010001	#18-891	18-891	18-912						
TSSSES	=	010013	#67-2335	67-2381	143-4738						
TOMSG		013124	58-2167	#58-2173							
T1		013564	16-848	#67-2335							
T1.1		013566	#67-2337								
T1.2		013706	#67-2358								
UAM	=	000200	#19-983								
UAL234		025162	#109-3778								
UCOO		013752	#67-2370								
UDCRST		027722	119-4077	#121-4201							
UDMDST		027670	119-4103	#121-4186							
UDSFST		030072	119-4101	#123-4230							
UDU234		025156	#109-3776								
UF243		027412	#119-4105								
UGOO		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						
UNPKMP		011656	50-1926	#52-1966							
UNT		012330	*52-1967	*52-1986	52-2015	52-2023	#52-2044				
UNTCO		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	CROSS REFERENCE	VALUE	REFERENCES		CREF	V01				
UOJECT	002224		71-2451	71-2453	71-2455	71-2463	95-3353	143-4687		
U1ADR	002222		#21-1094	*50-1906	50-1931	*52-1972	54-2067			
			#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			
XDVIST	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						
XER1	002663		27-1260	#27-1269						
XER2	002744		27-1261	#27-1270						
XID	020646		*85-2889	*85-2890	85-2893	85-2917	85-2929	*85-2930	85-2945	85-2952 85-2961
			*85-2962	85-2967	85-2971	*85-2972	85-2982	#85-3011		
XOD	020644		*85-2891	*85-2892	85-2894	85-2921	*85-2922	85-2925	85-2942	85-2952 85-2957
			*85-2958	85-2967	85-2969	85-2974	85-2985	#85-3010		
XPG	017554		#83-2815	83-2830						
XPSUN0	014700		71-2511	71-2515	71-2517	#71-2519				
XPSUN1	014740		71-2528	71-2530	#71-2532					
XREC	005134		37-1546	#37-1548						
XUPSC T	030340		125-4270	125-4275	125-4279	#125-4283				
XU23	025322		109-3797	109-3801	#109-3810					
XU234	025212		109-3772	109-3774	109-3782	#109-3784				
XXPG	017630		#83-2833	83-2837	83-2840					
XSALWA	= 000000		#16-786	145-4806	147-4866					
XS FALS	= 000040		#16-786	147-4843	147-4852	147-4858	147-4862	147-4862	147-4866	
XS OFFS	= 000400		#16-786	145-4806	147-4843	147-4852	147-4858			
XS TRUE	= 000020		#16-786							
X1211	016012		77-2613	77-2623	77-2626	77-2666	#77-2684			
X24U1	030470		#127-4315							
X243*	027720		121-4188	#121-4193						
X2433	030214		#123-4251							

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MACRO CROSS REFERENCE	MACRO NAME	REFERENCES
	BGNAU	64-2264
	BGNAUT	56-2091
	BGNCLN	54-2059
	BGNDU	62-2212
	BGNHRD	145-4799
	BGNHW	18-866
	BGNINI	50-1891
	BGNMOD	16-812 19-976 38-1606
	BGNMSG	31-1348 31-1367
	BGNPRO	48-1876
	BGNPTA	151-4953 151-495
	BGNRPT	38-1614
	BGNSEG	73-2544 77-2614 87-3057
	BGNSET	151-4952
	BGNSFT	147-4840
	BGNSUB	67-2337 67-2358
	BGNSW	18-891
	BGNTST	67-2335
	BNCOMP	50-1899 50-1903 50-1912 50-1924 77-2631 89-3151 95-3382
	BRESET	54-2071 71-2441
	CKLOOP	67-2368
	CLRVEC	54-2067 54-2070 58-2157
	DESCRI	16-837
	DEVTYP	25-1209
	DISPAT	16-848
	DOCLN	50-1930 52-2038 56-2130 67-2378
	DODU	56-2101 56-2104 56-2110 56-2113 56-2124 56-2127 79-2706
	DORPT	67-2380
	ENDAU	64-2272
	ENDAUT	56-2132
	ENDCLN	54-2072
	ENDDU	62-2232
	ENDHRD	145-4813
	ENDHW	18-879
	ENDINI	50-1935
	ENDMOD	18-914 37-1553 151-4950
	ENDMSG	31-1349 31-1369
	ENDPRO	48-1880
	ENDPTA	151-4958 151-4964
	ENDRPT	38-1650
	ENDSEG	73-2580 77-2682 87-3116
	ENDSET	151-4965
	ENDSFT	147-4877
	ENDSUB	67-2352 67-2369
	ENDSW	18-912
	ENDTST	143-4738
	EQUALS	19-983
	ERROR	27-1249 58-2170 79-2698
	ERRIBL	27-1252
	EXIT	67-2381 145-4806 147-4866
	GMANIL	77-2632
	GPHARD	50-1923

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REFERENCES

MACRO NAME	145-4801	145-4802	147-4845	147-4846	147-4847	147-4848	147-4859	147-4860	147-4863	147-4864
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GPRMD	145-4803	145-4804	147-4845	147-4846	147-4847	147-4848	147-4859	147-4860	147-4863	147-4864
GPRML	#77-2632	77-2632	147-4842	147-4844	147-4849	147-4850	147-4851	147-4853	147-4854	147-4855
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HEADER	16-829									
INLOOP	89-3150	95-3381								
LASTAD	151-4949									
MANUAL	77-2630									
MSBYTE	#16-829	16-829								
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	#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
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 MACRO NAME REFERENCES

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#50-1935	50-1935	#54-2072	54-2072	#56-2132	56-2132	#62-2232	62-2232	#64-2272	64-2272
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	#113-3883	113-3883								
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PRINTF	50-1928 52-2037 52-2040 62-2222 62-2230
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RFLAGS	50-1897
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SETVEC	50-1931 50-1934 58-2155
SVC	#16-785 16-786
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