

RX211,V21,02

RX02 SS PERF EXER
CZRXDB0

AH E513B MC

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FICHE 1 OF 1

NOV 1979

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MADE IN USA

This image shows a microfiche card with a grid of frames. The frames contain data, likely performance metrics or system logs, organized in columns and rows. The data is too small to read clearly but appears to be structured in a table format. The card is dark blue with a lighter grid pattern.

.REM 8

IDENTIFICATION

PRODUCT CODE: AC-E512B-MC
PRODUCT NAME: CZRXDB0 RX02 SS PERF EXER
PRODUCT DATE: 1 AUG 1979
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: L. S. PRUCHA

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS PROGRAM EXERCISES TWO RX02 SUBSYSTEMS (FOUR DRIVES), 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

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

1.2.2 SOFTWARE REQUIREMENTS

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

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ SUPERVISOR/USERS MANUAL CHQUS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

NONE

1.5 ASSUMPTIONS

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

1.6 MEMORY MAP

MEMORY LAYOUT ON 16K MACHINE - XXDP ENVIRONMENT

	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 C SUPERVISOR DIAGNOSTIC: 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	DV0	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 = RANDOM

6.3 EXERCISE OPTIONS

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

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

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

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

6.4 TRACK SEQUENCING

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

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

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

6.5 SECTOR/TRACK ADDRESSING

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

6.6 DISKETTE DENSITY

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

6.7 PROGRAM CONTROL

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

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

7.0 LISTING INDEX

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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
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132-	4375	MOD 2.5 - OUTPUT ERROR TYPE
134-	4490	MOD 2.5.1 - PRINT RETRY
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```
767 .TITLE PROGRAM HEADER AND TABLES
768 .SBTTL PROGRAM HEADER
802
804 .ENABL ABS,AMA
805 = 2000
807
808 002000 BGNMOD
809
810 :++
811 : THE PROGRAM HEADER IS THE INTERFACE BETWEEN
812 : THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
813 :--
814
815 002000 POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,ERRTBL,BGNSETUP
816
824
825 002000 HEADER CZRXDB0,0,0,2100,1
826
832
833 002122 -----
834 DESCRIPT ^$RX02 SS PERF EXER $
835 .EVEN
836 -----
837
838 .SBTTL DISPATCH TABLE
839
840 :++
841 : THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
842 : IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
843 :--
844 002152 DISPATCH 1
845
```

```
854      .SBTTL  DEFAULT HARDWARE P-TABLE
855
856      :++
857      : THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
858      : THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
859      : IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
860      :--
861
862 002156      BGNHW  DFPTBL
863
864 002160 177170      .WORD 177170      ;UNIBUS ADDRESS
865 002162 000264      .WORD 264        ;VECTOR ADDRESS
866 002164 000000      .WORD 0          ;DRIVE #
867 002166 000000      .WORD 0          ;FUTURE EXPANSION
868
874
875 002170      ENDSW
876
877
878
879
880      .SBTTL  SOFTWARE P-TABLE
881
882      :++
883      : THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
884      : PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
885      :--
886
887 002170      BGNSW  SFPTBL
888
889 002172 000000      RXXX: .WORD 0          ;FUTURE EXPANSION-RX
890 002174 000000      .WORD 0          ;P-TABLE CONTROL WORD
891 002176 000000      TSTN: .WORD 0        ;TEST #
892 002200 000000      TSTPAT: .WORD 0      ;TEST PATTERN #
893 002202 000000      TRKSEQ: .WORD 0     ;TRACK SEQUENCE #
894 002204 000021      SWREG: .WORD 21     ;SOFTWARE SWITCH REG
895 002206 000000      OTDITK: .WORD 0    ;OUTSIDE DIA. TRACK LIMIT
896 002210 000114      INDITK: .WORD 114  ;INSIDE DIA. TRACK LIMIT.
897 002212 000001      MINSEC: .WORD 1    ;MINIMUM SECTOR LIMIT
898 002214 000032      MAXSEC: .WORD 32   ;MAXIMUM SECTOR LIMIT
899 002216 000001      DFTL:  .WORD 1    ;DEVICE FATAL THRESHOLD LVL
900
907
908 002220      ENDSW
909
910 002220      ENDMOD
```

923
924
961
971
972 002220
973
974
975
976
977
978
979 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	EF.START== 32.	: START COMMAND WAS ISSUED
000037	EF.RESTART== 31.	: RESTART COMMAND WAS ISSUED
000036	EF.CONTINUE== 30.	: CONTINUE COMMAND WAS ISSUED
000035	EF.NEW== 29.	: A NEW PASS HAS BEEN STARTED
000034	EF.PWR== 28.	: A POWER-FAIL/POWER-UP OCCURRED

: PRIORITY LEVEL DEFINITIONS

000340	PRI07== 340
000300	PRI06== 300

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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
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980
981
982 :BIT DEFINITIONS
983 :
984 100000 BIT15== 100000
985 040000 BIT14== 40000
986 020000 BIT13== 20000
987 010000 BIT12== 10000
988 004000 BIT11== 4000
989 002000 BIT10== 2000
990 001000 BIT09== 1000
991 000400 BIT08== 400
992 000200 BIT07== 200
993 000100 BIT06== 100
994 000040 BIT15== 40
995 000020 BIT04== 20
996 000010 BIT03== 10
997 000004 BIT02== 4
998 000002 BIT01== 2
999 000001 BIT00= 1
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```
1000 :
1001 001000 BIT9== BIT09
1002 000400 BIT8== BIT08
1003 000200 BIT7== BIT07
1004 000100 BIT6== BIT06
1005 000040 BIT5== BIT05
1006 000020 BIT4== BIT04
1007 000010 BIT3== BIT03
1008 000004 BIT2== BIT02
1009 000002 BIT1== BIT01
1010 000001 BIT0== BIT00
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1011 :
1012 :EVENT FLAG DEFINITIONS
1013 : EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
```

```
1014      ; EF16:EF01 AVAILABLE FOR PROGRAM USE
1015      000040 EF.START== 32. ;START COMMAND WAS ISSUED.
1016      000037 EF.RESTART== 31. ;RESTART COMMAND WAS ISSUED.
1017      000036 EF.CONTINUE== 30. ;CONTINUE COMMAND WAS ISSUED.
1018      000035 EF.NEW== 29. ;A NEW PASS HAS BEEN STARTED.
1019      000034 EF.PWR== 28. ;A POWER FAIL/POWER-UP OCCURRED
1020      ;
1021      000020 EF16== 16.
1022      000017 EF15== 15.
1023      000016 EF14== 14.
1024      000015 EF13== 13.
1025      000014 EF12== 12.
1026      000013 EF11== 11.
1027      000012 EF10== 10.
1028      000011 EF09== 9.
1029      000010 EF08== 8.
1030      000007 EF07== 7.
1031      000006 EF06== 6.
1032      000005 EF05== 5.
1033      000004 EF04== 4.
1034      000003 EF03== 3.
1035      000002 EF02== 2.
1036      000001 EF01== 1.
1037      ;
1038      ;PRIORITY LEVEL DEFINITIONS
1039      ;
1040      000340 PRI07== 340
1041      000300 PRI06== 300
1042      000240 PRI05== 240
1043      000200 PRI04== 200
1044      000140 PRI03== 140
1045      000100 PRI02== 100
1046      000040 PRI01== 40
1047      000000 PRI00== 0
1048      ;
1049      ;PROGRAM DEFINITIONS
1050      ;
1051      000200 TRBIT==200
1052      000040 DNBIT==40
1053      004000 RX2BIT==BIT11
1054      000003 SOFT==3
1055      000002 HARD==2
1056      000001 DVFT==1
1057      000000 SYFT==0
1058      000004 BTRP4==4
1059      000006 BTRP6==6
1060      000002 RESTAR==BIT1
1061      000001 POWERF==BIT0
1062      004000 SYSERR==BIT11
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1076      .SBTTL GLOBAL DATA SECTION
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1078      :++
1079      : THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
1080      : IN MORE THAN ONE TEST.
1081      :--
1082
1083      :
1084      : STORAGE FOR DEVICE REGISTERS
1085      :
1086
1087      :-----
1088 002220 000000 UOADR: .WORD 0 ;UNIT 0 ADR
1089 002222 000000 U1ADR: .WORD 0 ;UNIT 1 ADR
1090 002224 000000 UOVECT: .WORD 0 ;UNIT 0 VECTOR
1091 002226 000000 U1VECT: .WORD 0 ;UNIT 1 VECTOR
1092      :-----
1093 002230 000000 SDD: .WORD 0 ;SYSTEM DRIVES DONE (SEE REG. DEF. BELOW)
1094 002232 000000 SUT: .WORD 0 ;SYSTEM UNDER TEST (SEE REG. DEF. BELOW)
1095 002234 000000 UUT: .WORD 0 ;UNIT UNDER TEST (SEE REG. DEF. BELOW)
1096 002236 000000 UUTADR: .WORD 0 ;UUT UNIBUS ADR
1097 002240 000000 UUTOFF: .WORD 0 ;UUT TABLE ADDRESSING OFFSET
1098 002242 000000 DEN: .WORD 0 ;DENSITY FLAG
1099 002244 000000 DELDAT: .WORD 0 ;DELETED DATA FLAG
1100 002246 000000 CSRUUT: .WORD 0 ;CONT/STATUS REG UUT
1101 002250 000000 ESRUUT: .WORD 0 ;ERROR/STATUS REG UUT
1102      :-----
1103 002252 000000 WDCNT: .WORD 0 ;WORD COUNT
1104 002254 000000 TRACK: .WORD 0 ;TRACK ADR
1105 002256 000000 SECTOR: .WORD 0 ;SECTOR ADR
1106 002260 000000 TRKDN: .WORD 0 ;TRACK DONE (UUT) FLAG
1107 002262 000000 SECDN: .WORD 0 ;SECTOR DONE (UUT) FLAG
1108      :-----
1109 002264 000000 FLGDRS: .WORD 0 ;"DRS" FLAGS
1110 002266 000000 FLAGS: .WORD 0 ;DIAGNOSTIC FLAGS
1111 002270 000000 ABORT: .WORD 0 ;ABORT FLAG
1112 002272 000000 PRTECD: .WORD 0 ;PRINT ERR CODE FLAG
1113      :-----
1114 002274 000000 ERRSY: .WORD 0 ;ERROR SYSTEM
1115 002276 000000 ERRTY: .WORD 0 ;ERROR TYPE
1116 002300 000000 HARDER: .WORD 0 ;HARD ERROR
1117 002302 000000 HDERCT: .WORD 0 ;HARD ERROR COUNTER (USED FOR "DFTL")
1118      :-----
1119 002304 000000 RETRY: .WORD 0 ;//(10)DATART/(4)RDRT/(2)WTRT/(1)SEEK/ SEE BELOW
1120 002306 000000 SEEKRT: .WORD 0 ;SEEK RETRY COUNT
1121 002310 000000 CKSMRT: .WORD 0 ;CHECK SUM RETRY COUNT
1122 002312 000000 CRCBRT: .WORD 0 ;CRC BAD RETRY COUNT
1123 002314 000000 CRCERT: .WORD 0 ;CRC ERR RETRY COUNT
1124 002316 000000 DATART: .WORD 0 ;DATA RETRY COUNT
1125 002320 000000 DARDRT: .WORD 0 ;DATA READ RETRY COUNT
1126 002322 000000 DAWTRT: .WORD 0 ;DATA WRITE RETRY COUNT
1127 002324 000000 READRT: .WORD 0 ;READ RETRY COUNT
1128 002326 000000 WRTRT: .WORD 0 ;WRITE RETRY COUNT
1129 002330 000000 DDERCT: .WORD 0 ;D.D. ERR RETRY COUNT
1130      :-----
    
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1194      .SBTTL GLOBAL TEXT SECTION
1195
1196      :++
1197      : THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
1198      : MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
1199      : MORE THAN ONE TEST.
1200      :--
1201
1202      :
1203      : NAMES OF DEVICES SUPPORTED BY PROGRAM
1204      :
1205      :     DEVTYP <RX02>
1211
1212      :
1213      : FORMAT STATEMENTS USED IN PRINT CALLS
1214      :
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1222
1223
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002346

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 1243 002354 012737 004506 002402
 1244 002362 013737 002334 002074
 1245 002370
 1246 002372 000207
 1247
 1248 002374
 002374 000000
 002376 000000
 002400 000000
 002402 000000
 1249
 1250
 1251
 1252
 1253 002404
 1254 002444 005737 002272
 1255 002450 001452
 1256 002452
 1257 002522
 1258 002572 005037 002272
 1259 002576 005037 002604
 1260 002602 000207
 1261
 1262 002604 000000
 1263
 1264 002606 045 101 040
 1265 002663 045 101 040
 1266 002744 045 101 040
 1267
 1268
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.SBTTL GLOBAL ERROR REPORT SECTION
;+
; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
; THAT ARE USED IN MORE THAN ONE TEST. IT ALSO INCLUDES THE ASCII MESSAGES
; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
;--

.SBTTL - MOD U.SFT.ERR - ERROR REPORT
-----
ERROR: MOV #NONE,ERRBLK ;SETUP ERROR BLOCK CODE
        MOV UNIT,L$LUN ;SETUP LUN FOR PRINT
        ERROR
        RETURN
-----

        ERRTBL
ERRTYP: .WORD 0
ERRNBR: .WORD 0
ERRMSG: .WORD 0
ERRBLK: .WORD 0
-----

.SBTTL - MOD U.PRT.ERR - PRINT ERRORS
-----
PRTEC: PRINTB #IDENT1,UNIT,CSRUIT,ESRUUT,CMD
IFAUP: TST PRTECD ;IF ERR CODE FLAG
        BEQ ENDUP ;SET, THEN
        PRINTX #XER1,<B,XERUIT>,<B,WC>,<B,CTK0>,<B,CTK1>
        PRINTX #XER2,<B,TTRK>,<B,TSEC>,<B,SFTSTS>,<B,BTRK>
        CLR PRTECD ;CLEAR ERR CODE FLAG
ENDUP: CLR ERRREG ;CLEAR ERR REGISTER
        RTS PC ;RETURN
-----

ERRREG: 0
-----

IDENT1: .ASCIZ /%A UNIT#%01%A RXCSR=%0%A RXESR=%0%A CMD=%0%N/
XER1: .ASCIZ /%A ERCD=%03%A WC=%03%A CTRK0=%D2%A. CTRK1=%D2%A./
XER2: .ASCIZ /%A TTRK=%D2%A. TSEC=%D2%A. SFTSTAT=%03%A BTRK=%D2%A.%N/
        .EVEN
;MOD U.PRT.ERR ----- END MODULE -----
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1273
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 1277 003034 105737 033544
 1278 003040 001424
 1279 003042 013701 033544
 1280 003046 042701 177400
 1281 003052 006201
 1282 003054 006201
 1283 003056 062701 003114
 1284 003062 011137 003114
 1285 003066
 1286 003106 105037 033544
 1287 003112 000207
 1288
 1289
 1290 003114 000000
 1291
 1292
 1293 003116 003170
 1294 003120 003236
 1295 003122 003304
 1296 003124 003332
 1297 003126 003400
 1298 003130 003451
 1299 003132 003477
 1300 003134 003555
 1301 003136 003603
 1302 003140 003660
 1303 003142 003714
 1304 003144 003773
 1305 003146 004021
 1306 003150 004107
 1307 003152 004153
 1308 003154 004207
 1309 003156 004254
 1310 003160 004311
 1311 003162 004360
 1312 003164 004413
 1313 003166 004442
 1314

.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
  
```

```

1317
1318 003170      045      101      040  EC1:  .ASCIZ  /%A  >NO HOME ON INITIALIZE-DRV #0.%N/
1319 003236      045      101      040  EC2:  .ASCIZ  /%A  >NO HOME ON INITIALIZE-DRV #1.%N/
1320 003304      045      101      040  EC3:  .ASCIZ  /%A  >ILL ERR CODE.%N/
1321 003332      045      101      040  EC4:  .ASCIZ  /%A  >TRIED TO ACCESS A TRACK > 76.%N/
1322 003400      045      101      040  EC5:  .ASCIZ  /%A  >HOME FOUND BEFORE DESIRED TRACK.%N/
1323 003451      045      101      040  EC6:  .ASCIZ  /%A  >ILL ERR CODE.%N/
1324 003477      045      101      040  EC7:  .ASCIZ  /%A  >52 HEADERS PASSED & SECTOR NOT FOUND.%N/
1325 003555      045      101      040  EC10: .ASCIZ  /%A  >ILL ERR CODE.%N/
1326 003603      045      101      040  EC11: .ASCIZ  /%A  >NO SEPCLOCK SEEN IN 40 MICROSECONDS.%N/
1327 003660      045      101      040  EC12: .ASCIZ  /%A  >PREAMBLE NOT FOUND.%N/
1328 003714      045      101      040  EC13: .ASCIZ  /%A  >PREAMBLE FOUND BUT NO ID MARK IN TIME.%N/
1329 003773      045      101      040  EC14: .ASCIZ  /%A  >ILL ERR CODE.%N/
1330 004021      045      101      040  EC15: .ASCIZ  /%A  >GOOD TRACK ADDRESS HEADER NOT=SELECTED TRACK.%N/
1331 004107      045      101      040  EC16: .ASCIZ  /%A  >TOO MANY TRIES FOR AN IDAM.%N/
1332 004153      045      101      040  EC17: .ASCIZ  /%A  >NO DATA AM IN TIME.%N/
1333 004207      045      101      040  EC20: .ASCIZ  /%A  >CRC ERROR ON READING SECTOR.%N/
1334 004254      045      101      040  EC21: .ASCIZ  /%A  >UNASSIGNED ERR CODE.%N/
1335 004311      045      101      040  EC22: .ASCIZ  /%A  >R-W ELECT. FAILED MAINT. TEST.%N/
1336 004360      045      101      040  EC23: .ASCIZ  /%A  >WORD CNT OVERFLOW.%N/
1337 004413      045      101      040  EC24: .ASCIZ  /%A  >DENSITY ERROR.%N/
1338 004442      045      101      040  EC25: .ASCIZ  /%A  >SET DENSITY WRONG KEY WORD.%N/
1339                                     .EVEN
1340
1341
1342                                     .SBTTL - ERROR PRINT CALLS/MSG CALLS
1343
1344 004506                                     BGNMSG  NONE
1345 004506                                     ENDMSG
1346
1363 004510                                     BGNMSG  PRTB1
1364 004510 004737 004536                       CALL    PRTB1S
1365 004514                                     ENDMSG
1366
1367 004516                                     PRTB0S: PRINTB  R1
1368 004534 000207                               RETURN
1369
1370 004536                                     PRTB1S: PRINTB  R1,R2
1371 004556 000207                               RETURN
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1456 004560 012700 000001
1457 004564 063700 004646
1458 004570 063700 004650
1459 004574 042700 170000
1460 004600 000241
1461 004602 006100
1462 004604 006100
1463 004606 010037 004646
1464 004612 005000
1465 004614 013700 004650
1466 004620 006000
1467 004622 006000
1468 004624 063700 004646
1469 004630 042700 170000
1470 004634 010037 004650
1471 004640 010037 004652
1472 004644 000207
1473
1474 004646 000000
1475 004650 000000
1476 004652 000000
1477

.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

```

1480 .SBTTL - MOD U.A.1 - CONVERSION UUT CODE --> SUTPTR
1481 ;-----
1482
1483 004654 000240 CVUTST: NOP ;
1484 004656 005037 004754 CLR SUTCV ;CLEAR SYS UNDER TEST CONVERTED
1485 004662 032737 000001 004752 BIT #1, CVUNIT ;IF DRIVE #0.
1486 004670 001014 BNE 2$ ;SELECTED, THEN
1487 004672 032737 000002 004752 BIT #2, CVUNIT ;IF UNIT #0 OR RXXX SIDE #0,
1488 004700 001004 BNE 1$ ;THEN
1489 004702 052737 000001 004754 BIS #1, SUTCV ;SET FOR UNIT CODE=00 IN SUT WORD
1490 004710 000417 BR ENDCVT ;BR TO END
1491 004712 052737 000004 004754 1$: BIS #4, SUTCV ;ELSE, SET FOR UNIT CODE=10 IN SUT WORD
1492 004720 000413 BR ENDCVT ;BR TO END
1493 004722 032737 000002 004752 2$: BIT #2, CVUNIT ;IF UNIT #0 OR RXXX SIDE #0,
1494 004730 001004 BNE 3$ ;THEN
1495 004732 052737 000002 004754 BIS #2, SUTCV ;SET FOR UNIT CODE=01 IN SUT WORD
1496 004740 000403 BR ENDCVT ;BR TO END
1497 004742 052737 000010 004754 3$: BIS #10, SUTCV ;ELSE, SET FOR UNIT CODE=11 IN SUT WORD
1498 004750 000207 ENDCVT: RTS PC ;RETURN
1499 ;-----
1500 004752 000000 CVUNIT: 0 ;UNIT CODE TO BE CONVERTED
1501 004754 000000 SUTCV: 0 ;SYS UNDER TEST AS CONVERTED
1502 ;MOD U.A.1 ----- END MODULE -----
1503
1504 .SBTTL - MOD U.A.2 - CONVERSION SUTPTR --> UUT CODE
1505 ;-----
1506
1507 004756 013705 021426 CVSTUT: MOV SUTPTR, R5 ;SAVE SUT POINTER IN R5
1508 004762 005004 CLR R4 ;CLEAR R4 (RESET UNIT CODE)
1509 004764 032705 000001 1$: BIT #1, R5 ;IF LSB R5
1510 004770 001003 BNE 2$ ;EQUALS 1, THEN BR TO 2$
1511 004772 006205 ASR R5 ;SHIFT RIGHT R5
1512 004774 005204 INC R4 ;INCREMENT R4
1513 004776 000772 BR 1$ ;BR TO 1$
1514 005000 010437 005024 2$: MOV R4, UNITST ;THEN R4 CONTAINS UUT CODE
1515 005004 006304 ASL R4 ;DOUBLE UNIT CODE FOR ADR
1516 005006 010437 002240 MOV R4, UUTOFF ;SET UUT OFFSET
1517 005012 062704 002336 ADP #U00, R4 ;GET UUT UNIT# FOR PRINT
1518 005016 011437 002334 MOV (R4), UNIT ;SET UNIT=PRINT UNIT#
1519 005022 000207 RTS PC ;RETURN
1520 ;-----
1521 005024 000000 UNITST: 0 ;
1522 ;MOD 2.0A ----- END MODULE -----

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1525      .SBTTL - MOD U.DEV.REC - DEVICE READ ERROR CODE
1526      ;-----
1527
1528 005026 000240      RDERCD: NOP      ;
1529 005030 013705 002236      MOV      UUTADR,R5      ;SET R5 = UUT ADDRESS
1530 005034 012737 000001 002272      MOV      #1,PRTECD      ;SET PRINT ERROR CODE FLAG
1531 005042 012737 000017 005136      MOV      #17,RECCMD      ;SET UUT EXTENDED ERROR CODE
1532 005050 053737 002242 005136      BIS      DEN,RECCMD      ;SET DEN FOR CMD
1533 005056 013715 005136      MOV      RECCMD,(R5)      ;SEND CMD TO UUT
1534 005062 013701 002236      MOV      UUTADR,R1      ;GET UUT ADDR
1535 005066 062701 000002      ADD      #2,R1      ;CAL DATA ADR
1536 005072 013737 002236 025332      MOV      UUTADR,CSRADR      ;SET CSR ADR
1537 005100 012737 000200 025330      MOV      #TRBIT,RDYWD      ;SET "TR" BIT TEST
1538 005106 004737 025230      CALL     DELAY      ;CALL DELAY MODULE-WAIT FOR TR
1539 005112 032715 000200      IAREC: BIT      #200,(R5)      ;IF TR
1540 005116 001004      BNE      LAREC      ;NOT SET
1541 005120 052737 040007 002274      BIS      #40007,ERRSY      ;THEN SET "TR" ERR ON FUNCTION
1542 005126 000402      BR      XREC      ;BR TO END MOD
1543 005130 012711 033544      LAREC: MOV      #XERUUT,(R1)      ;SEND BASE ADDR FOR EXTEND ERR CODE
1544 005134 000207      XREC:  RETURN      ;RETURN
1545      ;-----
1546 005136 000000      RECCMD: 0      ;COMMAND WORD USED IN THIS MODULE
1547      ;-----
1548
1549 005140      ENDMOD
1550

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1653          .SBTTL - PRINT REPORT HEADER
1654          ;-----;
1655 005414 005003 PRTHDR: CLR      R3          ;
1656 005416 013705 005504      MOV      PRT1,R5      ;SETUP 1ST PART OF HEADER PRINT
1657 005422 004737 006030      CALL     PREPT2     ;PRINT 1ST PART
1658 005426 012737 002336 005410  MOV     #UT00,UTTST ;GET BEGIN ADR OF UNITS-->TESTED FLAGS
1659 005434 012737 000004 005412  MOV     #4,UTCNT    ;SET UNIT COUNTER
1660 005442 005777 177742 1$:      TST      @UTTST    ;IF UNIT TESTED FLAG
1661 005446 100407          BMI      2$          ;NOT=-1, THEN
1662 005450 017737 177734 006026  MOV     @UTTST,PAR  ;SET UNIT TESTED # FOR PRINT
1663 005456 013705 005506      MOV     PRT2,R5      ;SET UNIT MSG
1664 005462 004737 006002      CALL     PREPT1     ;PRINT UNIT #
1665 005466 062737 000002 005410 2$:      ADD     #2,UTTST    ;ADVANCE ADR OF UNIT TESTED FLAG
1666 005474 005337 005412      DEC     UTCNT       ;DECREMENT UNIT COUNT
1667 005500 001360          BNE     1$          ;IF UNIT COUNT=0, THEN
1668 005502 000207          RTS      PC          ;RETURN
1669          ;-----;
1670 005504 000000      PRT1:   0          ;
1671 005506 000000      PRT2:   0          ;
1672          ;-----;
1673          .SBTTL - PRINT REPORT DATA
1674          ;-----;
1675          PRIDAT: NOP          ;
1676 005510 000240 1$:      TST      PRNUM      ;IF MODE
1677 005512 005737 005644      BEQ      2$          ;
1678 005516 001410          MOV     LINECT,PAR  ;SETUP LINE # TO PRINT
1679 005520 013737 005636 006026  MOV     LINTYP,R5   ;SETUP LINE TYPE TO PRINT
1680 005526 013705 005642      CALL     PREPT1     ;PRINT LINE #
1681 005532 004737 006002      BR      3$          ;
1682 005536 000403          2$:      MOV     (R1)+,R5   ;SETUP LOG TITLE ADR
1683 005540 012105          CALL     PREPT2     ;PRINT LOG TITLES
1684 005542 004737 006030 3$:      MOV     #UT00,UTTST ;GET UNIT # FOR PRINT
1685 005546 012737 002336 005410  MOV     #4,UTCNT    ;SETUP UNIT COUNT
1686 005554 012737 000004 005412 4$:      MOV     (R2)+,PAR  ;SETUP DATA TO PRINT
1687 005562 012237 006026      TST      @UTTST    ;IF UNIT # NOT = -1
1688 005566 005777 177616      BMI      5$          ;THEN
1689 005572 100404          MOV     #PTDAT1,R5 ;SETUP TO PRINT
1690 005574 012705 006243      CALL     PREPT1     ;PRINT DATA
1691 005600 004737 006002 5$:      ADD     #2,UTTST    ;SETUP TO CK NEXT UNIT
1692 005604 062737 000002 005410  DEC     UTCNT       ;DECREMENT UNIT COUNT
1693 005612 005337 005412      BNE     4$          ;IF DONE ALL UNITS THEN
1694 005616 001361          INC     LINECT      ;INCREMENT LINE COUNT
1695 005620 005237 005636      CMP     LINES,LINECT ;IF DONE ALL
1696 005624 023737 005640 005636  BHI     1$          ;LINES, THEN
1697 005632 101327          RTS      PC          ;RETURN
1698 005634 000207          ;-----;
1699          LINECT: 0          ;LINE COUNTER
1700 005636 000000          LINES:  0          ;# OF LINES TO PRINT
1701 005640 000000          LINTYP: 0         ;LINE PRINT TYPE.
1702 005642 000000          PRNUM:  0        ;PRINT MODE
1703 005644 000000          ;-----;
1704
    
```



```

1707          .SBTTL - PRINT READ/WRITE SECTOR COUNTERS
1708          ;-----
1709
1710 005646 000240          PRTCTR: NOP          ;
1711 005650 005037 005640          CLR          LINES          ;CLEAR LINE COUNTER
1712 005654 012702 007314          MOV          #READSC,R2      ;GET ADDRESS OF READ SECTOR CTR
1713 005660 012705 006116          MOV          #PTRDSC,R5      ;SETUP READ SECTORS MSG
1714 005664 004737 006002          1$: CALL          PREPT1      ;CALL PRINT REPORT-MSG
1715 005670 012737 002336 005410  MOV          #UT00,UTTST      ;GET UNIT # FOR PRINT
1716 005676 012737 000004 005412  MOV          #4,UTCNT          ;SETUP UNIT COUNT
1717 005704 005777 177500          2$: TST          @UTTST          ;IF UNIT #
1718 005710 100410          BMI          5$          ;NOT=-1, THEN
1719 005712 062702 000002          ADD          #2,R2          ;INCREMENT ADR TO UPPER WORD
1720 005716 011204          MOV          (R2),R4          ;SETUP DATA UPPER PART FOR PRINT
1721 005720 014203          MOV          -(R2),R3          ;SETUP DATA LOWER PART FOR PRINT
1722 005722 012705 006315          MOV          #PTFMN1,R5      ;SETUP TO PRINT DATA
1723 005726 004737 006050          CALL          PREPT3          ;PRINT DATA
1724 005732 062737 000002 005410  5$: ADD          #2,UTTST          ;SETUP TO CK NEXT UNIT
1725 005740 062702 000004          ADD          #4,R2          ;SET ADR TO NEXT CTR
1726 005744 005337 005412          DEC          UTCNT          ;DECREMENT UNIT COUNT
1727 005750 001355          BNE          2$          ;IF DONE THIS LINE, THEN
1728 005752 005237 005640          INC          LINES          ;INCREMENT LINE CTR
1729 005756 022737 000002 005640  CMP          #2,LINES          ;DO WHILE LINE CTR
1730 005764 001405          BEQ          6$          ;EQUALS <2
1731 005766 012702 007334          MOV          #WRITSC,R2      ;GET ADDRESS OF WRITE SECTOR CTR
1732 005772 012705 006147          MOV          #PTWTSC,R5      ;SETUP WRITE SECTORS MSG
1733 005776 000732          BR          1$          ;BR TO WRITE SECTORS SECTION
1734 006000 000207          6$: RETURN          ;RETURN
1735          ;-----
    
```

```
1738 .SBTTL - PRINT REPORT TYPE 1
1739 -----
1740 006002 PREPT1: PRINTS R5,PAR
1741 006024 000207 RTS PC ;
1742 -----
1743 006026 000000 PAR: 0 ;
1744 -----
1745
1746
1747
1748
1749
1750 .SBTTL - PRINT REPORT TYPE 2
1751 -----
1752 006030 PREPT2: PRINTS R5
1753 006046 000207 RTS PC ;
1754 -----
1755
1756
1757
1758
1759
1760 .SBTTL - PRINT REPORT TYPE 3
1761 -----
1762 006050 PREPT3: PRINTS R5,R4,R3
1763 006072 000207 RETURN
1764 -----
1765 006074 045 116 045 PT20SP: .ASCIZ /%N%N%S20/
1766 006105 045 116 045 PT19SP: .ASCIZ /%N%N%S19/
1767 006116 045 116 045 PTRDSC: .ASCIZ /%N%A# SECTOR READS (8)=/
1768 006147 045 116 045 PTWTSC: .ASCIZ /%N%A# SECTOR WRITES (8)=/
1769 006200 045 116 045 PTEC: .ASCIZ /%N%N%AERR%N%ACODE# /
1770 006225 045 116 045 PTTK: .ASCIZ /%N%N%ATRACK# /
1771 006243 045 101 040 PTDAT1: .ASCIZ /%A %D6/
1772 006253 045 123 061 PTUNT1: .ASCIZ /%S1%AUNIT#%D1%S1/
1773 006274 045 123 062 PTUNT2: .ASCIZ /%S2%AUNIT#%D1%S5/
1774 006315 045 123 062 PTFMN1: .ASCIZ /%S2%06%05/
1775 006327 045 116 045 PTECN: .ASCIZ /%N%02%A0%S3/
1776 006343 045 116 045 PTTKN: .ASCIZ /%N%S1%D2%S3/
1777 .EVEN
1778 -----
```

```

1781
1782 006360 006426 PRIDXX: .WORD PRID01
1783 006362 006455 .WORD PRID02
1784 006364 006504 .WORD PRID03
1785 006366 006533 .WORD PRID04
1786 006370 006562 .WORD PRID05
1787 006372 006611 .WORD PRID06
1788 006374 006640 .WORD PRID07
1789 006376 006667 .WORD PRID08
1790 006400 006716 .WORD PRID09
1791 006402 006745 .WORD PRID10
1792 006404 006774 .WORD PRID11
1793 006406 007023 .WORD PRID12
1794 006410 007052 .WORD PRID13
1795 006412 007101 .WORD PRID14
1796 006414 007130 .WORD PRID15
1797 006416 007157 .WORD PRID16
1798 006420 007206 .WORD PRID17
1799 006422 007235 .WORD PRID18
1800 006424 007264 .WORD PRID19
    
```

```

1801
1802
1803
1804 006426 045 116 045 PRID01: .ASCIZ /%N%ACHECK SUM: /
1805 006455 045 116 045 PRID02: .ASCIZ /%N%AFILL-EMP BUFF LOG:/
1806 006504 045 116 045 PRID03: .ASCIZ /%N%ANO ERR BIT: /
1807 006533 045 116 045 PRID04: .ASCIZ /%N%AINTER-NO DONE ERR:/
1808 006562 045 116 045 PRID05: .ASCIZ /%N%AINTERRUPT ERR: /
1809 006611 045 116 045 PRID06: .ASCIZ /%N%ASEEK: /
1810 006640 045 116 045 PRID07: .ASCIZ /%N%ACRC ERR: /
1811 006667 045 116 045 PRID08: .ASCIZ /%N%ACRC BAD: /
1812 006716 045 116 045 PRID09: .ASCIZ /%N%AREAD ERR: /
1813 006745 045 116 045 PRID10: .ASCIZ /%N%AWRITE ERR: /
1814 006774 045 116 045 PRID11: .ASCIZ /%N%ADATA ERR: /
1815 007023 045 116 045 PRID12: .ASCIZ /%N%ADEL. DATA ERR: /
1816 007052 045 116 045 PRID13: .ASCIZ /%N%AHRD SEEK: /
1817 007101 045 116 045 PRID14: .ASCIZ /%N%AHRD CRC ERR: /
1818 007130 045 116 045 PRID15: .ASCIZ /%N%AHRD CRC BAD: /
1819 007157 045 116 045 PRID16: .ASCIZ /%N%AHRD READ: /
1820 007206 045 116 045 PRID17: .ASCIZ /%N%AHRD WRITE: /
1821 007235 045 116 045 PRID18: .ASCIZ /%N%AHRD DATA: /
1822 007264 045 116 045 PRID19: .ASCIZ /%N%AHRD DEL. DATA ERR:/
1823 .EVEN
1824
    
```

```

1827          .SBTTL - STATISTICAL TABLES
1828          ;-----
1829
1830 007314   READSC: .BLKW 8.          ;READ SECTOR COUNTER
1831 007334   WRITSC: .BLKW 8.          ;WRITE SECTOR COUNTER
1832 007354   CKSML: .BLKW 4           ;CKSUM LOG
1833 007364   BUFERL: .BLKW 4          ;FILL/EMPTY BUFFER ERROR LOG
1834 007374   NOERL: .BLKW 4          ;NO ERR BIT LOG
1835 007404   UKINT: .BLKW 4          ;INTERRUPT - NO DONE LOG
1836 007414   INTER: .BLKW 4          ;INTERRUPT ERR
1837 007424   SEK: .BLKW 4            ;SEEK ERR
1838 007434   CRC: .BLKW 4            ;CRC ERR
1839 007444   CRCBAD: .BLKW 4         ;CRC BAD ERR
1840 007454   RD: .BLKW 4             ;READ ERR
1841 007464   WRT: .BLKW 4           ;WRITE ERR
1842 007474   DATA: .BLKW 4         ;DATA ERR
1843 007504   DLDTER: .BLKW 4        ;DEL DATA ERR
1844 007514   HSEK: .BLKW 4          ;HARD SEEK ERR
1845 007524   HCRC: .BLKW 4          ;HARD CRC ERR
1846 007534   HCRCBD: .BLKW 4        ;HARD CRC BAD ERR
1847 007544   HRD: .BLKW 4           ;HARD READ ERR
1848 007554   HWRT: .BLKW 4          ;HARD WRITE ERR
1849 007564   HDATA: .BLKW 4         ;HARD DATA ERR
1850 007574   HDD: .BLKW 4           ;HARD DEL DATA ERR
1851 007604   ECLOG: .BLKW 90.        ;ERROR CODE LOG
1852 010070   TKXX: .BLKW 308.        ;TRACK ERR LOG

```

```

1853          ;-----
1854 011240 000000   ENDST: .WORD 0          ;END TABLE
1855
1867
1868          .EVEN
1869

```

```

1870          .SBTTL LOAD DEVICE PROTECTION
1871          ;-----
1872 011242   BGNPROT
1873 011242 000000   .WORD 0          ;RX CSR - HARDWARE P-TABLE OFFSET
1874 011244 177777   .WORD -1         ;DON'T CARE
1875 011246 000004   .WORD 4          ;RX DRIVER-HARDWARE P-TABLE OFFSET
1876 011250   ENDPROT
1877          ;-----

```

1880
1881
1882
1883
1884
1885
1886 011250
1887 011250 005037 002266
1892 011254
1893 011262
1894 011270
1895 011272 052737 000001 002266
1896 011300 000507
1897 011302
1898 011310
1899 011312 005037 002220
1900 011316 005037 002222
1901 011322 005037 002224
1902 011326 005037 002226
1903 011332 005037 002232
1904 011336 023727 002012 000004
1905 011344 003051
1906 011346
1907 011354
1908 011356 052737 000002 002266
1909 011364 005037 002270
1910 011370 012737 177777 002334
1911 011376 012737 177777 002336
1912 011404 012737 177777 002340
1913 011412 012737 177777 002342
1914 011420 012737 177777 002344
1915 011426 062737 000001 002334
1916 011434 023737 002012 002334
1917 011442 001426
1918 011444
1919 011456
1920 011460 000240
1921 011462 004737 011656
1922 011466 000757
1923 011470
1924 011510 012737 000001 002270
1925 011516
1926 011520
1927 011546 005737 002226
1928 011552 001413
1929 011554
1930 011602
1950
1951 011604 000000
1952
1953 011606 045 116 045
1954
1955

```

.SBTTL INITIALIZE SECTION
:*****
; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
; AT THE BEGINNING OF EACH PASS.
-----
      BGNINIT
INIT:  CLR      FLAGS           ;CLEAR ALL FLAGS
      RFLAGS  FLGDRS         ;GET "DRS" FLAGS
      READEF  #EF.PWR        ;IF POWER FAIL FLAG IS
      BNCOMPLETE 1$          ;SET, THEN
      BIS     #POWERF,FLAGS   ;SET POWER FAIL FLAG
      BR      FIN            ;BR TO 'FIN'
1$:   READEF  #EF.START       ;IF START FLAG
      BNCOMPLETE 2$          ;SET, THEN
      CLR     U0ADR          ;CLEAR SYS U0 ADDRESS
      CLR     U1ADR          ;CLEAR SYS U1 ADDRESS
      CLR     U0VECT         ;CLEAR SYS U0 VECTOR
      CLR     U1VECT         ;CLEAR SYS U1 VECTOR
2$:   CLR     SUT            ;CLEAR SYS UNDER TST WORD
      CMP     L$UNIT,#4      ;IF 4 UNITS OR LESS SELECTED
      BGT     INITER         ;THEN
      READEF  #EF.RESTART    ;IF RESTART FLAG
      BNCOMPLETE SETUP      ;SET, THEN
      BIS     #RESTAR,FLAGS  ;SET RESTART FLAG
      CLR     ABORT          ;CLEAR ABORT FLAG
      MOV     #-1,UNIT       ;RESTORE UNIT # CTR
      MOV     #-1,UT00       ;RESET UNIT#1
      MOV     #-1,UT01       ;RESET UNIT#2
      MOV     #-1,UT10       ;RESET UNIT#3
      MOV     #-1,UT11       ;RESET UNIT#4
1$:   ADD     #1,UNIT         ;INCREMENT TO NEXT UNIT
      CMP     L$UNIT,UNIT    ;IF LOGICAL UNIT & UNIT
      BEQ     FIN            ;NOT YET EQUAL, THEN
      GPHARD  UNIT,PLOC     ;GET HARDWARE P-TABLE
      BNCOMPLETE 1$         ;IF P-TABLE AVAILABLE, THEN
      NOP
      JSR     PC,UNPKHP      ;CALL UNPACK HARDWARE P-TABLE
      BR     1$              ;BR TO BEGIN DO
INITER: PRINTF #INTER1      ;PRINT "TOO MANY UNITS"
      MOV     #1,ABORT       ;SET ABORT
      DOCLN                    ;DO CLEAN UP
      SETVEC  U0VECT,#INTH0,#PRI07 ;SET SYS U0 VECTOR
      TST     U1VECT         ;IF SYS U1 VECTOR
      BEQ     2$             ;NOT=0, THEN
1$:   SETVEC  U1VECT,#INTH1,#PRI07 ;SET SYS U1 VECTOR
2$:   ENDINIT
-----
PLOC:  .WORD  0
-----
INTER1: .ASCIZ /%N%ONLY FOUR UNITS ALLOWED, START OVER/
      .EVEN
-----

```

- MOD 1.1 - UNPACK HARDWARE P-TABLES

```

1958                                     .SBTTL - MOD 1.1 - UNPACK HARDWARE P-TABLES
1959                                     ;-----
1960
1961 011656 000240 UNPKHP: NOP ;
1962 011660 005037 012330 CLR UNT ;CLEAR UNT
1963 011664 013701 011604 MOV PLOC,R1 ;SAVE P-TABLE LOCATION
1964 011670 005737 002334 IFAI1: TST UNIT ;IF UNIT
1965 011674 001005 BNE IFBI1 ;IS ZERO
1966 011676 012137 002220 MOV (R1)+,UOADR ;LOAD UNIT #0 ADR
1967 011702 012137 002224 MOV (R1)+,UOVECT ;LOAD UNIT #0 VECTOR
1968 011706 000426 BR IFEI1 ;BR TO END IF 'A'
1969 011710 021137 002220 IFBI1: CMP (R1),UOADR ;IF THIS ADR
1970 011714 001003 BNE IFCI1 ;EQUALS UNIT #0 ADR
1971 011716 062701 000004 ADD #4,R1 ;INCREMENT TEMP #1 BY 4
1972 011722 000420 BR IFEI1 ;BR TO END IF 'A'
1973 011724 005737 002222 IFCI1: TST U1ADR ;IF UNIT ADDRESS
1974 011730 001005 BNE IFDI1 ;NOT LOADED PREVIOUSLY
1975 011732 012137 002222 MOV (R1)+,U1ADR ;LOAD UNIT#1 ADR
1976 011736 012137 002226 MOV (R1)+,U1VECT ;LOAD UNIT #1 VECTOR
1977 011742 000405 BR EICI1 ;BR TO END IF 'C'
1978 011744 021137 002222 IFDI1: CMP (R1),U1ADR ;IF UNIT ADR
1979 011750 001153 BNE ELDI1 ;EQUALS UNIT #1 ADR
1980 011752 062701 000004 ADD #4,R1 ;THEN ADD 4 TO TEMP #1
1981 011756 012737 000001 012330 EICI1: MOV #1,UNT ;SET UNT=1
1982 011764 005737 002172 IFEI1: TST RXXX ;IF RXXX
1983 011770 001445 BEQ IFII1 ;THEN
1984 011772 005711 IFFI1: TST (R1) ;IF DRIVE #0
1985 011774 001021 BNE IFHI1 ;THEN
1986 011776 062701 000002 IFGI1: ADD #2,R1 ;ADD 2 TO TEMP #1
1987 012002 005711 TST (R1) ;IF SIDE #0 SELECTED
1988 012004 001006 BNE ELGI1 ;THEN
1989 012006 052737 000001 002232 BIS #BIT0,SUT ;SET SIDE #0, DRIVE #0
1990 012014 005037 012326 CLR UNTCOD ;CLEAR UNIT CODE
1991 012020 000501 BR EIFI1 ;BR TO END IF 'F'
1992 012022 052737 000004 002232 ELGI1: BIS #BIT2,SUT ;SET SIDE #1, DRIVE #0
1993 012030 012737 000002 012326 MOV #2,UNTCOD ;SET UNIT CODE = 10
1994 012036 000472 BR EIFI1 ;BR TO END IF 'F'
1995 012040 062701 000002 IFHI1: ADD #2,R1 ;ADD 2 TO TEMP #1
1996 012044 005711 TST (R1) ;IF SIDE #0 SELECTED
1997 012046 001007 BNE ELHI1 ;THEN
1998 012050 052737 000002 002232 BIS #BIT1,SUT ;SET SIDE #0, DRIVE #1
1999 012056 012737 000001 012326 MOV #1,UNTCOD ;SET UNIT CODE = 01
2000 012064 000457 BR EIFI1 ;BR TO END IF 'F'
2001 012066 052737 000010 002232 ELHI1: BIS #BIT3,SUT ;SET SIDE #1, DRIVE #1
2002 012074 012737 000003 012326 MOV #3,UNTCOD ;SET UNIT CODE = 11
2003 012102 000450 BR EIFI1 ;BR TO END IF 'F'
2004 012104 062701 000002 IFI11: ADD #2,R1 ;ADD 2 TO R1
2005 012110 005711 TST (R1) ;IF SIDE
2006 012112 001056 BNE ELI11 ;EQUALS 0, THEN
2007 012114 162701 000002 IFJ11: SUB #2,R1 ;SUBTRACT 2 FROM TEMP #1
2008 012120 005711 TST (R1) ;IF DRIVE
2009 012122 001020 BNE IFL11 ;EQUALS ZERO, THEN
2010 012124 005737 012330 IFKI1: TST UNT ;IF UNIT
2011 012130 001006 BNE ELK11 ;EQUALS ZERO
2012 012132 052737 000001 002232 BIS #BIT0,SUT ;SET UNIT #0, DRIVE #0
2013 012140 005037 012326 CLR UNTCOD ;CLEAR UNIT CODE
2014 012144 000427 BR EIFI1 ;BR TO END IF 'F'

```

MOD 1.1 - UNPACK HARDWARE P-TABLES

```

2015 012146 052737 000004 002232 ELK11: BIS #BIT2,SUT ;SET UNIT #1, DRIVE #0
2016 012154 012737 000002 012326 MOV #2,UNTCOD ;SET UNIT CODE = 10
2017 012162 000420 BR EIF11 ;BR TO END IF 'F'
2018 012164 005737 012330 IFL11: TST UNT ;IF UNIT
2019 012170 001007 BNE ELL11 ;EQUALS 0
2020 012172 052737 000002 002232 BIS #BIT1,SUT ;SET UNIT #0, DRIVE #1
2021 012200 012737 000001 012326 MOV #1,UNTCOD ;SET UNIT CODE = 01
2022 012206 000406 BR EIF11 ;BR TO END IF 'F'
2023 012210 052737 000010 002232 ELL11: BIS #BIT3,SUT ;SET UNIT #1, DRIVE #1
2024 012216 012737 000003 012326 MOV #3,UNTCOD ;SET UNIT CODE = 11
2025 012224 012701 002336 EIF11: MOV #UT00,R1 ;GET BEGINING OF UNIT CODE TABLE
2026 012230 013702 012326 MOV UNTCOD,R2 ;GET UNIT CODE
2027 012234 006302 ASL R2 ;DOUBLE R2 FOR ADDRESSING
2028 012236 060201 ADD R2,R1 ;FIND ADDRESS FOR THIS UNIT CODE
2029 012240 013703 002334 MOV UNIT,R3 ;GET LOGICAL UNIT#
2030 012244 010311 MOV R3,(R1) ;SET USER UNIT# FOR PRINT OUT
2031 012246 000426 BR END11 ;BR TO END MOD
2032 012250 EL111: PRINTF #INMSG2,UNIT ;PRINT 'MUST SELECT RXXX TO SEL SIDE''
2033 012274 DOCLN
2034 012276 000412 BR END11 ;BR TO END MOD
2035 012300 ELD11: PRINTF #INMSG3,UNIT ;PRINT 'NOT SCHEDULED-TWO BUS ADR ONLY''
2036 012324 000207 END11: RTS PC ;RETURN
2037 -----
2038 012326 000000 UNTCOD: 0 ;UNIT CODE
2039 012330 000000 UNT: 0 ;UNIT FLAG
2040 -----
2041 012332 045 116 045 INMSG2: .ASCIZ /%N%AUNIT#%D1%A ANS RXXX EXPANSION TO SELECT SIDE #1->START OVER/
2042 012432 045 116 045 INMSG3: .ASCIZ /%N%AUNIT#%D1%A NOT SCHEDULED-TWO BUS ADDRESSSES ONLY%N/
2043 .EVEN
2044 ;MOD 1.1 ----- END MODULE -----

```

2047
2048
2049
2050
2051
2052
2053
2054 012522
2055 012522 000240
2062 012524
2063 012532 005737 002226
2064 012536 001403
2065 012540
2066 012546
2067 012550
2068
2080
2081

.SBTTL CLEANUP CODING SECTION

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

2\$: BGNCLN
NOP
CLRVEC UOJECT
TST UIVECT
BEQ 2\$
CLRVEC UIVECT
BRESET
ENDCLN

.EVEN


```

2084
2085
2086 012552
2087 012552 005737 002220
2088 012556 001447
2089 012560 012703 002336
2090 012564 013702 002220
2091 012570 004737 012774
2092 012574 005737 002270
2093 012600 001436
2094 012602 005737 002336
2095 012606 100403
2096 012610
2097 012616 005737 002340
2098 012622 100403
2099 012624
2100 012632 005737 002172
2101 012636 001417
2102 012640 012703 002342
2103 012644 005737 002342
2104 012650 100403
2105 012652
2106 012660 005737 002344
2107 012664 100440
2108 012666
2109 012674 000434
2110 012676 005737 002222
2111 012702 001425
2112 012704 012703 002342
2113 012710 013702 002222
2114 012714 004737 012774
2115 012720 005737 002270
2116 012724 001420
2117 012726 005737 002342
2118 012732 100403
2119 012734
2120 012742 005737 002344
2121 012746 100403
2122 012750
2123 012756 005737 002220
2124 012762 001001
2125 012764
2126 012766 005037 002270
2127 012772
2128
    
```

```

.SBTTL AUTO DROP SECTION
-----
        BGNAUTO
IAATDP: TST    U0ADR      ;IF SYS UNIT 0 ADDRESS
        BEQ    IDATDP     ;NOT=0, THEN
        MOV    #UT00,R3   ;SETUP R3 = ADR OF SELECTED UNIT
        MOV    U0ADR,R2   ;GET SYS UNIT 0 ADDRESS
        CALL   ADRTST     ;CALL ADDRESSING TEST
IBATDP: TST    ABORT      ;IF ABORT FLAG
        BEQ    IDATDP     ;SET, THEN
IGATDP: TST    UT00      ;IF UT00 SELECTED
        BMI    IHATDP     ;THEN
        DODU   UT00      ;DROP UNIT 00
IHATDP: TST    UT01      ;IF UT01 SELECTED
        BMI    ICATDP     ;THEN
        DODU   UT01      ;DROP UNIT 01
ICATDP: TST    RXXX      ;IF RXXX DEVICE
        BEQ    IDATDP     ;THEN
        MOV    #UT10,R3   ;SETUP R3 = ADR OF SELECTED UNIT
IIATDP: TST    UT10      ;IF UT10 SELECTED
        BMI    IJATDP     ;THEN
        DODU   UT10      ;DROP UNIT 10
IJATDP: TST    UT11      ;IF UT11 SELECTED
        BMI    XATDP      ;THEN
        DODU   UT11      ;DROP UNIT 11
        BR    XATDP      ;BR TO EXIT
IDATDP: TST    U1ADR      ;IF SYS UNIT 1 ADDRESS
        BEQ    IFATDP     ;NOT=0, THEN
        MOV    #UT10,R3   ;SETUP R3 = ADR OF SELECTED UNIT
        MOV    U1ADR,R2   ;GET SYS UNIT 1 ADDRESS
        CALL   ADRTST     ;CALL ADDRESSING TEST
IEATDP: TST    ABORT      ;IF ABORT FLAG
        BEQ    XATDP      ;SET, THEN
IKATDP: TST    UT10      ;IF UT10 SELECTED
        BMI    ILATDP     ;THEN
        DODU   UT10      ;DROP UNIT 10
ILATDP: TST    UT11      ;IF UT11 SELECTED
        BMI    IFATDP     ;THEN
        DODU   UT11      ;DROP UNIT 11
IFATDP: TST    U0ADR      ;IF SYS UNIT 0 ADDRESS
        BNE    XATDP      ;EQUALS 0, THEN
        DOCLN  ;DO CLEAN
XATDP:  CLR    ABORT      ;CLEAR ABORT FLAG
        ENDAUTO
-----
    
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 2148 012774 000240
 2149 012776 005037 002270
 2150 013002
 2151 013030 011201
 2152 013032
 2153 013040 005737 002270
 2154 013044 001426
 2155 013046 012701 013144
 2156 013052 012337 002074
 2157 013056 100005
 2158 013060 011337 002074
 2159 013064 100002
 2160 013066 005037 002074
 2161 013072 012737 000620 002376 1\$:
 2162 013100 012737 013124 002400
 2163 013106 012737 004510 002402
 2164 013114 005037 002374
 2165 013120
 2166 013122 000207
 2167
 2168 013124 101 104 104
 2169 013144 045 101 040
 2170 013200 045 101 040
 2171

```

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

ADRTST: NOP ;
CLR ABORT ;CLEAR ABORT FLAG
SETVEC #BTRP4,#TRAP,#PRI07
MOV (R2),R1 ;READ RXCSR
CLRVEC #BTRP4
TST ABORT ;IF ABORT FLAG
BEQ 2$ ;SET, THEN
MOV #TRPMS1,R1 ;SET TRAP MESSAGE
MOV (R3)+,L$LUN ;IF UNIT
BPL 1$ ;NOT SELECTED, THEN
MOV (R3),L$LUN ;IF NEXT UNIT
BPL 1$ ;NOT SELECTED, THEN
CLR L$LUN ;CLEAR UNIT
1$: MOV #400.,ERRNBR ;SETUP ERR NBR = ADR ERR
MOV #TOMSG,ERRMSG ;SETUP ERROR MSG
MOV #PRTB1,ERRBLK ;SETUP ERROR BLK
CLR ERR TYP ;SETUP ERR TYP = SYS FTL
ERROR ;CALL ERROR
2$: RETURN ;RETURN
-----

TOMSG: .ASCIZ /ADDRESSING TEST/
TRPMS1: .ASCII /%A BUS TRAP AT ADDRESS:%06%N/
        .ASCIZ /%A INTERFACE BAD OR NOT SET TO ABOVE ADDRESS%N/
        .EVEN
  
```

- MOD U.SFT.TRP - BUS TRAP HANDLER

```

2174 .SBTTL - MOD U.SFT.TRP - BUS TRAP HANDLER
2175 :++
2176 : FUNCTIONAL DESCRIPTION: SUBR TO HANDLE DEVICE BUS TRAP
2177 : INPUTS: NONE
2178 : IMPLICIT INPUTS: BUS TRAP
2179 : OUTPUTS: BUS TRAP ERROR, ABORT TEST
2180 : IMPLICIT OUTPUTS: NONE
2181 : SUBORDINATE ROUTINES USED: NONE
2182 : FUNCTIONAL SIDE EFFECTS: NONE
2183 : CALLING SEQUENCE: INTERRUPT
2184 :--

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2186 :-----
2187 :
2188 013260 052737 004000 002274 TRAP: BIS #SYSERR,ERRSY ;SET SYSTEM ERROR
2189 013266 005237 002270 INC ABORT ;ABORT TEST
2190 013272 000002 RTI ;RETURN FROM TRAP INTERRUPT
2191 :-----

```

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2194          .SBTTL  DROP UNIT SECTION
2195
2196          :++
2197          : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
2198          : TO NO LONGER BE TESTED.
2199          :--
2200
2206
2207 013274          BGNDU
2208
2209 013274 010037 013436      MOV     R0,UNITDP      ;GET LOGICAL UNIT #
2210 013300 005002          CLR     R2                ;LET R2=UNIT CODE# & UNIT COUNT /CLEAR IT!
2211 013302 012701 002336      MOV     #UT00,R1       ;GET BEGIN UNIT CODE ADDRESS
2212 013306 023721 013436      1$:    CMP     UNITDP,(R1)+    ;IF USER UNIT#
2213 013312 001417          BEQ     2$                ;IS = UNIT CODE - UNIT#
2214 013314 005202          INC     R2                ;INCREMENT UNIT CODE# & UNIT COUNT
2215 013316 022702 000005      CMP     #5,R2         ;IF MAX # OF UNITS
2216 013322 101371          BHI     1$                ;EXCEEDED, THEN
2217 013324          PRINTF #DUMSG2,UNITDP ;PRINT UNIT# NOT FOUND
2218 013350 000431          BR     3$                ;BR TO EXIT
2219 013352 012741 177777      2$:    MOV     #-1,-(R1)    ;DESELECT UNIT
2220 013356 010237 004752      MOV     R2,CVUNIT     ;SET UNIT CODE FOR CONVERSION
2221 013362 004737 004654      CALL   CVUTST        ;CALL MOD U.A.1 CONVERT UNIT# TO SUT CODE
2222 013366 013737 004754 013440  MOV     SUTCV,SUTDRP  ;SET SUT DROP CODE = SUT CONVERTED CODE
2223 013374 043737 013440 002232  BIC     SUTDRP,SUT    ;DROP UNIT SPEC IN SUTDRP
2224 013402 043737 013440 002230  BIC     SUTDRP,SDD    ;CLEAR UNIT SPEC IN SUT DROP
2225 013410          PRINTF #DUMSG1,UNITDP
2226
2227 013434          3$:    ENDDU
2228          ;-----
2229 013436 000000          UNITDP: 0                ;UNIT TO BE DROPPED
2230 013440 000000          SUTDRP: 0             ;SYS UNDER TST, DROP BIT
2231          ;-----
2232 013442 045 116 045  DUMSG1: .ASCIZ /%N% DROP UNIT#%D1% FROM TEST%/
2233 013503 045 116 045  DUMSG2: .ASCIZ /%N% COULD NOT DROP UNIT#%D1% -NOT SELECTED%/
2234          ;-----
2235
2247          .EVEN
2248
    
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2259 013562
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2267 013562
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.SBTTL ADD UNIT SECTION

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

BGNAU

ENDAU

.EVEN

```
2284 .TITLE HARDWARE TESTS
2285 .SBTTL TEST 1: RX02 SS PERF EXERCISER
2286 :++
2287 : TEST TO EXERCISE RX02/XX SYSTEM
2288 :--
2289 .SBTTL MOD 0.0 - EXERCISE A SYSTEM
2290 -----
2291 : BGNTST
2292 : BGND0
2293 : : BGNSUB
2294 : : : INITIALIZE (LOCATIONS, ETC.)
2295 : : : CALL MOD 1.0
2296 : : ENDSUB
2297 : : IF ERR SYS=1
2298 : : : THEN-
2299 : : : CALL MOD 4.0
2300 : : ENDF
2301 : : IF ABORT=0
2302 : : : THEN-
2303 : : : BGND0
2304 : : : : BGNSUB
2305 : : : : CALL MOD 2.0
2306 : : : : IF ERR SYS NOT=0
2307 : : : : : THEN-
2308 : : : : : CALL MOD 4.0
2309 : : : : : IF ABORT=0
2310 : : : : : : THEN-
2311 : : : : : : CALL MOD 3.0
2312 : : : : : ENDF
2313 : : : : : ELSE-
2314 : : : : : CALL MOD 3.0
2315 : : : : : ENDF
2316 : : : : : CK LOOP
2317 : : : : : ENDSUB
2318 : : : DO UNTIL ABORT=1 OR EXCMP=1
2319 : : ENDF
2320 : DO UNTIL SWREG BIT#15 NOT SET
2321 : IF ABORT=1
2322 : : THEN-
2323 : : : DO CLEAN UP
2324 : : : ELSE-
2325 : : : DO REPORT
2326 : : ENDF
2327 : ENDTST
2328 -----
```

```

2330 013564          BGNTST
2331 013564 000240   CONTRL: NOP
2332 013566          BG00:  BGNSUB
2333 013570 005037 014020   CLR      EXCMP
2334 013574 005037 002270   CLR      ABORT
2335 013600 012737 000001 014016   MOV      #1,INITL
2336 013606 005037 002304   CLR      RETRY
2337 013612 005037 002230   CLR      SDD
2338 013616 005037 002274   CLR      ERRSY
2339 013622 005037 002276   CLR      ERRTY
2340 013626 005037 002246   CLR      CSRUUT
2341 013632 005037 002250   CLR      ESRUUT
2342 013636 005037 033544   CLR      XERUUT
2343 013642 005037 002332   CLR      CMD
2344 013646 005037 023330   CLR      WDOT
2345 013652 012737 000001 021426   MOV      #1,SUTPTR
2346 013660 004737 014022   CALL     GTSYEX
2347 013664          ENDSUB
2348 013666 005737 002274   IA00:   TST      ERRSY
2349 013672 001402          BEQ      IB00
2350 013674 004737 032466   CALL     OTSYER
2351 013700 005737 002270   IB00:   TST      ABORT
2352 013704 001030          BNE      UG00
2353 013706          BC00:   BGNSUB
2354 013710 004737 020676   CALL     SCSYEX
2355 013714 005737 002274   ID00:   TST      ERRSY
2356 013720 001410          BEQ      LD00
2357 013722 004737 032466   CALL     OTSYER
2358 013726 005737 002270   IE00:   TST      ABORT
2359 013732 001005          BNE      ED00
2360 013734 004737 032444   CALL     OTEXCM
2361 013740 000402          BR       ED00
2362 013742 004737 032444   LD00:   CALL     OTEXCM
2363 013746          ED00:   CKLOOP
2364 013750          ENDSUB
2365 013752 005737 002270   UC00:   TST      ABORT
2366 013756 001007          BNE      IF00
2367 013760 005737 014020   TST      EXCMP
2368 013764 001750          BEQ      BC00
2369 013766 032737 100000 002204  UG00:   BIT      #100000,SWREG
2370 013774 001274          BNE      BG00
2371 013776 005737 002270   IF00:   TST      ABORT
2372 014002 001402          BEQ      LF00
2373 014004          DOCLN
2374 014006 000401          BR       END00
2375 014010          LF00:   DORPT
2376 014012          END00:  EXIT     TST
2377
-----
2378 014016 000000          INITL:  0
2379 014020 000000          EXCMP:  0
2380
;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
;DOUNT!L 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

```

```

2383
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2385      .SBTTL  MOD 1.0 - GET SYSTEM EXERCISE
2386      -----
2387 014022 000240      GTSYEX: NOP
2388 014024 032737 000001 002266  IFB10: BIT      #POWERF,FLAGS      ;IF POWER FLAG
2389 014032 001002      BNE      IFA10      ;NOT SET, THEN
2390 014034 004737 014076      JSR      PC,GTEXCD      ;CALL GET EXERCISE CONDITION
2391 014040 032737 040000 002204  IFA10: BIT      #40000,SWREG      ;IF NO INITIALIZE
2392 014046 001002      BNE      ELA10      ;NOT SET, THEN
2393 014050 004737 014216      JSR      PC,GTSYS      ;CALL GET SYSTEM TO EXERCISE
2394 014054 004737 017302      ELA10: JSR      PC,GTEX      ;CALL GET EXERCISE
2395 014060 042737 040000 002274  BIC      #BIT14,ERRSY      ;CLEAR ANY TIME OUT ERRORS ALREADY REPORTED
2396 014066 005037 014074      CLR      FIRST      ;CLEAR FIRST PASS FLAG
2397 014072 000207      RTS      PC      ;RETURN
2398
2399 014074 000001      FIRST: 1      ;FIRST PASS FLAG
2400      ;MOD 1.0 ----- END MODULE -----
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2404      .SBTTL  MOD 1.1 - GET EXERCISE CONDITIONS
2405      -----
2406
2407
2408 014076 000240      GTEXCD: NOP
2409 014100 032737 000001 002204  IFA11: BIT      #1,SWREG      ;IF SET FOR DOUBLE DENSITY
2410 014106 001404      BEQ      ELA11      ;THEN
2411 014110 012737 000200 002252  MOV      #200,WDCNT      ;SET WORD COUNT=256 BYTES
2412 014116 000403      BR      EIA11      ;BR TO END IF 'A'
2413 014120 012737 000100 002252  ELA11: MOV      #100,WDCNT      ;SET WORD COUNT=128 BYTES
2414 014126 013737 002206 020650  EIA11: MOV      OTDITK,OD      ;SET OUTSIDE TRACK ADR. (FROM SOFTW P-TAB)
2415 014134 013737 002210 020652  MOV      INDITK,ID      ;SET INSIDE TRACK ADR. (FROM SOFT P-TAB)
2416 014142 032737 000002 002204  BIT      #2,SWREG      ;IF DEL DATA SET
2417 014150 001404      BEQ      ELB11      ;THEN
2418 014152 012737 000010 002244  MOV      #10,DELDAT      ;SET DEL DATA MODE
2419 014160 000402      BR      IFC11      ;BR TO END IF 'B'
2420 014162 005037 002244      ELB11: CLR      DELDAT      ;CLEAR DEL DATA MODE
2421 014166 032737 000001 002204  IFC11: BIT      #1,SWREG      ;IF DOUBLE DEN IS SET IN SOFT SWREG
2422 014174 001404      BEQ      ELC11      ;THEN
2423 014176 012737 000400 002242  MOV      #400,DEN      ;SET DEN=DOUBLE
2424 014204 000402      BR      EIC11      ;BR TO END IF 'C'
2425 014206 005037 002242      ELC11: CLR      DEN      ;SET DEN=SINGLE
2426 014212 000240      EIC11: NOP
2427 014214 000207      RTS      PC      ;RETURN
2428      ;MOD 1.1 ----- END MODULE -----
  
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 014220 004737 014626
 014224 012737 000040 025330
 014232 013737 002220 025332
 014240 004737 025230
 014244 032777 000040 165746
 014252 001006
 014254 012737 016167 016130
 014262 004737 016016
 014266 000442
 014270 012777 040000 165722
 014276 012737 000040 025330
 014304 013737 002220 025332
 014312 004737 025230
 014316 032777 000040 165674
 014324 001006
 014326 012737 016235 016130
 014334 004737 016016
 014340 000415
 014342 012737 000002 015276
 014350 012737 000001 015302
 014356 005037 015300
 014362 013704 002220
 014366 004737 014742
 014372 000412
 014374 005737 002172
 014400 001404
 014402 042737 000017 002232
 014410 000403
 014412 042737 000003 002232
 014420 005737 002172
 014424 001401
 014426 000463
 014430 032737 000014 002232
 014436 001457
 014440 004737 014702
 014444 032777 000040 165550
 014452 001441
 014454 012777 040000 165540
 014462 012737 000040 025330
 014470 013737 002222 025332
 014476 004737 025230
 014502 032777 000040 165512
 014510 001416
 014512 012737 000004 015302
 014520 012737 000002 015276
 014526 012737 000002 015300
 014534 013704 002222
 014540 004737 014742
 014544 000414
 014546 012737 016235 016130
 014554 000403

.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-UO-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-UO, 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 UNTCN             ;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 RXXX       ;IF RXXX
IFH12: BEQ ELH12      ;THEN
BIC #17, SUT          ;CLEAR RXXX UO SELECTED DRIVES
BR IFC12              ;BR TO IF 'C'
ELH12: BIC #3, SUT    ;CLEAR RX02 UO SELECTED DRIVES
IFC12: TST RXXX       ;IF RXXX
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, UNTCN         ;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'
  
```

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2488 014556 012737 016167 016130 ELE12: MOV #INTER2,ITMSG ;SET MSG#-U1-'NO DONE BIT-BUS INIT''
2489 014564 004737 016016 EIE12: CALL ITERR ;INIT ERR
2490 014570 042737 000014 002232 BIC #14,SUT ;CLEAR SYS 1 FROM TEST
2491 014576 005737 002232 IFG12: TST SUT ;IF SYSTEM UNDER TEST
2492 014602 001007 BNE ELG12 ;EQUALS 0, THEN
2493 014604 012701 016305 MOV #INTER4,R1 ;SETUP PRINT - 'NO SYS TO TEST''
2494 014610 004737 004516 CALL PRTBOS ;CALL PRINT BASIC-0 ARG
2495 014614 012737 000001 002270 MOV #1,ABORT ;SET ABORT FLAG
2496 014622 000240 ELG12: NOP ;
2497 014624 000207 RTS PC ;RETURN
2498 ;MOD 1.2 ----- END MODULE -----
2499

```

```

2500 .SBTTL - MOD 1.2.U.1 - GET PRINTABLE SYSTEM 0 UNIT #
2501 ;-----
2502 014626 005037 002334 GPSUN0: CLR UNIT ;SET UNIT=0
2503 014632 005737 002336 TST UT00 ;IF UT00
2504 014636 100404 BMI 2$ ;VALID, THEN
2505 014640 013737 002336 002334 MOV UT00,UNIT ;SETUP UNIT FOR PRINT
2506 014646 000414 BR XPSUN0 ;BR TO EXIT
2507 014650 005737 002340 2$: TST UT01 ;IF UT01
2508 014654 100404 BMI 3$ ;VALID, THEN
2509 014656 013737 002340 002334 MOV UT01,UNIT ;SETUP UNIT FOR PRINT
2510 014664 000405 BR XPSUN0 ;BR TO EXIT
2511 014666 005737 002172 3$: TST RXXX ;IF RXXX
2512 014672 001402 BEQ XPSUN0 ;THEN
2513 014674 004737 014702 CALL GPSUN1 ;CALL GET PRINTABLE SYSTEM 1 UNIT #
2514 014700 000207 XPSUN0: RETURN ;RETURN
2515 ;-----

```

```

2516 .SBTTL - MOD 1.2.U.2 - GET PRINTABLE SYSTEM 1 UNIT #
2517 ;-----
2518 GPSUN1: CLR UNIT ;SET UNIT=0
2519 014702 005037 002334 1$: TST UT10 ;IF UT10
2520 014706 005737 002342 BMI 2$ ;VALID, THEN
2521 014712 100404 MOV UT10,UNIT ;SETUP UNIT FOR PRINT
2522 014714 013737 002342 002334 BR XPSUN1 ;BR TO EXIT
2523 014722 000406 2$: TST UT11 ;IF UT11
2524 014724 005737 002344 BMI XPSUN1 ;VALID, THEN
2525 014730 100403 MOV UT11,UNIT ;SETUP UNIT FOR PRINT
2526 014732 013737 002344 002334 XPSUN1: RETURN ;RETURN
2527 014740 000207 ;-----
2528

```

```

2531 .SBTTL MOD 1.2.1 - CK DRIVE AVAILABLE
2532 -----
2533 014742 010437 015272 CKDVAV: MOV R4,ITCSAD ;SAVE C & S ADR
2534 014746 062704 000002 ADD #2,R4 ;SET DATA BUFFER ADR
2535 014752 010437 015274 MOV R4,ITDBAD ;SAVE DB ADR
2536 014756 000240 BDA121: NOP ;
2537 014760 033737 015302 002232 IFA121: BIT SUTPOS,SUT ;IF THIS UNIT SUT & SUT
2538 014766 001521 BEQ EIA121 ;EQUAL, THEN
2539 014770 BGNSEG ;BEGIN SEGMENT-TO LOOP ON ERROR
2540 014772 013701 015300 MOV UNTCD,R1 ;SAVE UNIT CODE #
2541 014776 006301 ASL R1 ;DOUBLE UNIT CD FOR ADR
2542 015000 062701 002336 ADD #UT00,R1 ;FIND ADR UNIT#
2543 015004 011137 002334 MOV (R1),UNIT ;SET UNIT# FOR PRINT
2544 015010 032737 000001 015300 IFB121: BIT #1,UNTCD ;IF DRIVE #1 SET IN UNIT CODE
2545 015016 001407 BEQ ELB121 ;THEN
2546 015020 012737 000033 015266 MOV #33,INTCMD ;SET READ STATUS DRV #1
2547 015026 012737 000001 015270 MOV #1,DRIVEN ;SET PRINT FOR DRV #1
2548 015034 000405 BR EIB121 ;BR TO END IF 'B'
2549 015036 012737 000013 015266 ELB121: MOV #13,INTCMD ;SET READ STATUS DRV #0
2550 015044 005037 015270 CLR DRIVEN ;SET PRINT FOR DRIVE #0
2551 015050 013777 015266 000214 EIB121: MOV INTCMD,@ITCSAD ;EXECUTE READ STATUS ON DRIVE AT TEMP #4
2552 015056 013737 015272 025332 MOV ITCSAD,CSRADR ;PASS DOWN ADRS
2553 015064 012737 000040 025330 MOV #DNBIT,RDYWD ;PASS DOWN "DONE" BIT TO TEST
2554 015072 004737 025230 CALL DELAY ;CALL MOD - DELAY FOR DONE BIT
2555 015076 032777 000010 000170 IFH121: BIT #10,@ITDBAD ;IF AC LOW BIT
2556 015104 001404 BEQ IFC121 ;SET, THEN
2557 015106 012737 017200 016130 MOV #ITER3,ITMSG ;SET MSG# - "AC LOW"
2558 015114 000436 BR EIC121 ;BR TO END IF 'C'
2559 015116 032777 000200 000150 IFC121: BIT #200,@ITDBAD ;IF DRV RDY BIT
2560 015124 001004 BNE IFI121 ;NOT SET, THEN
2561 015126 012737 016334 016130 MOV #ITMSG1,ITMSG ;SET MSG# - "NO DRIVE READY"
2562 015134 000426 BR EIC121 ;BR TO END IF 'C'
2563 015136 032777 004000 000126 IFI121: BIT #RX2BIT,@ITCSAD ;IF CSR RX02 BIT
2564 015144 001004 BNE IFD121 ;NOT SET, THEN
2565 015146 012737 016521 016130 MOV #ITMSG5,ITMSG ;SET MSG # "NOT CAP. OF DOUBLE DENS. OPS."
2566 015154 000416 BR EIC121 ;BR TO END IF 'C'
2567 015156 005737 002172 IFD121: TST RXXX ;IF UNIT IS TO BE TESTED AS RXXX
2568 015162 001421 BEQ EID121 ;THEN
2569 015164 032737 000002 015300 IFE121: BIT #2,UNTCD ;IF SIDE #1
2570 015172 001415 BEQ EID121 ;SELECTED
2571 015174 032777 000002 000072 IFF121: BIT #2,@ITDBAD ;IF SIDE #1
2572 015202 001011 BNE EID121 ;NOT READY, THEN
2573 015204 012737 016357 016130 MOV #ITMSG2,ITMSG ;SET MSG# - "NO SIDE RDY"
2574 015212 004737 016016 EIC121: CALL ITERR ;CALL INITIALIZE ERROR
2575 015216 ENDSEG ;END SEGMENT-TO LOOP ON ERROR
2576 015220 004737 016064 CALL ITDROP ;CALL DROP UNIT
2577 015224 000402 BR EIA121 ;BR TO ENDIF 'A'
2578 015226 004737 015306 EID121: CALL REFDRV ;CALL REFORMAT DRIVE DENSITY
2579 015232 006137 015302 EIA121: ROL SUTPOS ;MOVE SELECT BIT TO TEST SYS UNDER TEST
2580 015236 005337 015276 DEC UNTCNT ;DECREMENT UNIT COUNT
2581 015242 005237 015300 INC UNTCD ;INCREMENT UNIT UNDER TEST CODE
2582 015246 005737 015276 DUA121: TST UNTCNT ;DJ
2583 015252 001402 BEQ END121 ;UNTIL
2584 015254 000137 014756 JMP BDA121 ;ALL UNITS DONE
2585 015260 000240 END121: NOP ;
2586 015262 000207 RTS PC ;RETURN
2587 -----

```

2590			:	-----
2591	015264	000000	REFCMD: 0	: REFORMAT COMMAND
2592	015266	000000	INTCMD: 0	: INITIAL COMMAND WORD
2593	015270	000000	DRIVEN: 0	: DRIVE NUMBER
2594	015272	000000	ITCSAD: 0	: INITIAL C & S ADR
2595	015274	000000	ITDBAD: 0	: INITIAL DATA BUFFER ADR
2596	015276	000000	UNTCNT: 0	: UNIT COUNT
2597	015300	000000	UNTCOD: 0	: UNIT CODE
2598	015302	000000	SUTPOS: 0	: SYS UNDER TST POSITION
2599	015304	000000	FORMCK: 0	: FORMATT CK FLAG
2600			:	-----

```

2603          .SBTTL MOD 1.2.1.1 - REFORMAT DRIVE DENSITY
2604          ;-----
2605
2606 015306 033737 015302 002232 REFDRV: BIT      SUTPOS,SUT      ;IF UNIT SELECTED IN
2607 015314 001003          BNE      IA1211      ;SYS UNDER TEST
2608 015316 000137 016012          JMP      X1211      ;THEN
2609 015322          BGNSEG          ;BEGIN SEGMENT-FOR LOOP ON ERROR
2610 015324 032737 000001 002204 IA1211: BIT      #1,SWREG      ;IF DOUBLE DENSITY
2611 015332 001417          BEQ      IC1211      ;SET, THEN
2612 015334 032777 000040 177732 IB1211: BIT      #40,@ITDBAD ;IF DISKETTE IS NOT DOUBLE DENSITY
2613 015342 001011          BNE      LB1211      ;THEN
2614 015344 012737 016401 016130          MOV      #ITMSG3,ITMSG ;SET MSG# DSK SGL DEN
2615 015352 004737 016102          CALL     ITPRNT      ;CALL PRINT -
2616 015356 012737 000400 015264          MOV      #BIT8,REFCMD ;SET REFORMAT CMD TO DOUBLE DENSITY
2617 015364 000417          BR       ID1211      ;BR TO IF 'D'
2618 015366 000137 016012          LB1211: JMP      X1211      ;ELSE BR TO END
2619 015372 032777 000040 177674 IC1211: BIT      #40,@ITDBAD ;IF DISKETTE
2620 015400 001002          BNE      1$          ;IS NOT SINGLE DENSITY, THEN
2621 015402 000137 016012          JMP      X1211      ;-
2622 015406 012737 016576 016130 1$: MOV      #ITMSG6,ITMSG ;SET MSG# DSK DBL DEN
2623 015414 004737 016102          CALL     ITPRNT      ;CALL PRINT -
2624 015420 005037 015264          CLR      REFCMD      ;SET REFORMAT CMD TO SINGLE DENSITY
2625 015424          ID1211: MANUAL          ;IF MANUAL INTERVENTION
2626 015426          BNCOMPLETE LD1211 ;IS ALLOWED,THEN
2627 015430          GMANIL  FCKMSG,FORMCK,1, YES
2628 015444 005737 015304          IE1211: TST      FORMCK ;IF REFORMATT
2629 015450 001544          BEQ      LE1211      ;OK, THEN
2630 015452 005037 015304          CLR      FORMCK      ;CLEAR REFORMATT CK
2631 015456 052737 000011 015264          BIS      #11,REFCMD ;SET REFORMAT CMD
2632 015464 032737 000001 015300 IF1211: BIT      #1,UNTC D ;IF DRIVE #1
2633 015472 001403          BEQ      IG1211      ;SELECTED
2634 015474 052737 000020 015264          BIS      #BIT4,REFCMD ;SET DRIVE #1 ON REFORMAT CMD
2635 015502 005737 002172          IG1211: TST      RXXX ;IF RXXX
2636 015506 001407          BEQ      EG1211      ;DEVICE AND
2637 015510 032737 000002 015300          BIT      #2,UNTC D ;SIDE #1
2638 015516 001403          BEQ      EG1211      ;SELECTED, THEN
2639 015520 052737 001000 015264          BIS      #BIT9,REFCMD ;SET SIDE #1 ON REFORMAT CMD
2640 015526 013777 015264 177536 EG1211: MOV      REFCMD,@ITCSAD ;SEND REFORMAT CMD
2641 015534 013737 015272 025332          MOV      ITCSAD,CSRADR ;PASS UNIT ADRS
2642 015542 012737 000200 025330          MOV      #TRBIT,RDYWD ;PASS "TR" BIT TO TEST
2643 015550 004737 025230          CALL     DELAY      ;CALL DELAY
2644 015554 005737 002274          IH1211: TST      ERRSY ;IF
2645 015560 001070          BNE      LH1211      ;T.O. ERR
2646 015562 012777 000111 177504          MOV      #111,@ITDBAD ;SEND VARIFY WORD (ASCII 'I')
2647 015570 013702 002334          MOV      UNIT,R2 ;SETUP UNIT # PRT
2648 015574 012701 016753          MOV      #ITMSG9,R1 ;SET MSG# WRG DEN REFORMAT
2649 015600 004737 004536          CALL     PRTB1S ;CALL PRINT BASIC-1 ARG
2650 015604 013737 015272 025332          MOV      ITCSAD,CSRADR ;SET UNIT BUS ADR
2651 015612 012737 000040 025330          MOV      #DNBIT,RDYWD ;SET DONE BIT TST
2652 015620 013737 025324 016014          MOV      RYDX,SAVDLY ;SAVE NORMAL DELAY MULTIPLIER
2653 015626 012737 001000 025324          MOV      #1000,RYDX ;SET DELAY MULT HIGH
2654 015634 004737 025230          CALL     DELAY      ;DELAY UNTIL DONE OR T. O.
2655 015640 013737 016014 025324          MOV      SAVDLY,RYDX ;RESET DELAY MULT
2656 015646 017737 177420 002246          MOV      @ITCSAD,CSRUT ;GET UUT CSR
2657 015654 017737 177414 002250          MOV      @ITDBAD,ESRUUT ;GET UUT ESR
2658 015662 032777 000040 177402 I11211: BIT      #40,@ITCSAD ;IF DONE BIT
2659 015670 001420          BEQ      L11211      ;SET ,THEN
  
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2660 015672 032777 100000 177372 1J1211: BIT #100000,@ITCSAD ;IF ERR BIT NOT SET
2661 015700 001444 X1211 ;THEN BR TO EXIT
2662 015702 013737 015264 002332 MOV REFCMD,CMD ;SET COMMAND FOR PRINT
2663 015710 013737 015272 002236 MOV ITCSAD,UUTADR ;SET UUT ADR
2664 015716 004737 005026 CALL RDERCD ;CALL DEVICE READ ERROR CODE
2665 015722 012737 017032 016130 MOV #ITER1,ITMSG ;ELSE, SET "ERROR ON REFORMAT" MSG
2666 015730 000407 BR EH1211 ;BR TO END IF 'H'
2667 015732 012737 017116 016130 L11211: MOV #ITER2,ITMSG ;SET "NO DONE BIT AFTER REFORMAT" MSG
2668 015740 000403 BR EH1211 ;BR TO END IF 'H'
2669 015742 012737 016454 016130 LH1211: MOV #ITMSG4,ITMSG ;SET MSG# NO "TR" BIT TIME OUT ERR
2670 015750 004737 016016 EH1211: CALL ITERR ;CALL INITIALIZE ERROR
2671 015754 004737 002404 CALL PRERR ;CALL PRINT ERR
2672 015760 000411 BR EA1211 ;BR TO END IF 'A'
2673 015762 012737 016652 016130 LE1211: MOV #ITMSG7,ITMSG ;SET MSG# DISK WRG DEN
2674 015770 000403 BR ED1211 ;BR TO END IF 'D'
2675 015772 012737 016704 016130 LD1211: MOV #ITMSG8,ITMSG ;SET MSG# MAN INTERVENTION NOT ALL
2676 016000 004737 016016 ED1211: CALL ITERR ;CALL INITIALIZE ERROR
2677 016004 EA1211: ENDSEG ;END SEGMENT-TO LOOP ON ERROR
2678 016006 004737 016064 CALL ITDROP ;CALL DROP UNIT
2679 016012 000207 X1211: RTS PC ;RETURN
2680 ;-----
2681 016014 000000 SAVDLY: 0 ;SAVE NORMAL DELAY MULTIPLIER
2682 ;-----

```

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2685      .SBTTL - MOD 1.2.U.3 - INITIALIZE ERROR
2686      ;-----
2687
2688 016016 012737 000310 002376 ITERR: MOV #200.,ERRNBR ;SET ERR NBR = INIT ERR
2689 016024 012737 016132 002400      MOV #ITERMG,ERPMSG ;
2690 016032 012737 004506 002402      MOV #NONE,ERRBLK ;
2691 016040 012737 000001 002374      MOV #1,ERRTYP ;SET ERR TYP = DEV FTL
2692 016046 013737 002334 002074      MOV UNIT,L$LUN ;SETUP LUN FOR PRINT
2693 016054      ERROR ;CALL ERROR
2694 016056 004737 016102      CALL ITPRNT ;CALL INITIALIZE PRINT
2695 016062 000207      RETURN ;RETURN
2696      ;-----
2697
2698      .SBTTL - MOD 1.2.U.4 - INITIALIZE DROP
2699      ;-----
2700 016064 013737 015302 013440 ITDROP: MOV SUTPOS,SUTDRP ;SETUP SYS. UNDER TEST DROP BIT
2701 016072      DODU UNIT ;DROP THIS UNIT FROM TEST
2702 016100 000207      RTS PC ;RETURN
2703      ;-----
2704
2705      .SBTTL - MOD 1.2.U.5 - INITIALIZE PRINT
2706      ;-----
2707
2708 016102 013702 002334 ITPRNT: MOV UNIT,R2 ;SETUP TO PRINT UNIT #
2709 016106 012701 016153      MOV #ITERUT,R1 ;SETUP MSG
2710 016112 004737 004536      CALL PRTB1S ;PRINT BASIC-1 ARG
2711 016116 013701 016130      MOV ITMSG,R1 ;SETUP TO PRINT MSG
2712 016122 004737 004516      CALL PRTBOS ;PRINT BASIC-0 ARG
2713 016126 000207      RTS PC ;RETURN
2714      ;-----
2715 016130 000000 ITMSG: 0 ;INITIALIZE MSG#
2716      ;-----
2717 016132 111 116 111 ITERMG: .ASCIZ /INITIALIZE ERROR/
2718 016153 045 101 040 ITERUT: .ASCIZ /%A UNIT#%D1/
2719 016167 045 101 055 INTER2: .ASCIZ /%A---NO DONE BIT AFTER BUS INITIALIZE/
2720 016235 045 101 055 INTER3: .ASCIZ /%A---NO DONE BIT AFTER PROG. INITIALIZE/
2721 016305 045 116 045 INTER4: .ASCIZ /%N% NO SYSTEM TO TEST/
2722 016334 045 101 055 ITMSG1: .ASCIZ /%A- NO DRIVE READY/
2723 016357 045 101 055 ITMSG2: .ASCIZ /%A- NO SIDE READY/
2724 016401 045 101 055 ITMSG3: .ASCIZ /%A- WRONG DENSITY -SINGLE DENSITY DISKETTE/
2725 016454 045 101 055 ITMSG4: .ASCIZ /%A- "TR" BIT AFTER SET DENSITY CMD%/
2726 016521 045 101 055 ITMSG5: .ASCIZ /%A- NOT CAPABLE OF DOUBLE DENSITY OPERATIONS/
2727 016576 045 101 055 ITMSG6: .ASCIZ /%A- WRONG DENSITY - DOUBLE DENSITY DISKETTE/
2728 016652 045 101 040 ITMSG7: .ASCIZ /%A DISKETTE WRONG DENSITY/
2729 016704 045 101 040 ITMSG8: .ASCIZ /%A MAN. INTERVENTION REQ'D - REFORMAT/
2730 016753 045 101 040 ITMSG9: .ASCIZ /%A UNIT#%D1%-REFORMATTING, DO NOT INTERRUPT%/
2731 017032 045 101 055 ITER1: .ASCIZ /%A- ERROR BIT SET AFTER REFORMAT COMMAND SEQUENCE%/
2732 017116 045 101 055 ITER2: .ASCIZ /%A- NO DONE BIT AFTER REFORMAT COMMAND SEQUENCE%/
2733 017200 045 101 055 ITER3: .ASCIZ /%A- AC LOW BIT SET/
2734 017223 040 040 040 FCKMSG: .ASCIZ / ->REFORMAT DISKETTE - ARE YOU SURE?/
2735      .EVEN
2736      ;-----

```

```
2739
2740          .SBTTL MOD 1.3 - GET EXERCISE
2741          ;-----
2742
2743 017302 013737 002200 017750 GTEX:  MOV    TSTPAT,PAT      ;GET TEST PATTERN #
2744 017310 004737 017376          CALL    STSTPA        ;CALL MOD 1.3.1 SET TEST PATTERN
2745 017314 013737 002202 020654          MOV    TRKSEQ,SEQUEN ;GET TRACK SEQ #
2746 017322 013737 002206 020650          MOV    OTDITK,OD     ;GET OUTSIDE DIA. TRK
2747 017330 013737 002210 020652          MOV    INDITK,ID     ;GET INSIDE DIA. TRK
2748 017336 004737 017752          CALL    STKSEQ       ;CALL MOD 1.3.2 SET TRACK SEQUENCE
2749 017342 005737 014074          IFB13: TST    FIRST   ;IF A FIRST PASS
2750 017346 001007          BNE    THC13        ;THEN
2751 017350 032737 000040 002204          IFC13: BIT    #40,SWREG ;IF CLEAR STATISTICAL TABLES
2752 017356 001406          BEQ    END13        ;IS SELECTED THEN
2753 017360 042737 000040 002204          BIC    #40,SWREG    ;CLEAR SELECTED - CLR STAT TABLE
2754 017366 004737 020656          THC13: CALL   CLRSTA  ;CALL MOD 1.3.3 - CLEAR STATISTICAL TABLES
2755 017372 000240          NOP
2756 017374 000207          END13: RTS    PC    ;RETURN
2757          ;MOD 1.3 ----- END MODULE -----
```



```

2760 .SBTTL MOD 1.3.1 - SET DATA PATTERN
2761 -----
2762 : PAT # ROUTINE DATA PATTERN
2763 : -----
2764 : 0 RANDAT NO PATTERN SPECIFIED (FORCE RANDOM DATA)
2765 : 1 DATA0 ALL ZEROS
2766 : 2 DATA1 ALL ONES
2767 : 3 FLOAT0 FLOAT ZERO THRU ONE'S
2768 : 4 FLOAT1 FLOAT ONE THRU ZERO'S
2769 : 5 PAT125 ALTERNATING BITS IN ONE BYTE COMP IN NEXT
2770 : 6 PAT333 ALTERNATING 1'S PAIR & 0 IN ONE BYTE COMP IN NEXT
2771 : 7 RANDAT RANDOM
2772 :
2773 : NOTE: DATA PATTERNS WILL BE MODIFIED SO BYTE #0 WILL CONTAIN TRACK ADDRESS
2774 : AND BYTE #1 THE SECTOR ADDRESS IN WHICH THE DATA IS WRITTEN.
2775 : THE LAST TWO BYTES CONTAIN THE CHECK SUM NUMBERS.
2776 :-----
2777 017376 042737 000377 017462 STSTPA: BIC #377,@#BRONPT ;CLEAR BRANCH OFFSET
2778 017404 005037 017744 CLR SUM ;SET UP FOR ACCUMULATION OF CHECK SUM
2779 017410 005737 017750 TST PAT ;IF NO PATTERN SPECIFIED FORCE PATTERN 7
2780 017414 001003 BNE 1$
2781 017416 012737 000007 017750 MOV #7,PAT
2782 017424 013704 017750 1$: MOV PAT,R4 ;GET PATTERN BITS
2783 017430 005304 DEC R4 ;ADJUST FOR CORRECT OFFSET
2784 017432 006304 ASL R4
2785 017434 150437 017462 BISB R4,@#BRONPT ;INSERT OFFSET
2786 017440 012704 034010 MOV #DATPAT+2,R4 ;SET UP ADDRESS OF FIRST BYTE
2787 017444 013705 002252 MOV WDCNT,R5 ;SETUP WORD COUNT
2788 017450 006305 ASL R5 ;DOUBLE WORD COUNT FOR ADR
2789 017452 062705 034006 ADD #DATPAT,R5 ;ADD DATA PATTERN ADR
2790 017456 162705 000004 SUB #4,R5 ;ADJ. FOR CHECKSUM
2791 017462 000777 BRONPT: BR ;BRANCH BY OFFSET SELECTED
2792 017464 000137 017520 JMP DATA0 ;000 DATA BYTE
2793 017470 000137 017536 JMP DATA1 ;377 DATA BYTE
2794 017474 000137 017546 JMP FLOAT0 ;FLOAT A 0 THROUGH ALL 1'S
2795 017500 000137 017614 JMP FLOAT1 ;FLOAT A 1 THROUGH ALL 0'S
2796 017504 000137 017622 JMP PAT125 ;125/052 DATA WORD
2797 017510 000137 017646 JMP PAT333 ;314/063 DATA WORD
2798 017514 000137 017656 JMP RANDAT ;RANDOM DATA BYTE
2799 :-----
2800 017520 005037 017746 DATA0: CLR DATBYT
2801 017524 004737 017704 PG: JSR PC,LOAD ;GO LOAD THE DATA BUFFER
2802 017530 005705 TST R5 ;IF R5
2803 017532 001463 BEQ END131 ;NOT =0 ,THEN
2804 017534 000773 BR PG
2805 :-----
2806 017536 112737 000377 017746 DATA1: MOVB #377,DATBYT
2807 017544 000767 BR PG
2808 :-----
2809 017546 112737 000376 017746 FLOAT0: MOVB #376,DATBYT ;SET UP A ONES FIELD
2810 017554 000261 XPG: SEC ;SET THE C BIT TO ROTATE THROUGH THE DATA
2811 017556 012702 000000 1$: MOV #0,R2 ;CLR R2 (CAN'T USE "CLR" AS IT CLEARS "C" BIT)
2812 017562 103001 BCC 2$ ;BR IF THE "C" BIT IS CLEARED
2813 017564 005202 INC R2 ;SET R2 IF NOT
2814 017566 004737 017704 2$: JSR PC,LOAD ;GO LOAD THE DATA BUFFER
2815 017572 005705 TST R5 ;IF R5
2816 017574 001442 BEQ END131 ;NOT ZERO THEN
  
```

```

2817 017576 000241          CLC
2818 017600 005702          TST      R2          ;IS R2 NONZERO
2819 017602 001401          BEQ      3$
2820 017604 000261          SEC
2821 017606 106137 017746  3$:  ROLB   DATBYT    ;YES, SET THE 'C' BIT
2822 017612 000761          BR      1$
2823
-----
2824 017614 005037 017746  FLOAT1: CLR   DATBYT
2825 017620 000755          BR      XPG
2826
-----
2827 017622 112737 000125 017746  PAT125: MOVB  #125,DATBYT
2828 017630 004737 017704  XXPG:  JSR   PC,LOAD
2829 017634 005705          TST      R5          ;IF R5
2830 017636 001421          BEQ      END131      ;NOT ZERO THEN
2831 017640 105137 017746          COMB   DATBYT
2832 017644 000771          BR      XXPG
2833
-----
2834 017646 112737 000333 017746  PAT333: MOVB  #333,DATBYT
2835 017654 000765          BR      XPG
2836
-----
2837 017656 004737 004560          RANDAT: JSR   PC,RANGEN ;GET RANDOM NUMBER
2838 017662 113737 004652 017746          MOVB   RANUM,DATBYT
2839 017670 004737 017704          JSR   PC,LOAD
2840 017674 005705          TST      R5          ;IF R5
2841 017676 001401          BEQ      END131      ;NOT ZERO THEN
2842 017700 000766          BR      RANDAT
2843
-----
2844 017702 000207          END131: RTS    PC          ;RETURN.
2845
-----
2846
2847
-----
2848 017704 063737 017746 017744  LOAD:  ADD   DATBYT,SUM ;ACCUMULATE THE PATTERN CHECK SUM
2849 017712 113724 017746          MOVB   DATBYT,(R4)+ ;LOAD THE DATA BUFFER
2850 017716 020504          CMP    R5,R4        ;HAVE 124 BYTES BEEN GENERATED
2851 017720 001401          BEQ    1$           ;IF YES, RETURN
2852 017722 000407          BR    ENLD         ;IF NO, RETURN TO PATTERN GENERATOR
2853 017724 113724 017744          1$:  MOVB  SUM,(R4)+ ;PUT CHECKSUM INTO TABLE
2854 017730 005137 017744          COM    SUM         ;COMPLIMENT CHECKSUM
2855 017734 113714 017744          MOVB  SUM,(R4)    ;PUT COMP CHECK SUM INTO TABLE
2856 017740 005005          CLR   R5          ;CLEAR TEMP #5 - FLAG DONE MODULE
2857 017742 000207          ENLD:  RTS    PC          ;RETURN
2858
-----
2859 017744 000000          SUM:   0
2860 017746 000000          DATBYT: 0
2861 017750 000000          PAT:   0
2862
;MOD 1.3.1 ----- END MODULE -----

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.SBTTL MOD 1.3.2 - SET TRACK SEQUENCE

SEQ #	SEQUENCE
0	NO SEQUENCE SPECIFIED (DEFAULT TO SEQ 7)
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      TKTBPT      ;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,TRKCNT ;SET UP NUMBER OF TRACK MOVEMENTS
        SUB      XOD,TRKCNT ;
        INC      TRKCNT     ;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 #
        BIC      #377,@#BRONTK ;CLEAR OUT BRANCH OFFSET
        TST      SEQUEN     ;IF TRACK SEQUENCE
        BNE      1$        ;EQUALS ZERO, THEN
        MOV      #7,SEQUEN  ;FORCE SEQ #7-RANDOM
1$:     MOV      SEQUEN,R4   ;GET SEQUENCE BITS
        DEC      R4        ;ADJUST FOR CORRECT OFFSET
        ASL      R4        ;
        BIS      R4,@#BRONTK ;THIS BR INST. IS MODIFIED SELECTED TRACK SEQUENCE
BRONTK: BR      .          ;BRANCH TO SELECTED TRACK SEQUENCE
        JMP      SEQ1
        JMP      SEQ2
        JMP      SEQ3
        JMP      SEQ4
        JMP      SEQ5
        JMP      SEQ6
        JMP      SEQ7
        ;BOUNCE ID TO OD
        ;DECREASING BOUNCE
        ;STROBE
        ;RANDOM
-----
SEQ1:   CMP      XID,PRESTK  ;IF PRESENT TRACK=ID
        BNE      1$        ;THEN
        MOV      #-1,TARGET ;TERMINATE TABLE
        BR      2$        ;END SEQ1
1$:     MOV      XOD,TARGET  ;ELSE SET NEW TRACK-OUTSIDE DIA
        INC      XOD       ;INCREMENT OUTSIDE DIA
2$:     BR      NEWTRK     ;END SEQ1
-----
SEQ2:   CMP      XOD,PRESTK  ;
        BNE      1$
  
```

```

2922 020230 012737 177777 020640      MOV    #-1,TARGET      ;TERMINATE TABLE
2923 020236 000405                    BR     2$              ;END SEQ2
2924 020240 013737 020646 020640 1$:  MOV    XID,TARGET      ;SET NEXT TRACK=INSIDIA
2925 020246 005337 020646          DEC    XID              ;DECREMENT INSIDE DIA
2926 020252 000547          2$:  BR     NEWTRK
2927
-----
2928 020254 005701          SEQ3: TST    R1              ;IF MODE
2929 020256 001402          BEQ    1$              ;NOT EQUAL TO ZERO
2930 020260 005001          CLR    R1              ;THEN CHANGE MODE
2931 020262 000756          BR     SEQ2            ;DO SEQ2
2932 020264 012701 000001 1$:  MOV    #1,R1           ;ELSE CHANGE MODE
2933 020270 000735          BR     SEQ1            ;DO SEQ1
2934
-----
2935 020272 005701          SEQ4: TST    R1              ;IF MODE
2936 020274 001405          BEQ    1$              ;NOT EQUAL TO ZERO
2937 020276 113737 020644 020640      MOVB   XOD,TARGET      ;THEN SET NEXT TRACK=OUTSIDE DIA
2938 020304 005001          CLR    R1              ;CHANGE MODE
2939 020306 000405          BR     2$              ;BR
2940 020310 113737 020646 020640 1$:  MOVB   XID,TARGET      ;ELSE SET NEXT TRACK=INSIDE DIA
2941 020316 012701 000001      MOV    #1,R1           ;TERMINATE TABLE
2942 020322 005337 020636          2$:  DEC    TRKCNTR      ;
2943 020326 001003          BNE    3$              ;
2944 020330 012737 177777 020640      MOV    #-1,TARGET      ;TERMINATE TABLE
2945 020336 000515          3$:  BR     NEWTRK
2946
-----
2947 020340 123737 020646 020644  SEQ5:  CMPB   XID,XOD          ;IF INSIDE & OUTSIDE DIA
2948 020346 001421          BEQ    2$              ;NOT EQUAL
2949 020350 005701          TST    R1              ;THEN, IF MODE
2950 020352 001407          BEQ    1$              ;
2951 020354 005001          CLR    R1              ;CHANGE MODE
2952 020356 013737 020644 020640      MOV    XOD,TARGET      ;SET NEXT TRACK=OUTSIDE DIA
2953 020364 005237 020644          INC    XOD             ;INCREMENT OUTSIDE DIA
2954 020370 000413          BR     3$              ;END SEQ5
2955 020372 012701 000001 1$:  MOV    #1,R1           ;CHANGE MODE
2956 020376 013737 020646 020640      MOV    XID,TARGET      ;SET NEXT TRACK=INSIDE DIA
2957 020404 005337 020646          DEC    XID             ;DECREMENT INSIDE DIA
2958 020410 000403          BR     3$              ;END SET5
2959 020412 012737 177777 020640 2$:  MOV    #-1,TARGET      ;TERMINATE TABLE
2960 020420 000464          3$:  BR     NEWTRK
2961
-----
2962 020422 123737 020646 020644  SEQ6:  CMPB   XID,XOD          ;IF O.D. JUST DONE
2963 020430 001416          BEQ    1$              ;THEN
2964 020432 123737 020642 020644      CMPB   PRESTK,XOD      ;SET TO DO I.D.
2965 020440 001006          BNE    3$              ;DECREMENT I.D. FOR NEXT
2966 020442 113737 020646 020640      MOVB   XID,TARGET      ;
2967 020450 005337 020646          DEC    XID             ;
2968 020454 000407          BR     2$              ;ELSE SET TO DO O.D.
2969 020456 113737 020644 020640 3$:  MOVB   XOD,TARGET      ;
2970 020464 000403          BR     2$              ;
2971 020466 012737 177777 020640 1$:  MOV    #-1,TARGET      ;
2972 020474 000436          2$:  BR     NEWTRK
2973
-----
2974 020476 000240          SEQ7:  NOP
2975 020500 004737 004560          JSR    PC,RANGEN      ;GET A RANDOM NUMBER
2976 020504 042737 177600 004652      BIC    #177600,RANUM   ;CLEAR ALL BUT LOW 7 BITS
2977 020512 123737 004652 020646  IDCOMP: CMPB   RANUM,XID      ;IF RANUM LARGER THAN ID ADDRESS
2978 020520 003401          BLE    ODCOMP         ;THEN
  
```

```

2979 020522 000765          BR      SEQ7          ;BR TO GET ANOTHER RANDOM NUMBER
2980 020524 123737 004652 020644 ODCOMP: CMPB   RANUM,XOD      ;IF RANUM SMALLER THAN OD ADDRESS
2981 020532 002001          BGE    PRESCK      ;THEN
2982 020534 000760          BR      SEQ7          ;BR TO GET ANOTHER RANDOM NUMBER
2983 020536 123737 004652 020642 PRESCK: CMPB   RANUM,PRESCK ;IF RANUM EQUALS PRESENT TRACK
2984 020544 001754          BEQ    SEQ7          ;GET ANOTHER RANDOM NUMBER
2985 020546 013737 004652 020640          MOV    RANUM,TARGET ;RANUM OK PUT IT IN TARGET TRACK
2986 020554 005337 020636          DEC    TRKCNT
2987 020560 001003          BNE    1$
2988 020562 012737 177777 020640          MGV   #-1,TARGET   ;TERMINATE TABLE
2989 020570 000400          1$:  BR      NEWTRK

```

```

2990
2991 020572 012702 033553          NEWTRK: MOV   #TRKTBL-1,R2
2992 020576 005237 020634          INC    TKTBPT
2993 020602 063702 020634          ADD    TKTBPT,R2
2994 020606 113712 020640          MOVB  TARGET,(R2)
2995 020612 005737 020640          TST   TARGET
2996 020616 100405          BMI   ENDTKS
2997 020620 113737 020640 020642          MOVB  TARGET,PRESCK
2998 020626 000137 020126          JMP   BRONTK
2999 020632 000207          ENDTKS: RTS    PC

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```

3000
3001 020634 000000          TKTBPT: 0          ;TRACK TABLE POINTER
3002 020636 000000          TRKCNT: 0          ;TRACK COUNT
3003 020640 000000          TARGET: 0          ;TARGET TRACK
3004 020642 000000          PRESCK: 0          ;PRESENT TRACK
3005 020644 000000          XOD:    0          ;X OUTSIDE DIA.
3006 020646 000000          XID:    0          ;X INSIDE DIA.
3007 020650 000000          OD:     0          ;OUTSIDE DIA.
3008 020652 000000          ID:     0          ;INSIDE DIA.
3009 020654 000000          SEQUEN: 0          ;SEQUENCE #
3010          ;MOD 1.3.2 ----- END MODULE -----

```

```

3011
3012
3013
3014
3015          .SBTTL MOD 1.3.3 - CLEAR STATISTICAL TABLES
3016          ;-----

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```

3017
3018 020656 012701 007314          CLRSTA: MOV   #READSC,R1      ;SET UP BEGINNING ADDRESS
3019 020662 012702 011240          MOV   #ENDST,R2             ;SET UP TABLE LENGTH
3020 020666 005021          BDA133: CLR  (R1)+           ;CLEAR ADDRESSED LOCATION
3021 020670 020102          CMP   R1,R2                 ;
3022 020672 001375          BNE   BDA133                ;DO UNTIL LAST ADDRESS DONE
3023 020674 000207          END133: RTS    PC           ;RETURN
3024          ;MOD 1.3.3 ----- END MODULE -----

```

```

3027
3028
3029           .SBTTL MOD 2.0 - SCHEDULE SYSTEM EXERCISE
3030           ;-----
3031
3032 020676 000240          SCSYEX: NOP          ;
3033 020700 005737 014016  IFK20: TST          INITL          ;IF INITIALIZE
3034 020704 001417          BEQ          ELK20          ;THEN
3035 020706 012737 000001 024252  MOV          #1,INITTK      ;SET INITIALIZE TRK FLG
3036 020714 005037 021430          CLR          EXHCP          ;CLEAR EX HALF COMPL
3037 020720 005037 021432          CLR          BTHDRV         ;CLEAR BOTH DRV DONE FLG
3038 020724 005037 021434          CLR          BDVSCD         ;CLEAR BOTH DRV SEC DONE FLG
3039 020730 005037 021442          CLR          DVDNCK         ;CLEAR DRV DONE CK FLG
3040 020734 005037 021444          CLR          DRVDN          ;CLEAR DRV DONE
3041 020740 005037 021452          CLR          ERTSAV         ;CLEAR ERR TYP SAVE
3042 020744 005037 021446          ELK20: CLR          SFERR          ;CLEAR SFT ERR
3043 020750 033737 021426 002232  IFA20: BIT          SUTPTR,SUT      ;IF SYSTEM UNDER TEST BIT
3044 020756 001406          BEQ          ELA20          ;IS SET
3045 020760 004737 004756          CALL         CVSTUT         ;CALL MOD U.A.2 - CONVERT SUTPTR-->UUT
3046 020764 013737 005024 002234  MOV          UNITST,UUT      ;SET UNIT UNDER TEST
3047 020772 000410          BR          BDB20         ;BR TO BEGIN 'B'
3048 020774 006337 021426          ELA20: ASL          SUTPTR         ;SHIFT SUT POINTER TO TEST
3049 021000 022737 000020 021426  DUC20: CMP          #20,SUTPTR    ;DO UNTIL SUT POINTER
3050 021006 003360          BGT          IFA20         ;EQUALS 10000 BIN
3051 021010 000137 021404          JMP          EDC20         ;BR TO END DO 'C'
3052 021014          BDB20: BGNSEG          ;BEGIN SEGMENT FOR ERROR LOOPS
3053 021016 013737 002176 021424  MOV          TSTN,EXN        ;GET TEST # = EXERCISE #
3054 021024 004737 021454          CALL         GETTST        ;CALL MOD 2.1 - GET A TEST
3055 021030 013737 022156 021422  MOV          TSTWD,TST       ;SAVE TEST WORD
3056 021036 032737 000400 021422  IFB20: BIT          #400,TST     ;IF NEXT UNIT BIT
3057 021044 001514          BEQ          ELB20         ;IS SET THEN
3058 021046 004737 032352          CALL         STDVDN        ;CALL MOD 2.6 -SET DRIVES DONE
3059 021052 032737 004000 021422  IFC20: BIT          #4000,TST    ;IF ADV TRK BIT
3060 021060 001001          BNE          IFI20        ;IS NOT SET THEN
3061 021062 000411          BR          EIC20         ;BR TO END IF 'C'
3062 021064 023727 021432 000003  IFI20: CMP          BTHDRV,#3     ;IF BOTH DRIVES DONE
3063 021072 001065          BNE          IFL20        ;THEN
3064 021074 013737 021432 021444  MOV          BTHDRV,DRVDN    ;SET BOTH DRVS DONE TEST
3065 021102 005037 021432          CLR          BTHDRV        ;CLEAR BOTH DRIVES DONE FLAG & THEN
3066 021106 013737 002234 021450  EIC20: MOV          UUT,RESTK   ;SET UUT TO RESET TRK
3067 021114 052737 002000 021450  BIS          #2000,RESTK     ;SET INC TRK ONTO RESET TRK
3068 021122 032737 001000 021422  IFF20: BIT          #1000,TST   ;IF DEL DATA CK BIT
3069 021130 001001          BNE          ELF20        ;IS SET THEN
3070 021132 000410          BR          EIF20         ;BR TO IF 'F'
3071 021134 012737 002000 021440  ELF20: MOV          #2000,ADVTRK ;SET ADV TRK = INCR TRK
3072 021142 005737 021430          IFG20: TST          EXHCP     ;IF EXERCISE 1/2 COMPLETE
3073 021146 001420          BEQ          IFH20        ;IS SET, THEN
3074 021150 005037 021430          CLR          EXHCP         ;CLEAR EX HALF COMPLETE
3075 021154 053737 021444 002230  EIF20: BIS          DRVDN,SDD   ;SET THIS DRV DONE
3076 021162 006337 021426          ASL          SUTPTR        ;SETUP PTR TO CK NXT UNIT
3077 021166 013737 002234 021450  MOV          UUT,RESTK     ;GET UUT
3078 021174 052737 002000 021450  BIS          #2000,RESTK     ;SET INCTRK ON RESET TRK FLAG
3079 021202 005037 021432          CLR          BTHDRV        ;CLEAR BOTH DRV DN FLAG
3080 021206 000504          BR          END20         ;BR TO END
3081 021210 005737 002244          IFH20: TST          DELDAT    ;IF DEL DATA MODE
3082 021214 001403          BEQ          ELH20        ;IS SET
3083 021216 005037 002244          CLR          DELDAT        ;CLEAR DEL DATA MODE

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3084 021222 000403          BR      EIH20          ;BR TO END IF 'H'
3085 021224 012737 000010 002244 ELH20: MOV      #10,DELDAT      ;SET DEC DATA MODE
3086 021232 005037 021444          EIH20: CLR      DRVDN          ;CLEAR DRV DONE
3087 021236 012737 000001 021430          MOV      #1,EXHCP          ;SET EX 1/2 COMPLETE
3088 021244 000443          BR      EIB20          ;BR TO END IF 'B'
3089 021246 032737 000003 021434 IFL20: BIT      #3,BDVSCD      ;IF BOTH DRV SEC DONE
3090 021254 001405          BEQ      ELL20          ;THEN
3091 021256 005037 021434          CLR      BDVSCD          ;CLEAR DRV SEC DONE FLAGS
3092 021262 012737 004000 021440          MOV      #4000,ADVTRK      ;ALLOW TRACK ADVANCE
3093 021270 004737 022320          ELL20: CALL     GTDRV          ;CALL MOD 2.2 - GET A DRIVE
3094 021274 000427          BR      EIB20          ;BR TO END IF 'B'
3095 021276 053737 021440 021436 ELB20: BIS      ADVTRK,INCTRK    ;SET ADV TRK (IF SET BY PREV OP)
3096 021304 013737 021422 023324          MOV      TST,DRVST          ;PASS DRIVE TEST
3097 021312 004737 022504          CALL     XDTVST          ;CALL MOD 2.3. - EXECUTE DRIVE TEST
3098 021316 013737 023324 025410          MOV      DRVST,TSTEV        ;PASS DRIVE TEST FOR EVAL
3099 021324 004737 025334          CALL     EVTSTR          ;CALL MOD 2.4 - EVAL. TEST RESULTS
3100 021330 013701 021422          MOV      TST,R1           ;GET DRV TST
3101 021334 042701 171777          BIC      #171777,R1         ;SAVE TRK BITS
3102 021340 010137 021436          MOV      R1,INCTRK        ;SET TRK BITS
3103 021344 005037 021440          CLR      ADVTRK          ;CLEAR ADV TRK FLAG
3104 021350 005037 014016          CLR      INITL           ;CLEAR INITIALIZE FLAG
3105 021354 000240          EIB20: NOP              ;
3106 021356 005737 002276          IFM20: TST      ERRTY        ;IF ERR TYPE
3107 021362 001402          BEQ      DUB20          ;NOT=0
3108 021364 004737 030702          CALL     OTERTP          ;CALL MOD 2.5 - O/P ERR TYPE
3109 021370 005737 002274          DUB20: TST      ERRSY        ;DO UNLESS SYSTEM ERROR
3110 021374 001011          BNE      END20          ;NOT=0 THEN
3111 021376          ENDSEG          ;END SEGMENT FOR ERROR LOOPS
3112 021400 000137 021014          JMP      BDB20          ;BR TO END MOD
3113 021404 012737 000001 021426 EDC20: MOV      #1,SUTPTR      ;SET SYS UNDER TEST PTR
3114 021412 052737 000001 021446          BIS      #1,SFERR          ;SET SFT ERR
3115 021420 000207          END20: RTS      PC          ;END MODULE
3116          ;-----
3117 021422 000000          TST:    0              ;TEST FOR EXECUTION
3118 021424 000000          EXN:    0              ;EXERCISE #
3119 021426 000001          SUTPTR: 1              ;SYSTEM UNDER TEST POINTER
3120 021430 000000          EXHCP:  0              ;EXERCISE HALF COMPLETE (EX#7) DEL DATA PASS
3121 021432 000000          BTHDRV: 0              ;BOTH DRIVES DONE FLAG
3122 021434 000000          BDVSCD: 0              ;BOTH DRIVE SECTORS DONE FLAG
3123 021436 000000          INCTRK: 0              ;INCREMENT TRACK FLAGS
3124 021440 000000          ADVTRK: 0              ;ADVANCE TRACK FLAG
3125 021442 000000          DVDNCK: 0              ;DRV DONE CK FLAG
3126 021444 000000          DRVDN:  0              ;DRIVE DONE
3127 021446 000000          SFERR:  0              ;SOFTWARE ERR
3128 021450 000000          RESTK:  0              ;RESET TRK FLAG
3129 021452 000000          ERTSAV: 0              ;ERR TYP SAVE REG
3130          ;MOD 2.0 ----- END MODULE -----

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3133      .SBTTL MOD 2.1 - GET A TEST
3134      ;-----
3135
3136 021454 000240      GETTST: NOP      ;
3137 021456 013701 021424      MOV      EXN,R1      ;GET EXERCISE NUMBER
3138 021462 006301      ASL      R1          ;DOUBLE EXERCISE NUMBER
3139 021464 012702 022164      MOV      #EXADTB,R2 ;GET EXERCISE ADDRESS TABLE
3140 021470 060102      ADD      R1,R2      ;CAL EXERCISE TO BE USED
3141 021472 011237 022154      MOV      (R2),EXADR ;GET BEGIN ADR EXERCISE
3142 021476 005737 014016      IFL21: TST      INITL ;IF INITIALIZE
3143 021502 001406      BEQ      IFA21      ;IS SET, THEN
3144 021504 005037 022152      CLR      TSTPTR     ;CLEAR TST PTR
3145 021510      IFF21: INLOOP    ;IF IN LOOP
3146 021512      BNCOMPLETE IFA21 ;SET, THEN
3147 021514 000137 022122      JMP      EIF21      ;BR TO END IF 'F'
3148 021520 005737 002304      IFA21: TST      RETRY ;IF RETRY
3149 021524 001410      BEQ      IFB21      ;NOT=0, AND
3150 021526 032737 000004 002204      BIT      #BIT02,SWREG ;IF RETRY ON ERROR
3151 021534 001106      BNE      IFH21      ;IS NOT SET, THEN
3152 021536 032737 000004 002264      BIT      #EVL,FLGDRS ;IF DRS "EVL" FLAG
3153 021544 001102      BNE      IFH21      ;IS NOT SET, THEN
3154 021546 005737 022152      IFB21: TST      TSTPTR ;IF TST PTR
3155 021552 001006      BNE      IFC21      ;EQUALS ZERO
3156 021554 012737 000002 022152      MOV      #2,TSTPTR  ;ADV. TST PTR 1 CMD
3157 021562 005037 022160      CLR      TBPRCT     ;CLEAR TABLE PAIR COUNT
3158 021566 000555      BR       EIF21      ;BR TO END IF 'F'
3159 021570 005737 002262      IFC21: TST      SECDN ;IF SECTOR DONE IS
3160 021574 001447      BEQ      IFG21      ;SET THEN
3161 021576 005737 022160      IFK21: TST      TBPRCT ;IF TABLE PAIR CNT=1,
3162 021602 001444      BEQ      IFG21      ;THEN
3163 021604 062737 000002 022152      ADD      #2,TSTPTR  ;ADVANCE ONE TEST CMD
3164 021612 005037 022160      CLR      TBPRCT     ;CLEAR TABLE PAIR COUNT
3165 021616 005037 021442      CLR      DVDNCK     ;CLEAR DRV DONE CK FLAG
3166 021622 032737 040000 022156      IFD21: BIT      #40000,TSTWD ;IF DONE CK
3167 021630 001411      BEQ      IFM21      ;IS SET, THEN
3168 021632 005737 002260      TST      TRKDN     ;IF TRACK DONE IS
3169 021636 001406      BEQ      IFM21      ;SET, THEN
3170 021640 005037 002260      CLR      TRKDN     ;CLEAR TRK DONE
3171 021644 012737 000001 021442      MOV      #1,DVDNCK ;SET DRV DONE CK
3172 021652 000523      BR       EIF21      ;BR TO END IF 'F'
3173 021654 032737 006000 022156      IFM21: BIT      #6000,TSTWD ;IF ADV OR INCR TRK
3174 021662 001517      BEQ      EIF21      ;IS SET, THEN
3175 021664 032737 100000 022156      IFN21: BIT      #100000,TSTWD ;IF '4 CMD SEQ'
3176 021672 001404      BEQ      ELN21      ;IS SET, THEN
3177 021674 162737 000010 022152      SUB      #10,TSTPTR ;BACK UP 4 CMDS
3178 021702 000507      BR       EIF21      ;BR TO END IF 'F'
3179 021704 162737 000004 022152      ELN21: SUB      #4,TSTPTR ;BACK UP TWO TEST CMDS
3180 021712 000503      BR       EIF21      ;BR TO END IF 'F'
3181 021714 005737 022160      IFG21: TST      TBPRCT ;IF TABLE PAIR COUNT
3182 021720 001406      BEQ      ELG21      ;EQUALS 1 THEN
3183 021722 005037 022160      CLR      TBPRCT     ;CLEAR TABLE PAIR COUNT
3184 021726 162737 000002 022152      SUB      #2,TSTPTR  ;BACK UP ONE CMD
3185 021734 000472      BR       EIF21      ;BR END IF 'F'
3186 021736 005237 022160      ELG21: INC      TBPRCT ;INCREMENT TABLE PAIR COUNT
3187 021742 062737 000002 022152      ADD      #2,TSTPTR  ;ADVANCE ONE CMD
3188 021750 000464      BR       EIF21      ;BR END IF 'F'
3189 021752 032737 000010 002304      IFH21: BIT      #10,RETRY ;IF NO DATA RETRY IS
  
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3190 021760 001005          BNE      IF121          ;SET, OR
3191 021762 032737 000020 002304  BIT      #20,RETRY      ;IF NO CRC RETRY IS
3192 021770 001001          BNE      IF121          ;SET, THEN
3193 021772 000453          BR       EIF21          ;BR END IF 'F'
3194 021774 032737 000002 002304  IF121:  BIT      #2,RETRY      ;IF WRITE RETRY IS
3195 022002 001412          BEQ      IFJ21          ;SET, THEN
3196 022004 162737 000006 022152  SUB      #6,TSTPTR      ;BACK UP 3 CMDS
3197 022012 042737 000002 002304  BIC      #2,RETRY      ;CLEAR WRITE RETRY
3198 022020 012737 000003 022162  MOV      #3,TSVCT       ;SET TEST ADV COUNT=3
3199 022026 000433          BR       E1121          ;BR TO END IF 'I'
3200 022030 032737 000004 002304  IFJ21:  BIT      #4,RETRY      ;IF READ RETRY IS
3201 022036 001412          BEQ      ELJ21          ;SET THEN
3202 022040 162737 000002 022152  SUB      #2,TSTPTR      ;BACK UP 1 CMD
3203 022046 042737 000004 002304  BIC      #4,RETRY      ;CLEAR READ RETRY
3204 022054 012737 000001 022162  MOV      #1,TSVCT       ;SET TEST ADV COUNT=1
3205 022062 000415          BR       E1121          ;BR TO END IF 'I'
3206 022064 005337 022162          ELJ21:  DEC      TSVCT       ;DECREMENT TEST ADV COUNT
3207 022070 062737 000002 022152  ADD      #2,TSTPTR      ;ADV TEST POINTER : CMD
3208 022076 005737 022162          IF021:  TST      TSVCT       ;IF TEST ADV COUNTER
3209 022102 001007          BNE      EIF21          ;EQUALS ZERO, THEN
3210 022104 005037 002304          CLR      RETRY         ;CLEAR RETRY
3211 022110 005237 022160          INC      TBPRCT        ;SET TABLE PAIR COUNT
3212 022114 000402          BR       EIF21          ;BR TO END IF 'F'
3213 022116 005037 022160          E1121:  CLR      TBPRCT        ;CLEAR TABLE PAIR CNT
3214 022122 013703 022152          EIF21:  MOV      TSTPTR,R3    ;GET TEST POINTER
3215 022126 063703 022154          ADD      EXADR,R3      ;CAL. CUR. TEST OF THIS EXERCISE
3216 022132 011337 022156          MOV      (R3),TSTWD    ;PASS UP TEST WORD
3217 022136 105713          IFE21:  TSTB      (R3)      ;IF CMD LOWER BYTE
3218 022140 002002          BGE      E1E21         ;EQUALS -1, THEN
3219 022142 005037 022152          CLR      TSTPTR       ;RESET TEST PTR
3220 022146 000240          E1E21:  NOP
3221 022150 000207          RTS      PC            ;RETURN
3222
-----
3223 022152 000000          TSTPTR: .WORD      0      ;TEST POINTER
3224 022154 000000          EXADR:  .WORD      0      ;CURRENT EXERCISE TABLE BASE ADDRESS
3225 022156 000000          TSTWD:  .WORD      0      ;TEST WORD TO PASS UP
3226 022160 000000          TBPRCT: .WORD      0      ;TABLE PAIR COUNT
3227 022162 000000          TSVCT:  .WORD      0      ;TEST ADVANCE COUNTER
3228
3229 022164 022300          EXADTB: .WORD      EX7    ;EXERCISE ADDRESS TABLE
3230 022166 022204          .WORD      EX1
3231 022170 022214          .WORD      EX2
3232 022172 022230          .WORD      EX3
3233 022174 022244          .WORD      EX4
3234 022176 022254          .WORD      EX5
3235 022200 022264          .WORD      EX6
3236 022202 022300          .WORD      EX7
-----
3237

```

		.SBTTL - EXERCISE/TEST TABLE		
3240				
3241				
3242	022204	177777	EX1: .WORD -1	:-, / FILL BUFFER
3243	022206	000000	.WORD 0	:DCK,ADVTRK / WRITE SECTOR
3244	022210	044002	.WORD 44002	:NXTUNT, / -1
3245	022212	000777	.WORD 777	
3246	022214	177777	EX2: .WORD -1	:-, / FILL BUFFER
3247	022216	000000	.WORD 0	:DCK,ADVTRK,RAW, / WRITE SECTOR
3248	022220	000002	.WORD 2	:NXTUNT, / READ SECTOR
3249	022222	000003	.WORD 3	:DCK,ADVTRK,RAW, / EMPTY BUFFER
3250	022224	154001	.WORD 154001	:NXTUNT, / -1
3251	022226	000777	.WORD 777	
3252	022230	177777	EX3: .WORD -1	:-, / FILL BUFFER
3253	022232	000000	.WORD 0	:DCK,ADVTRK,DATAACK, / WRITE SECTOR
3254	022234	000002	.WORD 2	:NXTUNT, / READ SECTOR
3255	022236	000003	.WORD 3	:DCK,ADVTRK,DATAACK,RAW, / EMPTY BUFFER
3256	022240	174001	.WORD 174001	:NXTUNT, / -1
3257	022242	000777	.WORD 777	
3258	022244	177777	EX4: .WORD -1	:-, / READ SECTOR
3259	022246	000003	.WORD 3	:DCK,ADVTRK,DATAACK, / EMPTY BUFFER
3260	022250	064001	.WORD 64001	:NXTUNT, / -1
3261	022252	000777	.WORD 777	
3262	022254	177777	EX5: .WORD -1	:-, / READ SECTOR
3263	022256	000003	.WORD 3	:DCK,ADVTRK, / EMPTY BUFFER
3264	022260	044001	.WORD 44001	:NXTUNT, / -1
3265	022262	000777	.WORD 777	
3266	022264	177777	EX6: .WORD -1	:-, / FILL BUFFER
3267	022266	000000	.WORD 0	:DCK,ADVTRK,DATAACK,RAW, / WRITE SECTOR
3268	022270	000002	.WORD 2	:NXTUNT, / READ SECTOR
3269	022272	000003	.WORD 3	:DCK,ADVTRK,DATAACK,RAW, / EMPTY BUFFER
3270	022274	170001	.WORD 170001	:ADVTRK, NXTUNT, / -1
3271	022276	004777	.WORD 4777	
3272	022300	177777	EX7: .WORD -1	:-, / FILL BUFFER
3273	022302	000000	.WORD 0	:DCK,ADVTRK,DATAACK,RAW,INCTK / WRITE SECTOR
3274	022304	000002	.WORD 2	:NXTUNT, / READ SECTOR
3275	022306	000003	.WORD 3	:DCK,ADVTRK,DATAACK,ADVTRK, / EMPTY BUFFER
3276	022310	172001	.WORD 172001	:DDCHK, NXTUNT, / -1
3277	022312	000003	.WORD 3	
3278	022314	064001	.WORD 64001	
3279	022316	001777	.WORD 1777	

BIT#	NUMONIC	FUNCTION
15	4CMD	4 COMMAND SEQUENCE
14	DCK	DONE CHECK
13	DATAACK	DO DATA CHECK
12	RAW	READ AFTER WRITE FLAG
11	ADVTRK	ADVANCE TRACK MODE
10	INCTK	INCREMENT TRACK MODE
09	DDCHK	DEL. DATA CHECK
08	NXTUNT	GET NEXT UNIT, IF DONE LAST UNIT

:MOD 2.1 ----- END MODULE -----

```

3296
3297
3298
3299
3300
3301 022320 000240          GTDRV:  NOP
3302 022322 032737 000001 002234  IFA22:  BIT      #1,UUT      ; IF UUT=DRIVE 0
3303 022330 001024          BNE     IFD22      ; THEN
3304 022332 032737 000002 002234  IFB22:  BIT      #2,UUT      ; IF UNIT/SIDE UNDER TEST (UUT)
3305 022340 001404          BEQ     ELB22      ; EQUALS 1
3306 022342 012737 000010 022502          MOV     #10,TSTSUT ; SET TEST OF SYS. UNDER TEST UNIT/SIDE=1
3307 022350 000403          BR      IFC22      ; BR TO IF 'C'
3308 022352 012737 000002 022502  ELB22:  MOV     #2,TSTSUT ; SET TEST OF SYS. UNDER TEST UNIT/SIDE=0
3309 022360 033737 022502 002232  IFC22:  BIT      TSTSUT,SUT ; IF DRIVE 1 SELECTED FOR TEST
3310 022366 001404          BEQ     ELC22      ; THEN
3311 022370 052737 000001 002234          BIS     #1,UUT      ; SET UNIT UNDER TEST TO DRV #1
3312 022376 000427          BR      EIE22      ; BR TO END IF 'E'
3313 022400 000417          ELC22:  BR      THE22      ; BR TO THEN 'E'
3314 022402 032737 000002 002234  IFD22:  BIT      #2,UUT      ; IF UNIT/SIDE UNDER TEST (UUT)
3315 022410 001404          BEQ     ELD22      ; EQUALS 1
3316 022412 012737 000004 022502          MOV     #4,TSTSUT ; SET TEST OF SYS. UNDER TEST UNIT/SIDE 1
3317 022420 000403          BR      IFE22      ; BR TO IF 'E'
3318 022422 012737 000001 022502  ELD22:  MOV     #1,TSTSUT ; SET TEST OF SYS. UNDER TEST UNIT/SIDE 0
3319 022430 033737 022502 002232  IFE22:  BIT      TSTSUT,SUT ; IF DRIVE 0 SELECTED FOR TEST
3320 022436 001404          BEQ     ELE22      ; THEN
3321 022440 042737 000001 002234  THE22:  BIC     #1,UUT      ; SET UNIT UNDER TEST TO DRV#0
3322 022446 000403          BR      EIE22      ; BR TO END IF 'E'
3323 022450 052737 000001 002234  ELE22:  BIS     #1,UUT      ; SET UNIT UNDER TEST TO DRV#1
3324 022456 013704 002234          EIE22:  MOV     UUT,R4    ; GET UNIT UNDER TEST
3325 022462 006304          ASL     R4          ; DOUBLE IT
3326 022464 010437 002240          MOV     R4,UUTOFF   ; SET UUT OFFSET
3327 022470 062704 002336          ADD     #U00,R4     ; GET UUT UNIT # FOR PRINT
3328 022474 011437 002334          MOV     (R4),UNIT  ; SET UNIT=PRINT UNIT #
3329 022500 000207          END22:  RTS     PC      ; RETURN
3330
3331 022502 000000          TSTSUT: 0
3332
;MOD 2.2 ----- END MODULE -----
    
```

```

3335
3336
3337           .SBTTL  MOD 2.3 - EXECUTE DRIVE TEST
3338           ;-----
3339
3340 022504 013737 002252 023326 XDVTST: MOV      WDCNT,WDCNT      ;SET DRIVE WORD CNT
3341 022512 013702 002240          MOV      UUTOFF,R2      ;GET UUT OFFSET
3342 022516 005737 002172 IFA23:  TST      RXXX          ;IF DEVICE IS AN
3343 022522 001010          BNE      1$              ;RX02 THEN
3344 022524 032737 000002 002234 BIT      #2,UUT          ;IF UNIT UNDER TEST IS
3345 022532 001404          BEQ      1$              ;#1 THEN
3346 022534 013737 002222 002236 MOV      U1ADR,UUTADR    ;GET UNIT #1 UNIBUS ADR
3347 022542 000403          BR       IF123          ;BR TO END IF 'A'
3348 022544 013737 002220 002236 1$:  MOV      UOADR,UUTADR    ;GET UNIT #0 UNIBUS ADR
3349 022552 005737 021450 IF123:  TST      RESTK        ;IF RESET TRK
3350 022556 001413          BEQ      IFB23          ;IF SET, THEN
3351 022560 113705 021450          MOVVB   RESTK,R5        ;GET UUT OFFSET
3352 022564 006305          ASL     R5              ;DOUBLE OFFSET
3353 022566 062705 023306          ADD     #CTRK,R5        ;ADD TRK TABLE ADR
3354 022572 013715 002206          MOV     OTDITK,(R5)     ;RESET TO MIN TRK
3355 022576 005037 002262          CLR    SECDN           ;CLEAR SEC DONE FLAG
3356 022602 005037 021450          CLR    RESTK           ;CLEAR RESET TRK FLAG
3357 022606 005737 014016 IFB23:  TST      INITL        ;IF INITIALIZE IS
3358 022612 001415          BEQ     EIB23          ;SET, THEN
3359 022614 012705 023276          MOV     #CSEC,R5       ;GET START OF CUR TRK & SEC TBL
3360 022620 012704 000004          MOV     #4,R4          ;SET TBL LENGTH
3361 022624 005025          1$:  CLR     (R5)+         ;CLEAR TABLES
3362 022626 005304          DEC     R4             ;DECR TBL LENGTH
3363 022630 001375          BNE     1$             ;DO UNTIL LENGTH=0
3364 022632 012704 000004          MOV     #4,R4          ;SET TBL LENGTH
3365 022636 013725 002206 2$:  MOV     OTDITK,(R5)+     ;SET STARTING TRACKS
3366 022642 005304          DEC     R4             ;DECREMENT TBL LENGTH
3367 022644 001374          BNE     2$            ;DO UNTIL LENGTH=0
3368 022646 012701 023306 EIB23:  MOV     #CTRK,R1        ;GET BEGIN ADR DRIVE CURRENT TRK.
3369 022652 060201          ADD     R2,R1          ;CAL. DRIVE CUR. TRK. LOCATOR
3370 022654 010137 023320          MOV     R1,CNTKLC      ;SAVE DRV. CUR. TRK.
3371 022660 017737 000434 024240 MOV     @CNTKLC,CURTRK  ;GET DRIVE CUR. TRK.
3372 022666 012701 023276          MOV     #CSEC,R1       ;GET BEGIN ADR DRIVE CUR. SEC.
3373 022672 060201          ADD     R2,R1          ;CAL. DRIVE CUR. SEC. LOCATOR
3374 022674 010137 023316          MOV     R1,CNSCLC      ;SAVE DRV CUR SEC LOC.
3375 022700 017737 000412 023710 MOV     @CNSCLC,CURSEC  ;GET DRIVE CUR SEC.
3376 022706          IFJ23: INLOOP        ;IF IN LOOP
3377 022710          BNCOMPLETE IFC23     ;THEN
3378 022712 000532          BR     EIJ23          ;BR TO END IF 'I'
3379 022714 005737 002304 IFC23:  TST      RETRY          ;IF RETRY IS
3380 022720 001447          BEQ     IFG23          ;NOT=0, AND
3381 022722 032737 000004 002204 BIT     #BIT02,SWREG     ;IF RETRY ON ERR
3382 022730 001004          BNE     IFD23          ;SET OR
3383 022732 032737 000004 002264 BIT     #EVL,FLGDRS     ;DRS "EVL" FLAG
3384 022740 001437          BEQ     IFG23          ;IS SET, THEN
3385 022742 032737 000001 002304 IFD23:  BIT     #1,RETRY        ;IF SEEK RETRY
3386 022750 001001          BNE     1$             ;IS = 0
3387 022752 000404          BR     2$             ;THEN BR TO 2$
3388 022754 032737 000010 002204 1$:  BIT     #BIT03,SWREG     ;ELSE IF RECAL SWITCH
3389 022762 001003          BNE     THD23          ;IS NOT SET
3390 022764 005037 023322 2$:  CLR     SEEK           ;THEN CLEAR SEEK FUNCTION FLAG
3391 022770 000420          BR     EID23          ;BR TO END IF 'D'

```

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3392 022772 012737 040000 024404 THD23: MOV #40000,DVTST ;PASS PROGRAM INITIALIZE TO DRIVE TEST
3393 023000 004737 024254          CALL GTDVFN ;CALL MOD 2.3.3 GET DRIVE FUNCTION
3394 023004 013737 023332 023330          MOV DRVFN,WDOT ;PASS DRIVE FUNCTION
3395 023012 013737 002236 025034          MOV UUTADR,CSADR ;SET ADR FOR DRIVE FUNCTION
3396 023020 004737 024406          CALL OTDVFN ;CALL MOD 2.3.4 O/P DRIVE FUNCTION
3397 023024 012737 000001 023322          MOV #1,SEEK ;SET SEEK FLAG
3398 023032 005037 002304          EID23: CLR RETRY ;CLEAR RETRY FLAGS
3399 023036 000460          BR EIJ23 ;BR TO END IF 'C'
3400 023040 013705 023324          IFG23: MOV DRVTST,R5 ;SETUP DRIVE TST
3401 023044 042705 177770          BIC #177770,R5 ;FOR TYPE CK
3402 023050 005705          TST R5 ;IF DRIVE TST
3403 023052 001404          BEQ IFE23 ;IS NOT 'FILL BUFF'
3404 023054 022705 000003          CMP #3,R5 ;OR
3405 023060 001401          BEQ IFE23 ;NOT 'READ SEC' , THEN
3406 023062 000434          BR IFH23 ;BR TO IF 'H'
3407 023064 005737 002262          IFE23: TST SECDN ;IF SEC DONE
3408 023070 001417          BEQ ELE23 ;IS = 1
3409 023072 005737 021436          IFF23: TST INCTRK ;IF INCR TRK FLAGS
3410 023076 001414          BEQ ELE23 ;ARE SET ,THEN
3411 023100 013737 021436 024236          MOV INCTRK,TRKINC ;PASS TRK FLAGS
3412 023106 004737 023742          CALL GETTRK ;CALL MOD 2.3.2 GET TRACK
3413 023112 013777 024240 000200          MOV CURTRK,@CNTKLC ;SAVE CURRENT TRACK
3414 023120 012737 000001 023322          MOV #1,SEEK ;SET SEEK FLAG
3415 023126 000402          BR EIE23 ;BR TO END IF 'E'
3416 023130 005037 023322          ELE23: CLR SEEK ;RESET SEEK
3417 023134 017737 000156 023710          EIE23: MOV @CNSCLC,CURSEC ;PASS CURRENT SECTOR
3418 023142 004737 023334          CALL GETSEC ;CALL MOD 2.3.1 GET A SECTOR
3419 023146 013777 023710 000142          MOV CURSEC,@CNSCLC ;SAVE UPDATED CURRENT SECTOR
3420 023154 032737 000006 023324          IFH23: BIT #6,DRVTST ;IF DRIVE TST
3421 023162 001006          BNE EIJ23 ;IS 'FILL BUFF' ,THEN
3422 023164 012701 034006          MOV #DATPAT,R1 ;SET UP DATA PATTERN ADR
3423 023170 117721 000124          MOV @CNTKLC,(R1)+ ;SET TRK ADR IN DATA BUF BYTE #0
3424 023174 117711 000116          MOV @CNSCLC,(R1) ;SET SEC ADR IN DATA BUF BYTE#1
3425 023200 005037 024404          EIJ23: CLR DVTST ;CLEAR DRIVE TEST
3426 023204 113737 023324 024404          MOV DRVTST,DVTST ;PASS DRIVE TEST
3427 023212 004737 024254          CALL GTDVFN ;CALL MOD 2.3.3 GET DRIVE FUNCTION
3428 023216 013737 023332 002332          MOV DRVFN,CMD ;SET COMMAND FOR PRINT
3429 023224 013737 023332 023330          MOV DRVFN,WDOT ;PASS FUNCTION WORD (PASS TO 2.3.4)
3430 023232 017737 000062 025036          MOV @CNTKLC,TRKADR ;PASS CURRENT TRACK (PASS TO 2.3.4)
3431 023240 017737 000052 025040          MOV @CNSCLC,SECADR ;PASS CURRENT SECTOR (PASS TO 2.3.4)
3432 023246 013737 002236 025034          MOV UUTADR,CSADR ;PASS UUT C&S ADR (PASS TO 2.3.4)
3433 023254 004737 024406          CALL OTDVFN ;CALL MOD 2.3.4 O/P DRIVE FUNCTION
3434 023260 013737 025036 002254          MOV TRKADR,TRACK ;SAVE TRACK ADDR IN GLOBAL
3435 023266 013737 025040 002256          MOV SECADR,SECTOR ;SAVE SECTOR ADDR IN GLOBAL
3436 023274 000207          RTS PC ;RETURN
3437

```

```
3440  
3441  
3442 023276 000000  
3443 023300 000000  
3444 023302 000000  
3445 023304 000000  
3446 023306 000000  
3447 023310 000000  
3448 023312 000000  
3449 023314 000000  
3450  
3451 023316 000000  
3452 023320 000000  
3453 023322 000000  
3454 023324 000000  
3455 023326 000000  
3456 023330 000000  
3457 023332 000000  
3458
```

```
-----  
;CSEC: .WORD 0 ;CURRENT DRV SECTOR TABLE  
; .WORD 0  
; .WORD 0  
; .WORD 0  
CTRK: .WORD 0 ;CURRENT DRV TRK TABLE  
; .WORD 0  
; .WORD 0  
; .WORD 0  
CNSCLC: .WORD 0 ;CURRENT SECTOR LOCATOR  
CNTKLC: .WORD 0 ;CURRENT TRACK LOCATOR  
SEEK: .WORD 0 ;SEEK FLAG  
DRVTST: .WORD 0 ;DRIVE TEST  
WDCT: .WORD 0 ;WORD COUNT  
WDOT: .WORD 0 ;FUNCTION WORD TO SEND OUT  
DRVFN: .WORD 0 ;DRIVE FUNCTION WORD  
;MOD 2.3 ----- END MODULE -----
```

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3461          .SBTTL MOD 2.3.1 - GET A SECTOR
3462          ;-----
3463
3464 023334 005037 023704 GETSEC: CLR      UTSCDN      ;CLEAR UUT SECTOR DONE
3465 023340 013705 002234          MOV      UUT,R5        ;GET UNIT UNDER TST
3466 023344 006305          ASL      R5            ;DOUBLE FOR WRD ADR
3467 023346 005737 014016 IFI231: TST     INITL      ;IF INITIALIZE IS
3468 023352 001406          BEQ     E11231         ;SET, THEN
3469 023354 012701 023664          MOV     #SSEC,R1      ;GET STARTING SEC ADR
3470 023360 005021          CLR     (R1)+         ;CLEAR UNT00 SSEC
3471 023362 005021          CLR     (R1)+         ;CLEAR UNT01 SSEC
3472 023364 005021          CLR     (R1)+         ;CLEAR UNT10 SSEC
3473 023366 005011          CLR     (R1)         ;CLEAR UNT11 SSEC
3474 023370 012701 023664 E11231: MOV     #SSEC,R1  ;GET START SECTOR BASE ADR
3475 023374 060501          ADD     R5,R1         ;FIND ADR UUT START SECTOR (TEMP 1)
3476 023376 011102          MOV     (R1),R2       ;SAVE UUT STARTING SECTOR (TEMP 2)
3477 023400 012703 023674          MOV     #NSEC,R3      ;GET NEXT SECTOR BASE ADR
3478 023404 060503          ADD     R5,R3         ;FIND ADR UUT NEXT SECTOR (TEMP 3)
3479 023406 011304          MOV     (R3),R4       ;SAVE UUT NEXT SECTOR (TEMP 4)
3480 023410 020237 002212 IFA231: CMP     R2,MINSEC ;IF STARTING SECTOR < MIN. SECTOR
3481 023414 103422          BLO    ELA231         ;THEN
3482 023416 010437 023710          MOV     R4,CURSEC     ;SET CURRENT SECTOR=UUT NEXT SECTOR
3483 023422 023737 023660 023706 IFG231: CMP     SCPSCT,INTLV ;IF SECTOR PASS CNT< INTERLV
3484 023430 103053          BHIS   THF231         ;THEN BR TO THEN 'F',ELSE
3485 023432 005737 023662 IFH231: TST     STSCFG    ;IF START SEC FLAG
3486 023436 001405          BEQ    ELH231         ;IS SET, THEN
3487 023440 005037 023662          CLR     STSCFG        ;CLEAR FLAG
3488 023444 010204          MOV     R2,R4         ;SET DRV NXT SEC= DRV START SEC
3489 023446 010213          MOV     R2,(R3)       ;SAVE DRV NXT SEC
3490 023450 000426          BR     IFC231         ;BR TO IF 'C'
3491 023452 063704 023706 ELH231: ADD     INTLV,R4  ;NSEC=NSEC+INTERLV
3492 023456 010413          MOV     R4,(R3)       ;SAVE NEXT SEC
3493 023460 000422          BR     IFC231         ;BR TO IF 'C'
3494 023462 013737 002212 023710 ELA231: MOV     MINSEC,CURSEC ;SET CURRENT SECTOR = MIN. SECTOR
3495 023470 013711 002212          MOV     MINSEC,(R1)   ;SET UUT START SECTOR = MIN. SECTOR
3496 023474 013702 002212          MOV     MINSEC,R2     ;SET R2=MINSEC
3497 023500 005037 023660          CLR     SCPSCT        ;CLEAR SECTOR PASS COUNT
3498 023504 023737 002212 002214 IFB231: CMP     MINSEC,MAXSEC ;IF MAX. SECTOR NOT=MIN. SECTOR
3499 023512 001443          BEQ    ELB231         ;THEN
3500 023514 010205          THB231: MOV    R2,R5   ;GET UUT STARTING SECTOR
3501 023516 063705 023706          ADD     INTLV,R5     ;ADD SECTOR INTERLEAVE
3502 023522 010513          MOV     R5,(R3)       ;SAVE NEXT UUT NEXT SEC (TEMP 5)
3503 023524 010504          MOV     R5,R4         ;SAVE NEXT UUT NEXT SEC (TEMP 4)
3504 023526 020437 002214 IFC231: CMP     R4,MAXSEC ;IF NEXT SECTOR > MAX. SECTOR
3505 023532 103432          BLO    ELC231         ;THEN
3506 023534 005211          INC     (R1)         ;INCREMENT UUT STARTING SECTOR
3507 023536 011102          MOV     (R1),R2       ;SET UP NEW START SEC
3508 023540 005237 023660          INC     SCPSCT        ;INCR SECTOR PASS CNT
3509 023544 020437 002214 IFD231: CMP     R4,MAXSEC ;IF NXT SEC NOT = MAX SEC
3510 023550 001417          BEQ    ELD231         ;THEN
3511 023552 020237 002214 IFF231: CMP     R2,MAXSEC ;IF DRV START SEC > MAX SEC
3512 023556 101411          BLOS   ELF231         ;THEN
3513 023560 012737 000001 023704 THF231: MOV     #1,UTSCDN ;SET UUT SECTOR DONE
3514 023566 004737 023712          CALL   STSCDN        ;CALL MOD 2.3.1.A - SET DRIVE SECTOR DONE FLAG
3515 023572 005011          CLR     (R1)         ;CLEAR UUT STARTING SECTOR
3516 023574 005037 023660          CLR     SCPSCT        ;CLEAR SEC PASS CNT
3517 023600 000420          BR     END231        ;BRANCH TO END GET SECTOR

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3518 023602 010213          ELF231: MOV     R2,(R3)          ;SET DRV NXT SEC = DRV START SEC
3519 023604 010204          MOV     R2,R4            ;SAVE DRV NXT SEC
3520 023606 000415          BR      END231          ;BR TO END
3521 023610 012737 000001 023662  ELD231: MOV     #1,STSCFG        ;SET START SEC FLAG
3522 023616 000411          BR      END231          ;BR TO END
3523 023620 000410          ELC231: BR      END231          ;BRANCH TO END GET SECTOR
3524 023622 012737 000001 023704  ELB231: MOV     #1,UTSCDN        ;SET DRIVE SECTOR DONE FLAG
3525 023630 004737 023712          CALL   STSCDN           ;CALL MOD 2.3.1.A - SET DRIVE SECTOR DONE FLAG
3526 023634 005037 023660          CLR    SCPSCT           ;CLEAR SEC PASS CNT
3527 023640 005011          CLR    (R1)             ;CLEAR UUT STARTING SECTOR
3528 023642 013737 023704 002262  END231: MOV     UTSCDN,SECDN      ;PASSUP UNIT SECTOR DONE
3529 023650 010437 023656          MOV     R4,NXSCSA       ;
3530 023654 000207          RTS     PC               ;RETURN TO MOD 2.3

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3531          ;MOD 2.3.1 ----- REGISTERS & TABLES -----
3532 023656 000000  NXSCSA: 0
3533 023660 000000  SCPSCT: 0          ;SEC PASS COUNT
3534 023662 000000  STSCFG: 0         ;GET NEW STARTING SEC FLAG
3535 023664 000000  SSEC: 0           ;UUT STARTING SECTOR
3536 023666 000000          0
3537 023670 000000          0
3538 023672 000000          0
3539 023674 000000  NSEC: 0           ;UUT NEXT SECTOR
3540 023676 000000          0
3541 023700 000000          0
3542 023702 000000          0
3543 023704 000000  UTSCDN: 0         ;UUT SECTOR DONE FLAG
3544 023706 000003  INTLV: 3          ;SECTOR INTERLEAVE
3545 023710 000000  CURSEC: 0        ;CURRENT SECTOR UUT
3546          ;MOD 2.3.1 ----- END MODULE -----
3547
3548
3549

```

```

3550          .SBTTL MOD 2.3.1.A - SET SECTOR DONE
3551          ;-----
3552
3553 023712 032737 000001 002234  STSCDN: BIT     #1,UUT          ;IF DRIVE #1 DONE
3554 023720 001404          BEQ     1$              ;THEN
3555 023722 052737 000002 021434          BIS     #2,BDVSCD        ;SET DRIVE #1 SEC DONE FLAG
3556 023730 000403          BR      2$              ;BR TO END
3557 023732 052737 000001 021434  1$:  BIS     #1,BDVSCD        ;SET DRIVE #0 SEC DONE FLAG
3558 023740 000207          2$:  RTS     PC           ;RETURN
3559          ;MOD 2.3.1.A ----- END MODULE -----

```



```

3562          .SBTTL MOD 2.3.2 - GET A TRACK
3563          ;-----
3564
3565 023742 013737 002210 024234 GETTRK: MOV      INDITK,MAXTRK ;GET INSIDE DIA AS SET BY OP
3566 023750 013737 002206 024232      MOV      OTDITK,MINTRK ;GET OUTSIDE DIA AS SET BY OP
3567 023756 005737 024252      IFH232: TST      INITTK      ;IF INITIALIZE TRK IS
3568 023762 001413      BEQ      EI232      ;SET, THEN
3569 023764 005037 024252      CLR      INITTK      ;RESET INITIALIZE TRK FLG
3570 023770 012701 024242      MOV      #TKTL,R1    ;GET START OF TRK TBL
3571 023774 005021      CLR      (R1)+      ;SET UNT00
3572 023776 005021      CLR      (R1)+      ;SET UNT01
3573 024000 005021      CLR      (R1)+      ;SET UNT10
3574 024002 005011      CLR      (R1)       ;SET UNT11
3575 024004 013737 024232 024240      MOV      MINTRK,CURTRK ;SET MIN CURRENT TRK
3576 024012 013702 002234      EI232: MOV      UUT,R2    ;GET UNIT UNDER TEST INDICATOR
3577 024016 006302      ASL      R2         ;DOUBLE FOR ADDRESSING WORDS
3578 024020 005037 024230      CLR      TRKDNF     ;CLEAR TRACK DONE FLAG
3579 024024 032737 002000 024236      IFA232: BIT      #2000,TRKINC ;IF INCREMENT TRACK FLAG
3580 024032 001023      BNE      IFG232     ;NOT SET, THEN (USE SELECTED TRK SEQ)
3581 024034 012701 024242      MOV      #TKTL,R1    ;GET DRIVE TRACK TABLE LOCATOR BASE ADR
3582 024040 060201      ADD      R2,R1      ;CAL. DRV. TRK. TAB. LOCATOR ADR
3583 024042 011102      MOV      (R1),R2     ;GET DRV. TRK. TAB. LOCATOR
3584 024044 012703 033554      MOV      #TRKTBL,R3  ;GET BEGIN TRACK TABLE ADR
3585 024050 060203      ADD      R2,R3      ;CAL. TRACK TAB. ADR. THIS DRIVE
3586 024052 005202      INC      R2         ;INCREMENT DRV. TRK. TAB. LOCATOR
3587 024054 010211      MOV      R2,(R1)     ;SAVE DRV. TRK. TAB. LOCATOR
3588 024056 111337 024240      MOV      (R3),CURTRK ;SAVE CURRENT TRACK
3589 024062 005203      INC      R3         ;INCREMENT TRACK TAB. POINTER
3590 024064 105713      IFF232: TST      (R3)   ;IF NEXT TRACK
3591 024066 002004      BGE      ELF232     ;EQUALS -1
3592 024070 012737 000001 024230      MOV      #1,TRKDNF   ;THEN SET TRACK DONE FLAG
3593 024076 005011      CLR      (R1)       ;RESET DRV. TRK. TAB. LOCATOR ADR.
3594 024100 000445      ELF232: BR      END232 ;BR TO END MOD.
3595 024102 123737 024240 024234      IFG232: CMP      CURTRK,MAXTRK ;IF CURRENT TRK > OR = MAX TRK (O. D.)
3596 024110 103403      BLO      IFB232     ;THEN
3597 024112 013737 024232 024240      MOV      MINTRK,CURTRK ;SET CURRENT TRK = MIN TRK
3598 024120 123737 024240 024232      IFB232: CMP      CURTRK,MINTRK ;IF CURRENT TRK > OR = MIN TRK (O.D.)
3599 024126 103427      BLO      ELB232     ;THEN
3600 024130 013701 024240      MOV      CURTRK,R1   ;GET CURRENT TRACK
3601 024134 005201      INC      R1         ;INCREMENT CURRENT TRACK
3602 024136 120137 024234      IFC232: CMP      R1,MAXTRK ;IF CURRENT TRK +1 < MAX TRK (I.D.)
3603 024142 103001      BHIS    IFD232     ;THEN
3604 024144 000406      BR      EID232     ;BRANCH TO END if 'D'
3605 024146 120137 024234      IFD232: CMP      R1,MAXTRK ;IF CURRENT TRK +1 = MAX TRK
3606 024152 001006      BNE      IFE232     ;THEN
3607 024154 012737 000001 024230      MOV      #1,TRKDNF   ;SET TRK DONE FLAG
3608 024162 010137 024240      EID232: MOV      R1,CURTRK ;SAVE CURRENT TRK +1 = CURRENT TRK
3609 024166 000412      BR      END232     ;BR END OF MOD.
3610 024170 123737 024234 024232      IFE232: CMP      MAXTRK,MINTRK ;IF TRK MAX = TRK MIN
3611 024176 001003      BNE      ELB232     ;THEN
3612 024200 012737 000001 024230      MOV      #1,TRKDNF   ;SET TRK DONE FLAG
3613 024206 013737 024232 024240      ELB232: MOV      MINTRK,CURTRK ;SET CURRENT TRK = MIN. TRK (O.D.)
3614 024214 013737 024230 002260      FND232: MOV      TRKDNF,TRKDN ;SAVE TRACK DONE FLAG
3615 024222 005037 024236      CLR      TRKINC     ;CLEAR TRK INCR FLAG
3616 024226 000207      RTS      PC        ;
3617          ;-----
  
```

```
3620  
3621 024230 000000  
3622 024232 000000  
3623 024234 000000  
3624 024236 000000  
3625 024240 000000  
3626 024242 000000  
3627 024244 000000  
3628 024246 000000  
3629 024250 000000  
3630 024252 000000  
3631
```

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 C ; DRV TRK TABLE LOCATOR
.WORD 0
.WORD 0
.WORD 0
INITTK: .WORD 0 ; INITIALIZE TRK FLAG
;MOD 2.3.2 ----- END MODULE -----

```

3634      .SBTTL  MOD 2.3.3 - GET A DRIVE FUNCTION
3635      ;-----
3636
3637 024254 005001      GTDVFN: CLR      R1      ;CLEAR REG #1
3638 024256 013701 024404      MOV      DVTST,R1      ;GET DRIVE TEST
3639 024262 032701 040000      IFA233: BIT      #40000,R1 ;IF NOT INITIALIZE
3640 024266 001012      BNE      IFB233      ;THEN
3641 024270 042701 177700      BIC      #177700,R1    ;CLEAR TOP BYTE OF R1
3642 024274 006301      ASL      R1      ;FORMAT FUNCTION
3643 024276 052701 000001      BIS      #1,R1      ;SET GO BIT
3644 024302 020127 000005      IFE233: CMP      R1,#5  ;IF WRT FUNCT
3645 024306 001002      BNE      IFB233      ;THEN
3646 024310 053701 002244      BIS      DELDAT,R1    ;SET DEL DAT WRT (IF SET)
3647 024314 005737 002172      IFB233: TST      RXXX   ;IF DRIVE IS RXXX
3648 024320 001411      BEQ      IFD233      ;THEN
3649 024322 032737 000002 002234 IFC233: BIT      #2,UUT  ;IF SIDE #1 IS SELECTED
3650 024330 001403      BEQ      ELC233      ;THEN
3651 024332 052701 001000      BIS      #1000,R1    ;SET SIDE #1 BIT
3652 024336 000402      BR       IFD233      ;BRANCH TO IF 'D'
3653 024340 042701 001000      ELC233: BIC      #1000,R1 ;SET FOR SIDE #0
3654 024344 032737 000001 002234 IFD233: BIT      #1,UUT  ;IF UNIT UNDER TEST IS
3655 024352 001403      BEQ      ELD233      ;DRIVE #1
3656 024354 052701 000020      BIS      #20,R1     ;THEN SET DRIVE #1 SELECT BIT
3657 024360 000402      BR       EID233      ;BRANCH TO IF 'D'
3658 024362 042701 000020      ELD233: BIC      #20,R1  ;ELSE CLEAR DRIVE #1 SELECT BIT
3659 024366 053701 002242      EID233: BIS      DEN,R1  ;SET DENSITY BIT
3660 024372 052701 000100      BIS      #100,R1    ;SET INTERRUPT BIT
3661 024376 010137 023332      MOV      R1,DRVFN   ;PASS UP FUNCTION WORD
3662 024402 000207      END233: RTS      PC   ;RETURN
3663      ;-----
3664 024404 000000      DVTST: 0      ;DRIVE TEST WORD
3665      ;MOD 2.3.3 ----- END MODULE -----

```

```

3668      .SBTTL MOD 2.3.4 - OUTPUT DRIVE FUNCTION
3669      ;-----
3670
3671 024406 013701 025034      OTDVFN: MOV      CSADR,R1      ;GET STATUS REG ADR
3672 024412 062701 000002      ADD      #2,R1      ;ADD 2 TO ADR
3673 024416 010137 025032      MOV      R1,DBADR    ;SAVE AS DATA ADDRESS
3674 024422 012737 000040 025330  MOV      #DNBIT,RDYWD ;READY TEST WD (PASS TO 2.3.4.1)
3675 024430 013737 023330 025022  MOV      WDOT,WRDS   ;WORD FOR OUTPUT (PASS TO 2.3.4.1)
3676 024436 013737 025034 025024  MOV      CSADR,ADRS  ;ADDRESS OF OUTPUT (PASS TO 2.3.4.1)
3677 024444 004737 025042      JSR      PC,OUTSWD   ;OUTPUT FUNCTION WD (FW) DO 2.3.4.1)
3678 024450 032737 040000 023330  IFA234: BIT      #40000,WDOT ;IF FUNCTION IS
3679 024456 001402      BEQ      THA234      ;NOT AN "INITIALIZE" (FW BIT#14=0)
3680 024460 000137 025016      JMP      END234      ;THEN,
3681 024464 032737 000010 023330  THA234: BIT      #10,WDOT ;IF FUNCTION IS
3682 024472 001043      BNE      IFC234      ;"READ, WRITE, FILL, EMPTY" (FW BIT#3=0)
3683 024474 032737 000004 023330  IFH234: BIT      #4,WDOT ;AND THEN IF FUNCTION IS
3684 024502 001047      BNE      ELH234      ;"EMPTY, FILL" (FW BIT#2=0)
3685 024504 012737 000200 025330  MOV      #TRBIT,RDYWD ;THEN SET OUTPUT READY TEST WORD (PASS TO 2.3.4.1)
3686 024512 013737 023326 025022  MOV      WDCT,WRDS   ;AND SET WORD FOR OUTPUT (PASS TO 2.3.4.1)
3687 024520 013737 025032 025024  MOV      DBADR,ADRS  ;AND SET ADDRESS OF OUTPUT (PASS TO 2.3.4.1)
3688 024526 004737 025042      JSR      PC,OUTSWD   ;OUTPUT BASE ADDRESS WORD DO 2.3.4.1
3689 024532 032737 000002 023330  IFK234: BIT      #2,WDOT ;IF "FILL" (FW BIT#1=0)
3690 024540 001004      BNE      ELK234      ;THEN
3691 024542 012737 034006 025022  MOV      #DATPAT,WRDS ;SET DATA PATTERN ADR (PASS TO 2.3.4.1)
3692 024550 000403      BR      EIK234      ;BR TO END IF 'K'
3693 024552 012737 034406 025022  ELK234: MOV      #DATBUF,WRDS ;SET DATA BUFFER ADR (PASS TO 2.3.4.1)
3694 024560 012737 000200 025330  EIK234: MOV      #TRBIT,RDYWD ;SET OUTPUT READY TEST WORD (PASS TO 2.3.4.1)
3695 024566 013737 025032 025024  MOV      DBADR,ADRS  ;ADDRESS OF OUTPUT (PASS TO 2.3.4.1)
3696 024574 004737 025042      JSR      PC,OUTSWD   ;OUTPUT WORD COUNT WORD DO 2.3.4.1
3697 024600 000444      BR      EIH234      ;BRANCH TO END IF 'H'
3698 024602 032737 000004 023330  IFC234: BIT      #4,WDOT ;IF FUNCTION WORD IS
3699 024610 001455      BEQ      IFE234      ;"WRITE D.D" OR "READ E.C" (FW BIT #2=1)
3700 024612 032737 000002 023330  IFD234: BIT      #2,WDOT ;THEN, IF FUNCTION IS
3701 024620 001035      BNE      ELD234      ;"WRITE D.D", THEN (FW BIT#1=0)
3702 024622 012737 000200 025330  ELH234: MOV      #TRBIT,RDYWD ;SET OUTPUT READY TEST WORD
3703 024630 013737 025040 025022  MOV      SECADR,WRDS ;MOVE TRACK AND SECTOR ADDRESS
3704 024636 042737 177700 025022  BIC      #177700,WRDS ;FORMAT TO SECTOR ADDRESS
3705 024644 013737 025032 025024  MOV      DBADR,ADRS  ;ADDRESS OF OUTPUT
3706 024652 004737 025042      JSR      PC,OUTSWD   ;OUTPUT SECTOR ADDRESS
3707 024656 013737 025036 025022  MOV      TRKADR,WRDS ;MOVE TRACK AND SECTOR ADDRESS
3708 024664 042737 177600 025022  BIC      #177600,WRDS ;FORMAT TRACK ADDRESS
3709 024672 012737 000200 025330  MOV      #TRBIT,RDYWD ;SET OUTPUT READY TEST WORD
3710 024700 013737 025032 025024  MOV      DBADR,ADRS  ;ADDRESS OF OUTPUT
3711 024706 004737 025042      JSR      PC,OUTSWD   ;OUTPUT TRACK ADDRESS
3712 024712 000437      BR      EIB234      ;ENDIF H -DONE
3713 024714 012737 000200 025330  ELD234: MOV      #TRBIT,RDYWD ;SET READY WD TO TR MODE
3714 024722 012737 033544 025022  MOV      #XERUUT,WRDS ;EXT FRR. CODE TABLE ADD
3715 024730 013737 025032 025024  MOV      DBADR,ADRS  ;ADDRESS OF OUTPUT, RXDB
3716 024736 004737 025042      JSR      PC,OUTSWD   ;O/P BASE ADD FOR ERR. CODE
3717 024742 000423      BR      EIB234      ;DONE
3718 024744 032737 000002 023330  IFE234: BIT      #2,WDOT ;IF FUNCTION IS
3719 024752 001404      BEQ      ELE234      ;"READ STATUS" (FW BIT#1=1)
3720 024754 012737 000001 025026  THE234: MOV      #1,ERSTAT ;THEN-SET ERR STATUS FLAG
3721 024762 000413      BR      EIB234      ;DONE
3722 024764 012737 000200 025330  ELE234: MOV      #TRBIT,RDYWD ;SET OUTPUT READY TEST WD
3723 024772 013737 025030 025022  MOV      VALWD,WRDS  ;VALIDATION WORD
3724 025000 013737 025032 025024  MOV      DBADR,ADRS  ;ADDRESS OF OUTPUT, RXDB

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3757          .SBTT' MOD U.2.3.4 - WATCH DOG TIMER
3758          ;-----
3759
3760 025104 005037 025226 WATCH: CLR DNFLAG ;CLEAR DONE FLAG
3761 025110          SETPRI #PRI00 ;SET PROCESSOR PRI=0 - ALLOW INTERRUPTS
3762 025116 013704 025222          MOV DX,R4 ;SET DELAY MULT
3763 025122 013703 025224 BAU234: MOV DLY,R3 ;SET DELAY
3764 025126 005737 025226 IBU234: TST DNFLAG ;IF INTERRUPTS DONE FLAG
3765 025132 001410          BEQ LBU234 ;IS SET, THEN
3766 025134 032777 000040 177672 ICU234: BIT #DNBIT,@CSADR ;IF DONT BIT
3767 025142 001023          BNE XU234 ;IS NOT SET, THEN
3768 025144 012737 010000 002276          MOV #BIT12,ERRTY ;SET INTERR, BUT NO DONE ERROR
3769 025152 000417          BR XU234 ;BR TO MOD 'EXIT'
3770 025154 005303          LBU234: DEC R3 ;DECREMENT DELAY COUNT
3771 025156 001363          UDU234: BNE IBU234 ;DO UNIT DELAY COUNT=0
3772 025160 005304          DEC R4 ;DECREMENT DELAY MULT
3773 025162 001357          UAU234: BNE BAU234 ;DO UNTIL DELAY MULT=0
3774 025164 032777 000040 177642 IEU234: BIT #DNBIT,@CSADR ;IF DONE BIT IS
3775 025172 001404          BEQ LEU234 ;SET, THEN
3776 025174 052737 020000 002276          BIS #BIT13,ERRTY ;SET DONE, BUT NO INTERRUPT ERROR
3777 025202 000403          BR XU234 ;BR TO MOD 'EXIT'
3778 025204 052737 040000 002274 LEU234: BIS #BIT14,ERRSY ;SET T.O. ERROR
3779 025212          XU234: SETPRI #PRI07 ;SET PROCESSOR PRI=7 - NO INTERRUPTS
3780 025220 000207          RTS PC ;RETURN TO MOD 2.3.4
3781          ;-----
3782 025222 000040          DX: 40 ;DELAY MULT
3783 025224 100000          DLY: 100000 ;DELAY
3784 025226 000000          DNFLAG: 0 ;DONE FLAG
3785          ;MOD U.2.3.4 ---- END MODULE ----
3786
3787          .SBTTL MOD U.2.3/4 DELAY
3788          ;-----
3789
3790 025230 000240          DELAY: NOP ;
3791 025232 023727 025330 000000 IFAU23: CMP RDYWD,#0 ;IF READY WORD
3792 025240 001430          BEQ XU23 ;EQUALS ZERO, THEN BR TO END IF 'A'
3793 025242 013704 025324          MOV RYDX,R4 ;SET READY DELAY MULT
3794 025246 013703 025326          BDAU23: MOV RYDLY,R3 ;SET READY DELAY
3795 025252 033777 025330 000052 BDBU23: BIT RDYWD,@CSRADR ;IF READY
3796 025260 001020          BNE XU23 ;EQUAL TO '1', THEN BR TO END IF 'B'
3797 025262 005303          DEC R3 ;ELSE DECREMENT DELAY
3798 025264 001372          BNE BDBU23 ;DO UNTIL R3=0
3799 025266 005304          DEC R4 ;DECREMENT DELAY MULT.
3800 025270 001366          BNE BDAU23 ;DO UNTIL R4=0
3801 025272 052737 040000 002274          BIS #40000,ERRSY ;SET TIME OUT ERR
3802 025300 017737 000026 002246          MOV @CSRADR,CSRUUT ;GET UUT C&S REG
3803 025306 062737 000002 025332          ADD #2,CSRADR ;SET CSRADR TO DB REG
3804 025314 017737 000012 002250          MOV @CSRADR,ESRUUT ;GET UUT E&S REG
3805 025322 000207          XU23: RTS PC ;RETURN TO CALLING MOD
3806          ;-----
3807 025324 000040          RYDX: 40 ;READY MULTIPLIER
3808 025326 100000          RYDLY: 100000 ;READY DELAY
3809 025330 000000          RDYWD: 0 ;READY WORD - TEST FOR DEVICE READY
3810 025332 000000          CSRADR: 0 ;C&S REG OF UNIT- WAITING FOR
3811          ;MOD U.2.3.4 ---- END MODULE ----

```

```
3814
3815
3816
3817
3818 025334 013737 025410 027070 EVTSTR: MOV TSTEV,FUNEV ;PASS TEST FUNCTION
3819 025342 004737 026206 CALL EVDVST ;CALL MOD 2.4.2 - EVALUATE DRIVE STATE
3820 025346 013737 025410 030622 MOV TSTEV,FNEV4 ;PASS TEST FUNCTION
3821 025354 004737 030476 CALL EVUTEC ;CALL MOD 2.4.4 - EVAL UNIT ERR CODE
3822 025360 032737 020000 025410 IFA24: BIT #20000,TSTEV ;IF DATA CK BIT
3823 025366 001402 BEQ EIA24 ;IS SET, THEN
3824 025370 004737 025412 CALL EVDATA ;CALL MOD 2.4.1 - EVALUATE DATA
3825 025374 013737 025410 027626 EIA24: MOV TSTEV,TSTCK ;PASS DRIVE TEST
3826 025402 004737 027230 CALL UPDVST ;CALL MOD 2.4.3 UPDATE DRIVE STATISTICS
3827 025406 000207 RTS PC ;
3828
3829 025410 000000 ;
3830 ;MOD 2.4 ----- END MODULE -----
```

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3833          .SBTTL MOD 2.4.1 - EVALUATE DATA
3834          ;-----
3835
3836 025412 005037 026054          EVDATA: CLR          DAERCT          :CLEAR DATA ERR COUNT
3837 025416 005037 026046          CLR          SEEKCK          :CLEAR SEEK CK
3838 025422 012737 000001 026062  MOV          #1,PTHEAD        :SET PRINT HEADER FLAG
3839 025430 013701 002252          MOV          WDCNT,R1         :SAVE WORD COUNT
3840 025434 006301          ASL          R1              :
3841 025436 162701 000001          SUB          #1,R1           :SUBTRACT 2 TO GET CHECKSUM
3842 025442 012702 034006          MOV          #DATPAT,R2      :GET ADDRESS DATA SOURCE
3843 025446 012703 034406          MOV          #DATBUF,R3     :GET ADDRESS DATA BUFFER
3844 025452 060102          ADD          R1,R2          :CAL. ADDR SOURCE CHECKSUM
3845 025454 060103          ADD          R1,R3          :CAL. ADDR BUFFER CHECKSUM
3846 025456 121213          IFA241: CMPB          (R2),(R3) :IF CHECK SUMS
3847 025460 001407          BEQ          ELA241         :NOT= THEN
3848 025462 032737 000002 021452  IFI241: BIT          #2,ERTSAV  :IF CRC ERR
3849 025470 001003          BNE          ELA241         :NOT SET, THEN
3850 025472 052737 000004 002276  BIS          #4,ERRTY        :SET CHECKSUM ERR
3851 025500 005037 026052          ELA241: CLR          BYTNUM        :CLEAR BYTE NUMBER
3852 025504 162701 000001          SUB          #1,R1           :CAL. TOTAL BYTE COUNT-LAST TWO
3853 025510 010137 026050          MOV          R1,BYTCNT       :SAVE BYTE COUNT
3854 025514 012701 034006          BDA241: MOV          #DATPAT,R1  :SET TEMP#1=DATA SOURCE BEGIN ADR
3855 025520 012702 034406          MOV          #DATBUF,R2     :SET TEMP#2=DATA BUFFER BEGIN ADR
3856 025524 063701 026052          ADD          BYTNUM,R1       :CAL CURRENT BYTE ADDR (SOURCE)
3857 025530 063702 026052          ADD          BYTNUM,R2       :CAL CURRENT BYTE ADDR (BUFFER)
3858 025534 121112          CMPB          (R1),(R2)     :IF SOURCE BYTE & BUFFER BYTE
3859 025536 001502          BEQ          ELB241         :NOT EQUAL
3860 025540 005237 026054          INC          DAERCT         :INCREMENT DATA ERR COUNT
3861 025544 052737 000010 002276  BIS          #10,ERRTY       :SET DATA ERR-ERR TYPE
3862 025552 042737 000004 002276  BIC          #4,ERRTY        :CLR CK SUM ERR-ERR TYPE
3863 025560 023727 026052 000002  IFC241: CMP          BYTNUM,#2   :IF BYTE #0 OR #1
3864 025566 002006          BGE          IFE241         :THEN
3865 025570 005737 026052          IFD241: TST          BYTNUM        :IF BYTE #0
3866 025574 001003          BNE          IFE241         :THEN
3867 025576 052737 000001 026046  BIS          #1,SEEKCK       :SET SEEK ERR-ERR TYPE
3868 025604 023727 026054 000012  IFE241: CMP          DAERCT,#12     :IF OVER 10 DATA ERRORS
3869 025612 103404          BLO          THF241         :THEN
3870 025614 032737 000020 002204  IFF241: BIT          #20,SWREG      :IF PRINT ONLY 10 DATA ERROR FLAG
3871 025622 001047          BNE          EIF241         :IS NOT SET, THEN
3872 025624 111137 026056          THF241: MOVB          (R1),DATASB :
3873 025630 111237 026060          MOVB          (R2),DATAWS   :
3874 025634 005737 026062          IFM241: TST          PTHEAD        :IF PRINT HEADER
3875 025640 001420          BEQ          EIM241         :OK, THEN
3876 025642 005037 026062          CLR          PTHEAD        :CLEAR PRINT HEADER
3877 025646          PRINTB          #DMSG1,UNIT,TRACK,SECTOR
3878 025702          EIM241: PRINTB          #DMSG2,BYTNUM,<B,DATASB>,<B,DATAWS>
3879 025742 000240          EIF241: NOP
3880 025744 005237 026052          ELB241: INC          BYTNUM        :INCREMENT BYTE #
3881 025750 005337 026050          DEC          BYTCNT         :DECREMENT BYTE COUNT
3882 025754 005737 026050          TST          BYTCNT         :DO UNTIL BYTE COUNT
3883 025760 003255          BGT          BDA241         :EQUALS 0
3884 025762 005737 026046          IFJ241: TST          SEEKCK        :IF DISK SEEK ERR
3885 025766 001413          BEQ          END241         :IS SET AND
3886 025770 032737 000010 002276  IFK241: BIT          #10,ERRTY       :IF DATA ERR
3887 025776 001007          BNE          END241         :NOT SET AND
3888 026000 032737 000002 021452  IFL241: BIT          #2,ERTSAV  :IF CRC ERR
3889 026006 001003          BNE          END241         :NOT SET

```



```
3890 026010 052737 000001 002276      BIS      #1,ERRTY      ;THEN SET SEEK ERR
3891 026016 000240      END241: NOP      ;
3892 026020 005037 021452      CLR      ERTSAV      ;CLEAR ERR TYP SAV
3893 026024 012705 034406      MOV      #DATBUF,R5 ;GET BEGIN OF DATA BUFFER
3894 026030 012704 000200      MOV      #128.,R4   ;SET WORD LENGTH OF TABLE
3895 026034 005025      BDB241: CLR      (R5)+ ;CLEAR WORD IN DATA BUFFER TABLE
3896 026036 005304      DEC      R4         ;DECREMENT WORD COUNT
3897 026040 005704      TST      R4         ;DO UNTIL
3898 026042 001374      EDB241: BNE      BDB241 ;ALL TABLE WORDS ZEROED
3899 026044 000207      RTS      PC         ;RETURN
3900      ;-----
3901 026046 000000      SEEKCK: 0          ;SEEK CECK FLAG
3902 026050 000000      BYTCNT: 0         ;BYTE COUNT
3903 026052 000000      BYTNUM: 0         ;BYTE NUMBER
3904 026054 000000      DAERCT: 0        ;DATA ERR COUNT
3905 026056 000000      DATASB: 0        ;DATA SHOULD BE
3906 026060 000000      DATAWS: 0       ;DATA WAS
3907 026062 000000      PTHEAD: 0        ;PRINT HEADER FLAG
3908      ;-----
3909 026064      045      116      045      DMSG1: .ASCIZ /%N% UNIT#%01% TRK#%D3% SEC#%D2%N% BYTE#%S2%AGOOD%S6%ABAD/
3910 026161      045      116      045      DMSG2: .ASCIZ /%N%S3%D3%S2%B8%S2%B8/
3911      .EVEN
3912      ;MOD 2.4.1 ----- END MODULE -----
```

```

3915          .SBTTL MOD 2.4.2 - EVALUATE DRIVE STATE
3916          -----
3917 026206 013705 002236          EVDVST: MOV      UUTADR,R5
3918 026212 013737 002246 027072  MOV      CSRUUT,CSREV      ;GET COMMAND & STATUS LAST OP UUT
3919 026220 013737 002250 027074  MOV      ESRUUT,ESREV      ;GET ERROR STATUS LAST OP UUT
3920 026226 005037 033544          CLR      XERUUT           ;CLEAR EXTENDED ERROR CODE LOCATION
3921 026232 032737 000040 027072  IFA242: BIT      #40,CSREV      ;IF DONE NOT
3922 026240 001032          BNE     IFB242           ;SET THEN
3923 026242 012715 040000          MOV      #40000,(R5)      ;ISSUE PROG INIT TO UUT
3924 026246 013737 002236 025332  MOV      UUTADR,CSRADR      ;SET CSR ADR
3925 026254 012737 000040 025330  MOV      #DNBIT,RDYWD      ;SET DONE TEST
3926 026262 004737 025230          CALL    DELAY            ;WAIT FOR TR
3927 026266 032715 000040          IFC242: BIT      #40,(R5)      ;IF DONE NOT
3928 026272 001005          BNE     ELC242           ;SET THEN
3929 026274 052737 000010 002274  BIS      #10,ERRSY        ;SET NO DONE ON INT-SYS ERR
3930 026302 000137 027064          JMP     END242           ;BR TO END MOD
3931 026306 113701 027070          ELC242: MOVB     FUNEV,R1      ;GET DRIVE FUNCTION
3932 026312 042701 177770          BIC     #177770,R1        ;CLEAR ALL BUT FUNCTION
3933 026316 050137 002274          BIS      R1,ERRSY        ;SET NO DONE ON FUNCTION-SYS ERR
3934 026322 000137 027064          JMP     END242           ;BR TO END MOD
3935 026326 004737 027076          IFB242: CALL    EVDVRE        ;CALL MOD 2.4.2.1 EVALUATE DRIVE RESPONSE
3936 026332 005737 002274          TST     ERRSY            ;IF SYS ERR
3937 026336 001463          BEQ     IFG242           ;NOT=0 THEN
3938 026340 032737 000001 002234  BIT      #1,UUT           ;IFDRV#1 UNDER TST
3939 026346 001404          BEQ     1$              ;THEN
3940 026350 012737 000020 027066  MOV      #20,EVCMD        ;SET CMD TO DRV#1
3941 026356 000402          BR      2$              ;BR
3942 026360 005037 027066          1$:    CLR     EVCMD        ;SET CMD TO DRV#0
3943 026364 052737 000013 027066  2$:    BIS     #13,EVCMD      ;SET READ UUT ESR IN CMD
3944 026372 053737 002242 027066  BIS     DEN,EVCMD        ;SET DEN FOR CMD
3945 026400 013715 027066          MOV     EVCMD,(R5)        ;READ UUT ESR
3946 026404 013737 002236 025332  MOV     UUTADR,CSRADR      ;SET CSR ADR
3947 026412 012737 000040 025330  MOV     #DNBIT,RDYWD      ;SET DONE BIT
3948 026420 004737 025230          CALL    DELAY            ;CALL
3949 026424 032715 000040          IFX242: BIT      #40,(R5)      ;IF DONE BIT
3950 026430 001005          BNE     IFD242           ;NOT SET THEN
3951 026432 052737 000200 002274  BIS     #200,ERRSY        ;SET NO DONE BIT (SECONDARY PROBLEM)
3952 026440 000137 027064          JMP     END242           ;BK TO END
3953 026444 032715 100000          IFD242: BIT      #100000,(R5)  ;IF ERR BIT
3954 026450 001403          BEQ     IFE242           ;SET
3955 026452 052737 100000 002276  BIS     #100000,ERRTY      ;ERR BIT - ERR TYPE
3956 026460 013701 002236          IFE242: MOV     UUTADR,R1      ;GET UUT ADR
3957 026464 062701 000002          ADD     #2,R1            ;CAL DBR ADR
3958 026470 032711 000200          BIT     #200,(R1)        ;IF DRV RDY BIT
3959 026474 001102          BNE     IFN242           ;EQUALS 0
3960 026476 052737 000040 002274  BIS     #40,ERRSY        ;SET DRIVE NOT RDY-SYS ERR
3961 026504 000561          BR      IFS242           ;BR TO END IF 'E'
3962 026506 032737 002021 027074  IFG242: BIT      #2021,ESREV      ;IF ANY ESR ERR BIT SET
3963 026514 001410          BEQ     IFH242           ;THEN
3964 026516 032737 100000 027072  IFI242: BIT      #100000,CSREV      ;IF UUT ERR BIT
3965 026524 001010          BNE     IFJ242           ;NOT=1 THEN
3966 026526 052737 040000 002276  BIS     #40000,ERRTY      ;SET MISSING ERR BIT
3967 026534 000450          BR      IFL242           ;BR TO IF 'L'
3968 026536 032737 100000 027072  IFH242: BIT      #100000,CSREV      ;IF UUT CSR ERR BIT
3969 026544 001456          BEQ     IFN242           ;EQUALS 1 THEN
3970 026546 013701 025410          IFJ242: MOV     TSTEV,R1      ;GET TEST FUNCTION
3971 026552 042701 177774          BIC     #177774,R1        ;CLEAR ALL BUT TWO BOTTOM BITS
  
```

```

3972 026556 022701 000002          CMP      #2,R1          ;IF WRITE FUNCTION
3973 026562 001004          BNE     IFK242        ;THEN
3974 026564 052737 004000 002276    BIS     #4000,ERRTY   ;SET WRITE ERR - ERR TYPE
3975 026572 000431          BR      IFL242        ;BR TO IF 'L'
3976 026574 013701 025410          IFK242: MOV    TSTEV,R1 ;GET TEST FUNCTION
3977 026600 042701 177770          BIC     #177770,R1   ;CLEAR ALL BUT FUNCTION
3978 026604 022701 000003          CMP     #3,R1        ;IF READ FUNCTION
3979 026610 001004          BNE     IFM242        ;THEN
3980 026612 052737 002000 002276    BIS     #2000,ERRTY   ;SET READ ERR-ERR TYPE
3981 026620 000416          BR      IFL242        ;BR TO IF 'L'
3982 026622 013701 025410          IFM242: MOV    TSTEV,R1 ;GET TEST FUNCTION
3983 026626 042701 177771          BIC     #177771,R1   ;CLEAR BITS
3984 026632 032701 000006          BIT     #6,R1        ;IF. FILL/EMPTY BUFFER
3985 026636 001004          BNE     ELM242        ;THEN
3986 026640 052737 001000 002276    BIS     #1000,ERRTY   ;SET FILL/EMPTY ERR-ERR TYP
3987 026646 000403          BR      IFL242        ;BR TO IF 'L'
3988 026650 052737 000400 002276    ELM242: BIS    #400,ERRTY ;ELSE SET UNK ERR
3989 026656 032737 000001 027074    IFL242: BIT    #1,ESREV ;IF CRC ERR (ESR)
3990 026664 001406          BEQ     IFN242        ;THEN
3991 026666 042737 000001 002276    BIC     #1,ERRTY     ;CLEAR ANY SEEK ERR
3992 026674 052737 000002 002276    BIS     #2,ERRTY     ;SET CRC ERR
3993 026702 032737 006010 027074    IFN242: BIT    #6010,ESREV ;IF ESR BIT#3,10,11 ARE
3994 026710 001404          BEQ     IFF242        ;SET, THEN
3995 026712 052737 100000 002274    BIS     #100000,ERRSY ;SET UNKNOWN ERR-SYS ERR
3996 026720 000453          BR      IFS242        ;BR TO IF 'S'
3997 026722 013701 025410          IFF242: MOV    TSTEV,R1 ;GET TEST FUNCTION
3998 026726 032701 000002          BIT     #2,R1        ;IF FUNCTION WAS
3999 026732 001446          BEQ     IFS242        ;POSSIBLE READ OR WRITE
4000 026734 032701 000005          BIT     #5,R1        ;BUT REALLY
4001 026740 001043          BNE     IFS242        ;IS READ OR WRITE, THEN
4002 026742 005737 002244          IF0242: TST    DELDAT ;IF DELETED DATA FLAG IS
4003 026746 001410          BEQ     IFQ242        ;SET THEN
4004 026750 032737 000100 027074    IFP242: BIT    #100,ESREV ;IF UUT ESR DD BIT
4005 026756 001013          BNE     IFR242        ;NOT SET THEN
4006 026760 052737 000100 002276    BIS     #100,ERRTY   ;SET MISSING DP MARK-ERR TYP
4007 026766 000407          BR      IFR242        ;BR TO IF 'R'
4008 026770 032737 000100 027074    IFQ242: BIT    #100,ESREV ;IF D.D. BIT IS
4009 026776 001403          BEQ     IFR242        ;SET THEN
4010 027000 052737 000040 002276    BIS     #40,ERRTY    ;SET UNEX DD BIT
4011 027006 032737 000020 027074    IFR242: BIT    #20,ESREV ;IF DEN. ERR. (ESR)
4012 027014 001403          BEQ     IFU242        ;THEN
4013 027016 052737 020000 002274    BIS     #20000,ERRSY ;SET DEN. ERR-SYS ERR
4014 027024 005737 002242          IFU242: TST    DEN    ;IF DOUBLE DEN MODE IS
4015 027030 001407          BEQ     IFS242        ;SET AND THEN
4016 027032 032737 000040 027074    IFV242: BIT    #40,ESREV ;IF. UUT RESPONDS IN
4017 027040 001003          BNE     IFS242        ;SINGLE DENSITY, THEN
4018 027042 052737 010000 002274    BIS     #10000,ERRSY ;SET DRIVE DENSITY ERR-SYS ERR
4019 027050 032737 100000 027072    IFS242: BIT    #100000,CSREV ;IF UUT ERR BIT
4020 027056 001402          BEQ     END242        ;NOT=0 THEN
4021 027060 004737 005026          CALL   RDERCD        ;CALL UUT - READ ERROR CODE
4022 027064 000207          END242: RTS    PC
4023                                     -----
4024 027066 000000          EVCMD: 0              ;CMD WORD USED IN THIS MOD
4025 027070 000000          FUNEV: 0
4026 027072 000000          CSREV: 0
4027 027074 000000          ESREV: 0
4028                                     -----
;MOD 2.4.2 ----- END MODULE -----

```

```

4031
4032
4033
4034
4035 027076 013701 025410
4036 027102 042701 177771
4037 027106 032701 000006
4038 027112 001445
4039 027114 005737 002172
4040 027120 001421
4041 027122 032737 000002 002234
4042 027130 001403
4043 027132 012701 001000
4044 027136 000401
4045 027140 005001
4046 027142 013702 002250
4047 027146 042702 176777
4048 027152 020102
4049 027154 001403
4050 027156 052737 001000 002274
4051 027164 032737 000001 002234
4052 027172 001403
4053 027174 012701 000400
4054 027200 000401
4055 027202 005001
4056 027204 013702 002250
4057 027210 042702 177377
4058 027214 020102
4059 027216 001403
4060 027220 052737 000400 002274
4061 027226 000207
4062

      .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
1$:      BIT      #1,UUT        ;IF DRIVE #1 SELECTED
          BEQ      4$           ;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$
6$:      BIS      #400,ERRSY     ;SET WRONG DRIVE RESPONDING SYS ERR
          RTS      PC
      ;MOD 2.4.2.1 ----- END MODULE -----
  
```

```

4065          .SBTTL MOD 2.4.3 - UPDATE DRIVE STATISTICS
4066          ;-----
4067
4068 027230 013737 027626 030342 UPDVST: MOV      TSTCK,FUNTY ;PASS TEST FUNCTION TO UPDATE SEC CTR
4069 027236 004737 030216          CALL    UPSECT  ;CALL UP DATE SECTOR CONTENTS
4070 027242 032737 000002 027606 IA243: BIT      #2,ETSAV ;IF ERRTY SAVE
4071 027250 001405          BEQ      EA243  ;HAS CRC ERR BIT SET, THEN
4072 027252 004737 027722          CALL    UDCRST ;CALL UPDATE CRC STATISTICS
4073 027256 005037 027606          CLR      ETSAV  ;CLEAR ERR TYPE SAVE
4074 027262 000457          BR       IG243  ;BR TO IF 'G'
4075 027264 013737 002276 027606 EA243: MOV      ERRTY,ETSAV ;SAVE ERR TYP --> ETSAV
4076 027272 013737 002276 027614          MOV      ERRTY,STERRG ;GET ERR TYP --> STAT ERR REG
4077 027300 005037 027616          CLR      STCNTR ;ZERO STAT COUNTER
4078 027304 032737 000002 027614 ID243: BIT      #2,STERRG ;IF ERR IS
4079 027312 001403          BEQ      BF243  ;CRC, THEN
4080 027314 042737 006002 027614          BIC      #6002,STERRG ;CLEAR CRC, RD, & WRT ERR BITS OF STAT ERR REG
4081 027322 000241          BF243: CLC      ;CLEAR CARRY BIT
4082 027324 006037 027614          ROR      STERRG ;ROTATE RIGHT STAT ERROR REG
4083 027330 103026          IB243: BCC      EB243  ;IF CARRY BIT SET, THEN
4084 027332 013701 027616          MOV      STCNTR,R1 ;GET STAT COUNTER
4085 027336 006301          ASL      R1      ;& DOUBLE FOR WORD ADDRESSING
4086 027340 062701 027630          ADD      #ETTAB,R1 ;CAL. CLASSIFICATION WORD-ADDRESS
4087 027344 011137 027620          MOV      (R1),CLASWD ;GET CLASSIFICATION WORD
4088 027350 011102          MOV      (R1),R2  ;GET CLASSIFICATION WORD-TO FIND LOG OFFSET
4089 027352 000302          SWAB    R2      ;GET CLASSIFICATION WORD UPPER BYTE
4090 027354 006302          ASL      R2      ;--SHIFT LEFT TO GET LOG REG OFFSET (LAST 6 BITS)
4091 027356 006302          ASL      R2      ;--SHIFT LEFT AGAIN
4092 027360 042702 177004          BIC      #177004,R2 ;CLEAR UNWANTED BITS
4093 027364 010237 027622          MOV      R2,LOGOFF ;SAVE ERROR LOG OFFSET
4094 027370 005711          IC243: TST      (R1) ;IF ERR TYP CLASSIFICATION WORD
4095 027372 100403          BMI      LC243  ;TYPE=SOFT, THEN
4096 027374 004737 030072          CALL    UDSFST ;CALL UPDATE SOFT ERROR STATISTICS
4097 027400 000402          BR       EB243  ;BR TO END 'B'
4098 027402 004737 027670          LC243: CALL    UDHDST ;CALL UPDATE HARD ERROR STATISTICS
4099 027406 005237 027616          EB243: INC      STCNTR ;INCREMENT STAT COUNTER
4100 027412 022737 000020 027616 UF243: CMP      #16,STCNTR ;DO UNTIL ALL 16
4101 027420 101340          BHI      BF243  ;BITS ARE DONE
4102 027422 013703 033544          IG243: MOV      XERUUT,R3 ;GET EXTENDED ERROR CODE
4103 027426 042703 177400          BIC      #177400,R3 ;CLEAR UPPER BYTE
4104 027432 005703          TST      R3      ;IF EXTENDED ERROR CODE
4105 027434 001410          BEQ      IH243  ;NOT=0, THEN
4106 027436 162703 000010          SUB      #10,R3  ;ADJ ERROR CODE # FOR LOGGING
4107 027442 012702 007604          MOV      #ECLOG,R2 ;GET LOC OF ERR CODE LOG
4108 027446 060302          ADD      R3,R2  ;ADD ERR CODE TO LOC ERR CODE LOG
4109 027450 063702 002240          ADD      UUTOFF,R2 ;FIND LOC ERR REG THIS UNIT
4110 027454 005212          INC      (R2)   ;INCREMENT UNIT ERR REG
4111 027456 013703 002276          IH243: MOV      ERRTY,R3 ;GET ERR TYPE
4112 027462 042703 171774          BIC      #171774,R3 ;CLEAR ALL ERRS BUT RD, WT, CRC, SEEK
4113 027466 005703          TST      R3      ;IF ONE OF THESE ERRORS
4114 027470 001412          BEQ      I1243  ;THEN
4115 027472 013702 002254          MOV      TRACK,R2 ;GET TRACK ADR
4116 027476 006302          ASL      R2      ;DOUBLE TRACK ADR FOR WORD ADDRESSING
4117 027500 006302          ASL      R2      ;ADJ TRK
4118 027502 006302          ASL      R2      ;FOR ADR.
4119 027504 062702 010070          ADD      #TKXX,R2 ;ADD TRACK LOG LOCATION
4120 027510 063702 002240          ADD      UUTOFF,R2 ;FIND LOC ERR REG THIS UNIT
4121 027514 005212          INC      (R2)   ;INCREMENT UNIT ERR REG

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4122 027516 005737 027610      11243: TST      ERRSAV      ;IF ERR SAVE HAS
4123 027522 001023              BNE      L1243      ;NO ERROR SET, THEN
4124 027524 005237 027612      INC      ERSVCT      ;INCREMENT ERROR SAVE COUNTER
4125 027530 022737 000004 027612 1J243: CMP      #4,ERSVCT  ;IF ERROR SAVE COUNTER
4126 027536 101017              BHI      E1243      ;NOT=4, THEN
4127 027540 012701 002306      MOV      #SEEKRT,R1 ;SET BEGIN ADDRESS OF RETRY COUNTERS
4128 027544 012702 000011      MOV      #11,R2     ;SET # OF RETRY COUNTERS
4129 027550 005021              BK243: CLR      (R1)+  ;CLEAR RETRY COUNTER
4130 027552 005302              DEC      R2         ;DECREMENT RETRY COUNTER #
4131 027554 005702              UK243: TST      R2     ;DO UNTIL
4132 027556 001374              BNE      BK243      ;ALL COUNTERS CLEARED
4133 027560 005037 027612      CLR      ERSVCT      ;CLEAR ERROR SAVE COUNTER
4134 027564 005037 002304      CLR      RETRY       ;CLEAR RETRY COUNTER
4135 027570 000402              BR       E1243      ;BR TO END 'I'
4136 027572 005037 027612      L1243: CLR      ERSVCT  ;CLEAR ERROR SAVE COUNT
4137 027576 013737 002276 027610 E1243: MOV      ERRTY,ERRSAV ;SAVE ERROR TYPE FOR NEXT ERROR CHECK
4138 027604 000207      END243: RTS      PC   ;RETURN
4139
4140 027606 000000      ETSAV: 0           ;ERR TYPE SAVE
4141 027610 000000      ERRSAV: 0         ;ERR TYPE SAVE REG
4142 027612 000000      ERSVCT: 0         ;ERROR SAVE COUNTER-COUNTS # OF NO ERROR PASSES
4143 027614 000000      STERRG: 0        ;STAT ERR REG
4144 027616 000000      STCNTR: 0        ;STAT COUNTER
4145 027620 000000      CLASWD: 0        ;ERROR CLASSIFICATION WORD-FROM TABLE
4146 027622 000000      LOGOFF: 0        ;ERROR LOG OFFSET FROM #CKSML
4147 027624 000000      RTOFF: 0         ;RETRY COUNTER OFFSET FROM # SEEKRT
4148 027626 000000      TSTCK: 0        ;TEST WORD-USED TO CHECK TEST DONE
4149
;MOD 2.4.3 ----- END MODULE -----

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```

4150
4151 ;----- ERROR TYPE CLASSIFICATION & OFFSETS TABLE -----
4152 ;TYPE/LOG-OFF/RT-OFF/CLASS /BIT#
4153 ;-----/-----/-----/-----/-----
4154 027630 005001      ETTAB: .WORD 005001 ;SFT /SEEK /SEEK /SK-RTMSK/ 0
4155 027632 006005      .WORD 006005 ;SFT /CRC /CRC /CRC / 1
4156 027634 100407      .WORD 100407 ;HRD /CKSML / - /HD / 2
4157 027636 012106      .WORD 012106 ;SFT /DATA /DATA /DT-RTMSK/ 3
4158 027640 154400      .WORD 154400 ;HRD / - / - / - / 4
4159 027642 113227      .WORD 113227 ;HRD /DDUNX /DD /HD / 5
4160 027644 113227      .WORD 113227 ;HRD /DDMIS /DD /HD / 6
4161 027646 154400      .WORD 154400 ;HRD / - / - / - / 7
4162 027650 154400      .WORD 154400 ;HRD /UNK / - / - / 8
4163 027652 101407      .WORD 101407 ;HRD /FIL-EMP/ - /HD / 9
4164 027654 010164      .WORD 010164 ;SFT /RD /RD /RD-RTMSK/ 10
4165 027656 011202      .WORD 011202 ;SFT /WRT /WT /WT-RTMSK/ 11
4166 027660 103407      .WORD 103407 ;HRD /INTR-ND/ - /HD / 12
4167 027662 104407      .WORD 104407 ;HRD /D-NINTR/ - /HD / 13
4168 027664 102407      .WORD 102407 ;HRD /ER-NSET/ - /HD / 14
4169 027666 154407      .WORD 154407 ;HRD /ERR BIT/ - /HD / 15
4170
4171 ;
4172 ;-----<CLASSIFICATION (SEEK=1/CRC=5/DATA=6/WRITE=2/READ=4)
4173 ;-----<RETRY COUNTER OFFSET
4174 ;-----<LOG REGISTER OFFSET-(FROM CKSML ADDRESS)
4175 ;-----<TYPE (SOFT=0/HARD=1)

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4178      .SBTTL MOD 2.4.3.1 - UPDATE HARD ERROR STATISTICS
4179      :-----
4180
4181 027670 000240 UDHDST: NOP
4182 027672 032737 000007 027620 IA2431: BIT #7,CLASWD ;IF ERROR CLASS WORD-
4183 027700 001007 ;CLASS=HD(7), THEN
4184 027702 013701 027622 MOV LOGOFF,R1 ;GET ERROR LOG OFFSET
4185 027706 062701 007354 ADD #CKSML,R1 ;ERR LOG ADR=ERR LOG OFF + CKSML ADR
4186 027712 063701 002240 ADD UUTOFF,R1 ;UUT ERR LOG ADR=UUT OFFSET + ERR LOG ADR
4187 027716 005211 INC (R1) ;INCREMENT THE ERROR LOG
4188 027720 000207 X2431: RTS PC ;RETURN
4189 ;MOD 2.4.3.1 ----- END MODULE -----
4190
4191
4192
4193      .SBTTL MOD 2.4.3.2 - UPDATE CRC STATISTICS
4194      :-----
4195
4196 027722 000240 UDCRST: NOP
4197 027724 032737 020000 027626 IA2432: BIT #BIT13,TSTCK ;IF TEST=DATA CHECK
4198 027732 001425 LA2432: BEQ LA2432 ;BIT SET, THEN
4199 027734 032737 000010 002276 IB2432: BIT #BIT03,ERRTY ;IF ERR TYPE=DATA ERR
4200 027742 001007 BNE LB2432 ;NOT SET, THEN
4201 027744 012737 000020 027622 MOV #20,LOGOFF ;SET LOG OFFSET=CRC BAD LOG
4202 027752 012737 000006 027624 MOV #6,RTOFF ;SET RETRY OFFSET=CRC ERR
4203 027760 000420 BR IC2432 ;BR TO 'C'
4204 027762 012737 000050 027622 LB2432: MOV #50,LOGOFF ;SET DATA LOG OFFSET
4205 027770 005037 030474 CLR RTMASK ;CLEAR RETRY MASK
4206 027774 012737 000012 027624 MOV #12,RTOFF ;SET DUMMY DATA RETRY COUNTER OFFSET
4207 030002 004737 030344 CALL SFERLG ;CALL SOFT ERROR LOGGER
4208 030006 012737 000010 027622 LA2432: MOV #10,LOGOFF ;SET LOG OFFSET=CRC ERR LOG
4209 030014 012737 000006 027624 MOV #6,RTOFF ;SET RETRY OFFSET=CRC ERR
4210 030022 032737 010000 027626 IC2432: BIT #BIT12,TSTCK ;IF READ AFTER WRITE (RAW)
4211 030030 001407 BEQ LC2432 ;BIT SET, THEN
4212 030032 012737 000020 030474 MOV #BIT04,RTMASK ;SET RETRY MASK=CRC
4213 030040 052737 000002 030474 BIS #BIT1,RTMASK ;SET RETRY MASK=WRITE
4214 030046 000406 BR EC2432 ;BR TO END 'C'
4215 030050 012737 000020 030474 LC2432: MOV #BIT04,RTMASK ;SET RETRY MASK=CRC
4216 030056 052737 000004 030474 BIS #BIT02,RTMASK ;SET RETRY MASK=READ
4217 030064 004737 030344 EC2432: CALL SFERLG ;CALL SOFT ERROR LOGGER
4218 030070 000207 RETURN ;RETURN
4219 ;MOD 2.4.3.2 ----- END MODULE -----

```

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4222          .SBTTL  MOD 2.4.3.3 - UPDATE SOFT ERROR STATISTICS
4223          ;-----
4224
4225 030072 013702 027620      UDSFST: MOV      CLASWD,R2      ;PUT CLASSIFICATION WORD IN R1
4226 030076 006202              ASR      R2          ;  SHIFT WORD RIGHT
4227 030100 006202              ASR      R2          ;    3 TIMES TO GET
4228 030102 006202              ASR      R2          ;    RETRY COUNTER OFFSET (LAST 6 BITS)
4229 030104 042702 177700      BIC      #177700,R2    ;CLEAR TOP 10 BITS
4230 030110 010237 027624      MOV      R2,RTOFF     ;SET RETRY COUNTER OFFSET
4231 030114 013702 027620      1A2433: MOV     CLASWD,R2    ;GET CLASSIFICATION WORD
4232 030120 042702 177770      BIC      #177770,R2    ;CLEAR ALL BIT ERROR CLASSIFICATION
4233 030124 022702 000006      CMP      #6,R2        ;IF ERROR
4234 030130 001022              BNE      LA2433        ;CLASS=DATA, THEN
4235 030132 032737 010000 027626 1B2433: BIT      #BIT12,TSTCK  ;IF TEST HAS
4236 030140 001404              BEQ      LB2433        ;READ AFTER WRITE (RAW) BIT SET, THEN
4237 030142 012737 000012 030474      MOV      #12,RTMASK   ;SET DATA & WRITE RETRY
4238 030150 000403              BR       EB2433        ;BR TO END IF 'B'
4239 030152 012737 000014 030474      LB2433: MOV     #14,RTMASK  ;SET DATA & READ RETRY
4240 030160 012737 000010 027624      EB2433: MOV     #10,RTOFF   ;SET DATA RT COUNTER OFFSET
4241 030166 012737 000050 027622      MOV      #50,LOGOFF   ;SET DATA LOG OFFSET
4242 030174 000405              BR       EA2433        ;BR TO END 'A'
4243 030176 010237 030474      LA2433: MOV     R2,RTMASK  ;ELSE-PUT CLASS INTO RETRY MASK
4244 030202 162737 000050 027622      SUB      #50,LOGOFF   ;ADJ. LOG OFFSET SO THAT 'SEK' IS LOG BEGIN
4245 030210 004737 030344      EA2433: CALL    SFERLG    ;CALL SOFT ERROR LOGGER
4246 030214 000207      X2433:  RTS      PC      ;RETURN
4247          ;MOD 2.4.3.3 ----- END MODULE -----

```



```

4250
4251      .SBTTL MOD 2.4.3.4 - UPDATE SECTOR WRITTEN/READ COUNTERS
4252      ;-----
4253
4254 030216 013701 002234      UPSECT: MOV      UUT,R1      :GET UNIT UNDER TEST
4255 030222 006301              ASL      R1      :DOUBLE FOR WORD ADDRESSING
4256 030224 006301              ASL      R1      :DOUBLE FOR 2 WORD ADDRESSING
4257 030226 042737 177770 030342 BIC      #177770,FUNTY :CLEAR ALL BUT FUNCTION
4258 030234 022737 000003 030342 1A2434: CMP      #3,FUNTY   :IF FUNCTION TYPE
4259 030242 001002              BNE      1B2434   :IS READ, THEN
4260 030244 005002              CLR      R2      :CLEAR R2
4261 030246 000412              BR       EA2434   :BR TO END 'A'
4262 030250 022737 000002 030342 1B2434: CMP      #2,FUNTY   :IF FUNCTION TYPE
4263 030256 001404              BEQ      LB2434   :IS NOT WRITE #1, THEN
4264 030260 022737 000006 030342 1C2434: CMP      #6,FUNTY   :IF FUNCTION TYPE
4265 030266 001024              BNE      XUPSCT   :IS WRITE #2, THEN
4266 030270 012702 000020      LB2434: MOV      #20,R2   :SET R2 OFFSET=WRITE
4267 030274 000241      EA2434: CLC              :CLEAR CARRY BIT
4268 030276 060102              ADD      R1,R2   :SETUP OFFSET
4269 030300 005262 007314      INC      READSC(R2) :INCREMENT SECTOR COUNTER
4270 030304 100015      BPL      XUPSCT   :IF BIT#15 SET, THEN
4271 030306 005062 007314      CLR      READSC(R2) :CLEAR SECTOR COUNTER
4272 030312 062702 000002      ADD      #2,R2   :SETUP TO INCREMENT DOUBLE PRECISION WORD
4273 030316 005262 007314      INC      READSC(R2) :INCREMENT DOUBLE PRECISION WORD
4274 030322 103006      BCC      XUPSCT   :IF CARRY BIT SET, THEN
4275 030324 005062 007314      CLR      READSC(R2) :CLEAR DOUBLE PRECISION CTR
4276 030330 162702 000002      SUB      #2,R2   :
4277 030334 005062 007314      CLR      READSC(R2) :CLEAR DOUBLE PRECISION CTR
4278 030340 000207      XUPSCT: RETURN    :RETURN
4279      ;-----
4280 030342 000000      FUNTY: 0          :STATISTICS FUNCTION CK
4281      ;-----
  
```

```

4284          .SBTTL - MOD 2.4.U.1 - SOFT ERROR LOGGER
4285          ;-----
4286
4287 030344 013701 027622 SFERLG: MOV LOGOFF,R1 ;GET ERR LOG OFFSET
4288 030350 013702 027624          MOV RTOFF,R2 ;GET RETRY COUNTER OFFSET
4289 030354 062702 002306          ADD #SEEKRT,R2 ;CAL. RETRY COUNTER ADR
4290 030360 032737 000004 002204 1A24U1: BIT #BIT02,SWREG ;IF (SFT SW REG) RETRY ON ERROR, LOG SOFT OR HD ERROR
4291 030366 001004          BNE 1B24U1 ;SET OR
4292 030370 032737 000004 002264          BIT #EVL,FLGDRS ;DRS "EVL" FLAG
4293 030376 001412          BEQ LB24U1 ;SET, THEN
4294 030400 021227 000012 1B24U1: CMP (R2),#12 ;IF RETRY COUNTER
4295 030404 103007          BHIS LB24U1 ;EQUALS < 10 ERRORS, THEN
4296 030406 005212          INC (R2) ;INCREMENT RETRY COUNTER
4297 030410 053737 030474 002304          BIS RTMASK,RETRY ;SET RT FLAGS PER RT MASK
4298 030416 005037 002300          CLR HARDER ;CLEAR HARD ERROR
4299 030422 000413          BR EB24U1 ;BR TO END 'B'
4300 030424 062701 007514 1B24U1: ADD #HSEK,R1 ;HD ERR LOG ADR=HARD SEEK ADR+LOG OFFSET
4301 030430 063701 002240          ADD UUTOFF,R1 ;UUT ERR LOG ADR=UUT OFFSET+LOG ADR
4302 030434 005211          INC (R1) ;INCREMENT UUT HARD ERROR LOG
4303 030436 043737 030474 002304          BIC RTMASK,RETRY ;CLEAR RETRY FALGS USING RT MASK
4304 030444 005012          CLR (R2) ;CLEAR RETRY COUNTER
4305 030446 005237 002300          INC HARDER ;SET HARD ERROR FLAG
4306 030452 013701 027622 EB24U1: MOV LOGOFF,R1 ;GET ERR LOG OFFSET
4307 030456 062701 007424          ADD #SEK,R1 ;ERR LOG ADR=SEK LOG ADR+LOG OFFSET
4308 030462 063701 002240          ADD UUTOFF,R1 ;UUT ERR LOG ADR=UUT OFFSET+LOG ADR
4309 030466 005211          INC (R1) ;INCREMENT UUT ERROR LOG
4310 030470 000240          X24U1: NOP ;
4311 030472 000207          RTS PC ;RETURN
4312          ;-----
4313 030474 000000          RTMASK: 0 ;RETRY MASK
4314          ;MOD 2.4.U1 ----- END MODULE -----

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4317      .SBTTL MOD 2.4.4 - EVALUATE UNIT ERROR CODE
4318      ;-----
4319
4320 030476 013701 033544      EVUTEC: MOV      XER(UT,R1      ;GET ERR CODE & SAVE
4321 030502 042701 177400      BIC      #177400,R1      ;CLEAR TOP BYTE
4322 030506 005701      IFA244: TST      R1        ;IF ERRCODE
4323 030510 001443      BEQ      END244          ;NOT=0, THEN
4324 030512 006201      ASR      R1        ;SHIFT ERR CODE FOR LOOK UP
4325 030514 006201      ASR      R1        ;AND ADDRESSING
4326 030516 062701 030624      ADD      #ECCLAS,R1      ;CAL ERR TABLE CLASSIFICATION ADR
4327 030522 011102      MOV      (R1),R2        ;GET ERR CODE CLASSIFICATION WORD
4328 030524 105702      IFB244: TSTB     R2        ;IF LOWER BYTE
4329 030526 001003      BNE      IFC244          ;EQUALS 0, THEN
4330 030530 050237 002274      BIS      R2,ERRSY       ;SET ERR ONTO ERRSY
4331 030534 000431      BR       END244          ;BR TO END IF 'B'
4332 030536 122702 000300      IFC244: CMPB     #300,R2  ;IF LOW BYTE
4333 030542 001024      BNE      ELC244          ;EQUALS 300, THEN
4334 030544 022737 000003 030622  IFD244: CMP      #3,FNEV4   ;IF FUNCTION WAS
4335 030552 001004      BNE      IFE244          ;A READ, THEN
4336 030554 052737 002000 002276  BIS      #2000,ERRTY     ;SET READ ERR
4337 030562 000416      BR       END244          ;BR TO END IF 'B'
4338 030564 022737 000002 030622  IFE244: CMP      #2,FNEV4   ;IF FUNCTION WAS
4339 030572 001004      BNE      ELE244          ;A WRITE, THEN
4340 030574 052737 004000 002276  BIS      #4000,ERRTY     ;SET WRITE ERROR
4341 030602 000406      BR       END244          ;BR TO END IF 'B'
4342 030604 052737 040000 002276  ELE244: BIS      #40000,ERRTY ;SET UNK ERROR
4343 030612 000402      BR       END244          ;BR TO END IF 'B'
4344 030614 050237 002276      ELC244: BIS      R2,ERRTY  ;SET CLASSIFIED ERROR ONTO ERRTY
4345 030620 000207      END244: RTS      PC      ;RETURN
4346      ;-----
4347 030622 000000      FNEV4: 0                ;FUNCTION FOR EVALUATION
4348      ;-----
4349 030624 000000      ECCLAS: .WORD 0        ;ERR CODE # 00 ----> NOT USED (NO ERROR)
4350 030626 000001      .WORD 1                ;ERR CODE # 10 ----> SEEK
4351 030630 000001      .WORD 1                ;ERR CODE # 20 ----> SEEK
4352 030632 000000      .WORD 0                ;ERR CODE # 30 ----> NOT ASSIGNED
4353 030634 004000      .WORD 4000             ;ERR CODE # 40 ----> SYS ERR
4354 030636 000001      .WORD 1                ;ERR CODE # 50 ----> SEEK
4355 030640 002000      .WORD 2000            ;ERR CODE # 60 ----> SELF DIAG ERR
4356 030642 000300      .WORD 300             ;ERR CODE # 70 ----> READ OR WRITE ERR
4357 030644 004000      .WORD 4000            ;ERR CODE # 100 ----> SYS ERR
4358 030646 000300      .WORD 300             ;ERR CODE # 110 ----> READ OR WRITE ERR
4359 030650 000300      .WORD 300             ;ERR CODE # 120 ----> READ OR WRITE ERR
4360 030652 000300      .WORD 300             ;ERR CODE # 130 ----> READ OR WRITE ERR
4361 030654 000002      .WORD 2                ;ERR CODE # 140 ----> CRC ERR
4362 030656 000001      .WORD 1                ;ERR CODE # 150 ----> SEEK ERR
4363 030660 000300      .WORD 300             ;ERR CODE # 160 ----> READ OR WRITE ERR
4364 030662 000300      .WORD 300             ;ERR CODE # 170 ----> READ OR WRITE ERR
4365 030664 000002      .WORD 2                ;ERR CODE # 200 ----> CRC ERR
4366 030666 000000      .WORD 0                ;ERR CODE # 210 ----> NOT ASSIGNED
4367 030670 002000      .WORD 2000            ;ERR CODE # 220 ----> SELF DIAG ERR
4368 030672 004000      .WORD 4000            ;ERR CODE # 230 ----> SYS ERR
4369 030674 020000      .WORD 20000           ;ERR CODE # 240 ----> DENSITY ERR
4370 030676 020000      .WORD 20000           ;ERR CODE # 250 ----> DENSITY ERR
4371 030700 000000      .WORD 0                ;ERR CODE # 260 ----> NOT ASSIGNED
4372      ;MOD 2.4.4 ----- END MODULE -----

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4375      .SBTTL MOD 2.5 - OUTPUT ERROR TYPE
4376      -----
4377 030702 013737 002276 002604 OTERTP: MOV   ERRTY,ERRREG ;SET ERROR TYPE FOR PRINT OUT
4378 030710 013701 002276      MOV   ERRTY,R1   ;GET ERROR TYPE
4379 030714 005002      CLR   R2         ;CLEAR ERROR # COUNT
4380 030716 000240      BDA25: NOP          ;
4381 030720 032701 000001      IFA25: BIT    #1,R1 ;IF BIT #1
4382 030724 001405      BEQ   ELA25      ;EQUALS 1, THEN
4383 030726 010204      MOV   R2,R4     ;SAVE ERROR # COUNT
4384 030730 006304      ASL   R4        ;DOUBLE ERR # COUNT FOR ADDRESSING
4385 030732 062704 031616      ADD   #ET1,R4   ;SET ADDR FOR ERR MSG PRINT
4386 030736 000407      BR    THA25     ;BR TO THEN 'A'
4387 030740 000241      ELA25: CLC      ;CLEAR CARRY BIT
4388 030742 006201      ASR   R1        ;SHIFT ERR TYPE RIGHT
4389 030744 005202      INC   R2        ;INCREMENT ERROR # COUNT
4390 030746 022702 000017      CMP   #17,R2   ;DO UNTIL ERROR # COUNT
4391 030752 001361      BNE   BDA25     ;EQUALS 15, THEN
4392 030754 000507      BR    EIA25     ;BR TO END IF 'A'
4393 030756 005003      THA25: CLR    R3 ;CLEAR R3
4394 030760 010205      MOV   R2,R5     ;GET ERR#
4395 030762 062705 031656      ADD   #ETCLAS,R5 ;CAL. ERR# CLASSIFICATION ADR
4396 030766 111503      MOVB  (R5),R3   ;GET ERR# CLASSIFICATION
4397 030770 032703 000001      IFB25: BIT    #1,R3 ;IF SOFT ERR
4398 030774 001415      BEQ   IFC25     ;CLASS, THEN
4399 030776 005737 002300      TST   HARDER   ;IF HARD ERR
4400 031002 001015      BNE   ELB25     ;NOT SET, THEN
4401 031004 010237 002376      MOV   R2,ERRNBR ;SET ERR #
4402 031010 011437 002400      MOV   (R4),ERRMSG ;SET ERR MSG
4403 031014 012737 000003 002374      MOV   #SOFT,ERRTYP ;SET ERR TYP=SOFT
4404 031022 004737 002354      CALL  ERROR     ;CALL ERROR
4405 031026 000437      BR    EIC25     ;
4406 031030 032703 000002      IFC25: BIT    #2,R3 ;IF HARD ERR
4407 031034 001434      BEQ   EIC25     ;CLASS, THEN
4408 031036 052702 000040      ELB25: BIS    #40,R2 ;SET HARD ERROR #
4409 031042 010237 002376      MOV   R2,ERRNBR ;SET ERR #
4410 031046 011437 002400      MOV   (R4),ERRMSG ;SET ERR MSG
4411 031052 012737 000002 002374      MOV   #HARD,ERRTYP ;PRESET ERR TYP=HARD ERR
4412 031060 032737 000004 002264      IFF25: BIT    #EVL,FLGDRS ;IF DRS 'EVL' FLAG
4413 031066 001413      BEQ   EIF25     ;IS SET, THEN
4414 031070 005237 002302      INC   HDERCT    ;INCREMENT HARD ERROR CTR
4415 031074 023737 002302 002216      IFE25: CMP   HDERCT,DFTL ;IF DEVICE FATAL THRESHOLD
4416 031102 101005      BHI   EIF25     ;REACHED, THEN
4417 031104 012737 000001 002374      MOV   #DVFT,ERRTYP ;RESET ERR TYP=DEVICE FATAL
4418 031112 005037 002302      CLR   HDERCT    ;CLEAR HARD ERROR CTR
4419 031116 004737 002354      EIF25: CALL  ERROR ;CALL ERROR
4420 031122 005237 002300      INC   HARDER    ;SET HARD ERROR FLAG
4421 031126 013737 002276 002604      EIC25: MOV   ERRTY,ERRREG ;SET ERR TYPE FOR PRINT OUT
4422 031134 004737 002404      CALL  PRTER     ;CALL U.P.ERR - PRINT ERR INFO
4423 031140 013737 002276 021452      MOV   ERRTY,ERTSAV ;SAVE ERR TYP FOR DATA CK
4424 031146 005037 002276      CLR   ERRTY     ;CLEAR DEVICE ERR
4425 031152 004737 003034      CALL  XERPRT    ;CALL MOD U.PRT.B - PRINT ERR CODE
4426 031156 005737 002300      IFD25: TST   HARDER ;IF NOT A
4427 031162 001002      BNE   ELD25     ;HARDER, THEN
4428 031164 004737 031676      CALL  PTRTY     ;CALL 2.5.1 - PRINT RETRY #
4429 031170 005037 002300      ELD25: CLR   HARDER ;CLEAR HARD ERROR FLAG
4430 031174 000207      EIA25: RTS    PC ;RETURN
4431      -----

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4432
4433 031176      040      123      105  ERT1:  .ASCIZ / SEEK ERR/
4434 031210      040      103      122  ERT2:  .ASCIZ / CRC ERR/
4435 031221      040      103      113  ERT3:  .ASCIZ / CK SUM ERR/
4436 031235      040      104      101  ERT4:  .ASCIZ / DATA ERR/
4437 031247      040      125      116  ERT5:  .ASCIZ / UNASSG ERR/
4438 031263      040      104      105  ERT6:  .ASCIZ / DEL. DATA UNEXPECTED ERR/
4439 031315      040      104      105  ERT7:  .ASCIZ / DEL. DATA MISSING ERR/
4440 031344      040      125      116  ERT8:  .ASCIZ / UNASSG ERR/
4441 031360      040      125      116  ERT9:  .ASCIZ / UNK ERR/
4442 031371      040      106      111  ERT10: .ASCIZ / FILL OR EMPTY BUFFER ERR/
4443 031423      040      122      105  ERT11: .ASCIZ / READ ERR/
4444 031435      040      127      122  ERT12: .ASCIZ / WRITE ERR/
4445 031450      040      111      116  ERT13: .ASCIZ / INTERRUPT BUT NO DONE BIT ERR/
4446 031507      040      104      117  ERT14: .ASCIZ / DONE BIT BUT NO INTERRUPT ERR/
4447 031546      040      105      122  ERT15: .ASCIZ / ERROR, BUT NO ERR BIT SET/
4448 031601      040      105      122  ERT16: .ASCIZ / ERR BIT SET/

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4449
4450 031616      031176      ET1:  .EVEN
4451 031620      031210      .WORD  ERT1
4452 031622      031221      .WORD  ERT2
4453 031624      031235      .WORD  ERT3
4454 031626      031247      .WORD  ERT4
4455 031630      031263      .WORD  ERT5
4456 031632      031315      .WORD  ERT6
4457 031634      031344      .WORD  ERT7
4458 031636      031360      .WORD  ERT8
4459 031640      031371      .WORD  ERT9
4460 031642      031423      .WORD  ERT10
4461 031644      031435      .WORD  ERT11
4462 031646      031450      .WORD  ERT12
4463 031650      031507      .WORD  ERT13
4464 031652      031546      .WORD  ERT14
4465 031654      031601      .WORD  ERT15

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4466
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4468
4469 031656      001      ETCLAS: .BYTE 1      ;ERROR
4470 031657      001      .BYTE 1      ;SEEK          - TYPE - ERR#
4471 031660      002      .BYTE 2      ;CRC          - SOFT - 0 -32
4472 031661      001      .BYTE 1      ;CKSUM       - SOFT - 1 -33
4473 031662      000      .BYTE 0      ;DATA        - HARD - -34
4474 031663      002      .BYTE 2      ;UNASSIGNED  - SOFT - 3 -35
4475 031664      002      .BYTE 2      ;DEL. DATA UNEX - HARD - -37
4476 031665      000      .BYTE 0      ;DEL. DATA MISSING - HARD - -38
4477 031666      002      .BYTE 2      ;UNASSIGNED  -
4478 031667      002      .BYTE 2      ;UNK ERR     - HARD - -40
4479 031670      001      .BYTE 1      ;FILL/EMPTY BUFFER - HARD - -41
4480 031671      001      .BYTE 1      ;READ        - SOFT - 10-42
4481 031672      002      .BYTE 2      ;WRITE       - SOFT - 11-43
4482 031673      002      .BYTE 2      ;INTER-BUT NO DONE - HARD - -44
4483 031674      002      .BYTE 2      ;DONE-BUT NO INTER - HARD - -45
4484 031675      002      .BYTE 2      ;ERR-BUT NO ERR BIT - HARD - -46
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;MOD 2.5 ----- END MODULE -----

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.SBTTL MOD 2.5.1 - PRINT RETRY

```

-----
PTRTY: NOP
IFA251: TST RETRY ; IF RETRY
        BEQ END251 ; NOT=0, THEN
IFB251: BIT #1,RETRY ; IF RETRY
        BEQ IFC251 ; IS SEEK, THEN
        MOV SEEKRT,R2 ; SET SEEK RT COUNT
        MOV #MSKRT,R1 ; SET SEEK RT MSG
        BR EIB251 ; BR TO END IF 'B'
IFC251: BIT #2,RETRY ; IF RETRY
        BEQ IFE251 ; IS WRT, THEN
IFD251: BIT #30,RETRY ; IF RETRY
        BEQ ELD251 ; IS DATA OR CRC, THEN
IFG251: BIT #10,RETRY ; IF RETRY
        BEQ ELG251 ; IS DATA, THEN
        MOV DATART,R2 ; SET DATA RT COUNT
        MOV #MDWTRT,R1 ; SET DATA WRT MSG
        BR EIB251 ; BR TO END IF 'B'
ELG251: MOV CRCERT,R2 ; SET CRC RETRY COUNT
        MOV #MCWTRT,R1 ; SET CRC WRT MSG
        BR EIB251 ; BR TO END IF 'B'
ELD251: MOV WRTRT,R2 ; SET WRT RT COUNT
        MOV #MWTRT,R1 ; SET WRT RT MSG
        BR EIB251 ; BR TO END IF 'B'
IFE251: BIT #4,RETRY ; IF RETRY
        BEQ END251 ; IS READ, THEN
IFF251: BIT #30,RETRY ; IF RETRY
        BEQ ELF251 ; IS DATA OR CRC, THEN
IFH251: BIT #10,RETRY ; IF RETRY
        BEQ ELH251 ; IS DATA, THEN
        MOV DATART,R2 ; SET DATA RT COUNT
        MOV #MDRDRT,R1 ; SET DATA READ RT MSG
        BR EIB251 ; BR TO END IF 'B'
ELH251: MOV CRCERT,R2 ; SET CRC RETRY COUNT
        MOV #MCRDRT,R1 ; SET CRC READ MSG
        BR EIB251 ; BR TO END IF 'B'
ELF251: MOV READRT,R2 ; SET READ RT COUNT
        MOV #MRDRT,R1 ; SET READ RT MSG
EIB251: CALL PRTB1S ; PRINT RETRY # & TYPE
END251: RTS PC ; RETURN
-----
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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4569
 4570
 4571 032444 000240
 4572 032446 023737 002232 002230
 4573 032454 001003
 4574 032456 012737 000001 014020
 4575 032464 000207
 4576

```

.SBTTL MOD 3.0 - OUTPUT EXERCISE COMPLETE
-----
;
;OTEXCM: NOP
;          CMP      SUT,SDD      ;IF ALL SCHEDULED
;          BNE     END30        ;DRIVE DONE
;          MOV     #1,EXCMP     ;SET EXERCISE COMPLETE
;          RTS      PC          ;RETURN
;MOD 3.0 ----- END MODULE -----

```



```

4579      .SBTTL MOD 4.0 - OUTPUT SYSTEM ERROR
4580      ;-----
4581 032466 013701 002274 OTSYER: MOV     ERRSY,R1      ;GET SYSTEM ERR
4582 032472 000241          CLC             ;CLEAR CARRY BIT
4583 032474 006201          ASR      R1      ;SHIFT
4584 032476 000241          CLC             ;
4585 032500 006201          ASR      R1      ;      FUNCTION
4586 032502 006201          ASR      R1      ;      OUT
4587 032504 005002          CLR      R2      ;CLEAR ERR # COUNT
4588 032506 000240          BDA40: NOP
4589 032510 032701 000001 IFA40: BIT     #1,R1      ;IF BIT #1
4590 032514 001405          BEQ     ELA40     ;EQUALS 1, THEN
4591 032516 010204          MOV     R2,R4      ;SAVE ERROR # COUNT
4592 032520 006304          ASL     R4      ;DOUBLE ERR # COUNT FOR ADDRESSING
4593 032522 062704 033416          ADD     #SE1,R4     ;SET ADDR FOR ERR MSG PRINT
4594 032526 000406          BR      THA40     ;BR TO THEN 'A'
4595 032530 006201          ELA40: ASR     R1      ;SHIFT ERR TYPE RIGHT
4596 032532 005202          INC     R2      ;INCREMENT ERROR # COUNT
4597 032534 022702 000017          CMP     #17,R2     ;DO UNTIL ERR # COUNT
4598 032540 001362          BNE     BDA40     ;EQUALS 15, THEN
4599 032542 000452          BR      EIA40     ;BR TO END IF 'A'
4600 032544 010205          THA40: MOV     R2,R5      ;GET ERR#
4601 032546 062705 033450          ADD     #ESCLAS,R5  ;CAL. ERR# CLASSIFICATION ADR
4602 032552 111503          MOVVB  (R5),R3     ;GET ERR# CLASSIFICATION
4603 032554 032703 000002          IFB40: BIT     #2,R3      ;IF DEVICE FATAL
4604 032560 001415          BEQ     IFC40     ;ERROR, THEN
4605 032562 010205          MOV     R2,R5      ;GET ERR#
4606 032564 052705 000100          BIS     #100,R5    ;SET ERR CLASS=SYS
4607 032570 010537 002376          MOV     R5,ERRNBR  ;SET ERR#
4608 032574 011437 002400          MOV     (R4),ERRMSG ;SET ERR MSG
4609 032600 012737 000001 002374          MOV     #DVFT,ERRTYP ;SET DEVICE FATAL ERROR
4610 032606 004737 002354          CALL    ERROR      ;CALL ERROR
4611 032612 000417          BR      EIC40     ;BR TO END IF 'C'
4612 032614 032703 000004          IFC40: BIT     #4,R3      ;IF SYSTEM FATAL
4613 032620 001414          BEQ     EIC40     ;ERROR, THEN
4614 032622 010205          MOV     R2,R5      ;GET ERR#
4615 032624 052705 000200          BIS     #200,R5    ;SET ERR CLASS=SYS
4616 032630 010537 002376          MOV     R5,ERRNBR  ;SET ERR#
4617 032634 011437 002400          MOV     (R4),ERRMSG ;SET ERR MSG
4618 032640 012737 000000 002374          MOV     #SYFT,ERRTYP ;SET ERR TYP=SYS FATAL
4619 032646 004737 002354          CALL    ERROR      ;CALL ERROR
4620 032652 013737 002274 002604          EIC40: MOV     ERRSY,ERRREG ;SET SYS ERR FOR PRINT OUT
4621 032660 004737 002404          CALL    PRterr     ;CALL U.P.ERR - PRINT ERR INFO
4622 032664 004737 003034          CALL    XERPRT     ;CALL MOD U.PRT.B - PRINT ERROR CODE
4623 032670 000240          EIA40: NOP
4624 032672 005037 002274          CLR     ERRSY      ;CLEAR SYS ERRORS
4625 032676 000207          END40: RTS      PC
4626      ;-----

```

```

4629
4630
4631 032700      040      116      117  SYSE4: .ASCIZ / NO DONE BIT ON INITIALIZE/
4632 032733      040      116      117  SYSE5: .ASCIZ / NO DONE BIT ON FUNCTION/
4633 032764      040      116      117  SYSE6: .ASCIZ / NO DRIVE READY BIT/
4634 033010      040      116      117  SYSE7: .ASCIZ / NO SIDE READY BIT/
4635 033033      040      116      117  SYSE8: .ASCIZ / NO DONE BIT AFTER READ STATUS/
4636 033072      040      127      122  SYSE9: .ASCIZ / WRONG DRIVE RESPONDING/
4637 033122      040      127      122  SYSE10: .ASCIZ / WRONG SIDE RESPONDING/
4638 033151      040      125      116  SYSE11: .ASCIZ / UNUSED/
4639 033161      040      125      116  SYSE12: .ASCIZ / UNUSED/
4640 033171      040      104      111  SYSE13: .ASCIZ / DISKETTE WRONG DENSITY ERR/
4641 033225      040      104      105  SYSE14: .ASCIZ / DENSITY ERR/
4642 033242      040      124      111  SYSE15: .ASCIZ / TIME OUT ON "TR" OR "DONE" BIT/
4643 033302      040      125      116  SYSE16: .ASCIZ / UNCLASSIFIED SYSTEM ERROR/
4644 033335      045      116      045  FUNCT: .ASCIZ /%N%AFUNCTION CODE:%O3/
4645 033363      045      116      045  ERRORS: .ASCIZ /%N%ASYSTEM ERROR REG=%B%N/
4646
4647 033416 032700      SE1: .EVEN
4648 033420 032733      .WORD SYSE4
4649 033422 032764      .WORD SYSE5
4650 033424 033010      .WORD SYSE6
4651 033426 033033      .WORD SYSE7
4652 033430 033072      .WORD SYSE8
4653 033432 033122      .WORD SYSE9
4654 033434 033151      .WORD SYSE10
4655 033436 033161      .WORD SYSE11
4656 033440 033171      .WORD SYSE12
4657 033442 033225      .WORD SYSE13
4658 033444 033242      .WORD SYSE14
4659 033446 033302      .WORD SYSE15
4660
4661
4662
4663 033450      004      ESCLAS: .BYTE 4
4664 033451      002      .BYTE 2
4665 033452      002      .BYTE 2
4666 033453      002      .BYTE 2
4667 033454      004      .BYTE 4
4668 033455      004      .BYTE 4
4669 033456      000      .BYTE 0
4670 033457      000      .BYTE 0
4671 033460      002      .BYTE 2
4672 033461      002      .BYTE 2
4673 033462      004      .BYTE 4
4674 033463      004      .BYTE 4
4675 033464      004      .BYTE 4
4676
4677

```

```

;ERROR
;-----
;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 -----

```

```

4680 .SBTTL - MOD INTR.1 - INTERRUPT HANDLER #0
4681 -----
4682 033466 013737 002220 033542 INTH0: MOV UOADR,INCSAD ;SET UNIT #0 ADDRESS
4683 033474 004737 033516 CALL SVUTRG ;CALL MOD U.INTR.U - SAVE UNIT REG
4684 033500 000002 RTI ;
4685 ;MOD U.INTR.1 ----- END MODULE -----
4686
4687 .SBTTL - MOD INTR.2 - INTERRUPT HANDLER #1
4688 -----
4689 033502 013737 002222 033542 INTH1: MOV U1ADR,INCSAD ;SET UNIT #1 ADDRESS
4690 033510 004737 033516 CALL SVUTRG ;CALL MOD U.INTR.U - SAVE UNIT REG
4691 033514 000002 RTI ;
4692 ;MOD U.INTR.2 ----- END MODULE -----
4693
4694 .SBTTL MOD U.INTR.U - SAVE UNIT REG
4695 -----
4696 033516 012737 000001 025226 SVUTRG: MOV #1,DNFLAG ;SET DONE FLAG
4697 033524 013701 033542 MOV INCSAD,R1 ;SAVE UUT ADDRESS
4698 033530 012137 002246 MOV (R1)+,CSRUUT ;SAVE UUT CSR
4699 033534 011137 002250 MOV (R1),ESRUUT ;SAVE UUT ESR
4700 033540 000207 RTS PC ;RETURN
4701 -----
4702 033542 000000 INCSAD: 0 ;INTERRUPTING UNIT CSR ADDRESS
4703 ;MOD U.I.U ----- END MODULE -----
4704
4705 .SBTTL - READ ERROR CODE BUFFER
4706 -----
4707 033544 000 XERUUT: .BYTE 0 ;ERROR CODE UUT
4708 033545 000 WC: .BYTE 0 ;WORD COUNT UUT
4709 033546 000 CTKO: .BYTE 0 ;CUR TRK DRV#0
4710 033547 000 CTK1: .BYTE 0 ;CUR TRK DRV#1
4711 033550 000 TTRK: .BYTE 0 ;TARGET TRK
4712 033551 000 TSEC: .BYTE 0 ;TARGET SEC
4713 033552 000 SFTSTS: .BYTE 0 ;MICRO CODE SOFT STATUS
4714 033553 000 BTRK: .BYTE 0 ;BAD TRK ADR
4715 -----
4716
4717 .SBTTL - TRACK TABLE
4718 -----
4719 033554 000232 TRKTBL: .REPT 154. ;TRACK TABLE
4722 -----
4723
4724 .SBTTL - DATA BUFFERS
4725 -----
4726 034006 000400 DATPAT: .REPT 256. ;DATA PATTERN
4729 034406 000400 DATBUF: .REPT 256. ;DATA BUFFER
4732 -----
4733 035006

```

ENDTST

4736
4747
4748
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4785
4786
4787
4788
4789
4790
4791
4792
4793
4794 035010
4795
4796 035012
4797 035022
4798 035032
4799 035044
4800
4801 035056
4802
4808 035060
4809
4810 035060
4811 035073
4812 035106
4813 035121
4814
4815

122 130 040
126 105 103
104 122 111
105 130 120

```
.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
```

4824
4825
4826
4827
4828
4829
4830
4831
4832
4833
4834
4835 035134
4836
4837 035136
4838 035144
4839 035146
4840 035154
4841 035166
4842 035200
4843 035212
4844 035224
4845 035232
4846 035240
4847 035246
4848 035250
4849 035256
4850 035264
4851 035272
4852 035300
4853 035306
4854 035310
4855 035322
4856 035334
4857 035342
4858 035344
4859 035356
4860 035370
4861 035376
4862
4869
4870
4871
4872 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,D,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

```

4875                                     ;-----
4876                                     CR==15                               ;CARRIAGE RETURN
4877                                     LF==12                               ;LINE FEED
000015
000012
4878 035400      122      130      130  MSG5:  .ASCIIZ  /RXXX EXPANSION TYPE <CR> /
4879 035432      110      105      114  MSG6:  .ASCIIZ  /HELP TEST SETUP /
4880 035453      105      130      105  MSG7:  .ASCII   /EXERCISE OPTIONS/<CR><LF>
4881 035475      040      040      040  .ASCII   / 0 = WRITE-READ-DATA CK & READ-DATA CK/<CR><LF>
4882 035547      040      040      040  .ASCII   / 1 = WRITE ONLY/<CR><LF>
4883 035572      040      040      040  .ASCII   / 2 = WRITE-READ/<CR><LF>
4884 035615      040      040      040  .ASCII   / 3 = WRITE-READ-DATA CHECK/<CR><LF>
4885 035653      040      040      040  .ASCII   / 4 = READ-DATA CHECK ONLY/<CR><LF>
4886 035710      040      040      040  .ASCII   / 5 = READ ONLY (CRC CHECK)/<CR><LF>
4887 035746      040      040      040  .ASCII   / 6 = WRITE-READ-DATA CHECK ON ALTERNATE DRIVES/<CR><LF>
4888 036030      104      101      124  .ASCII   /DATA PATTERN OPTIONS/<CR><LF>
4889 036056      040      040      040  .ASCII   / 0 = RANDOM/<CR><LF>
4890 036075      040      040      040  .ASCII   / 1 = ZEROS/<CR><LF>
4891 036113      040      040      040  .ASCII   / 2 = ONES/<CR><LF>
4892 036130      040      040      040  .ASCII   / 3 = FLOATING ZERO/<CR><LF>
4893 036156      040      040      040  .ASCII   / 4 = FLOATING ONE/<CR><LF>
4894 036203      040      040      040  .ASCII   / 5 = 125/<CR><LF>
4895 036217      040      040      040  .ASCII   / 6 = 333/<CR><LF>
4896 036233      124      122      101  .ASCII   /TRACK SEQUENCE OPTIONS/<CR><LF>
4897 036263      040      040      040  .ASCII   / 0 = RANDOM/<CR><LF>
4898 036302      040      040      040  .ASCII   / 1 = INCREMENT O.D./<CR><LF>
4899 036331      040      040      040  .ASCII   / 2 = DECREMENT I.D./<CR><LF>
4900 036360      040      040      040  .ASCII   / 3 = INCREMENT O.D.-DECREMENT I.D./<CR><LF>
4901 036426      040      040      040  .ASCII   / 4 = BOUNCE BETWEEN I.D. & O.D./<CR><LF>
4902 036471      040      040      040  .ASCII   / 5 = BOUNCE BETWEEN INCR. O.D. & DECR. I.D./<CR><LF>
4903 036550      040      040      040  .ASCII   / 6 = BOUNCE BETWEEN O.D. & DECR. I.D./<CR><LF>
4904 036621      040      040      040  .ASCII   / (O.D. = OUTSIDE DIA. & I.D. = INSIDE DIA.)/<CR><LF>
4905 036703      055      076      104  .ASCII   /->DEVICE FATAL THRESHOLD LVL=NO. OF HARD ERRS THAT CAUSE DEVICE FATAL ERR/<
4906 037016      040      040      111  .ASCII   / IF DRS 'EVL' FLAG IS SET, BUT HARD ERR WILL STILL LOG AS A HARD ERR./<CR>
4907 037126      040      040      124  .ASCII   / THE 'EVL' FLAG WILL CAUSE 10 RETRIED SOFT ERRS TO BECOME A HARD ERR/<CR><
4908 037235      124      131      120  .ASCIIZ  /TYPE "CR" TO CONTINUE/
4909 037263      105      130      105  MSG8:  .ASCIIZ  /EXERCISE # (0-6)/
4910 037312      104      101      124  MSG11: .ASCIIZ  /DATA PATTERN # (0-6)/
4911 037341      124      122      101  MSG14: .ASCIIZ  /TRACK SEQUENCE # (0-6)/
4912 037370      104      105      126  MSG9:  .ASCIIZ  /DEVICE FATAL THRESHOLD LEVEL/
4913 037425      122      125      116  MSG15: .ASCIIZ  /RUN TEST IN DOUBLE DENSITY /
4914 037463      122      125      116  MSG16: .ASCIIZ  /RUN TEST IN DELETED DATA MODE/
4915 037521      101      116      131  MSG17: .ASCIIZ  /ANY PROGRAM CONTROL FLAGS /
4916 037557      040      040      040  MSG18: .ASCIIZ  / REPLY ON ERROR, LOG SOFT & HARD ERRS/
4917 037627      040      040      040  MSG19: .ASCIIZ  / RECALIBRATE ON SEEK ERRORS /
4918 037677      040      040      040  MSG20: .ASCIIZ  / PRINT ONLY 10 DATA ERRORS & CONTINUE/
4919 037747      040      040      040  MSG21: .ASCIIZ  / CLEAR STATISTICAL TABLES NEXT PASS /
4920 040017      115      117      104  MSG22: .ASCIIZ  /MODIFY TRACK ADDRESS LIMITS /
4921 040055      040      040      040  MSG23: .ASCIIZ  / OUTER DIAMETER ADR #/
4922 040105      040      040      040  MSG24: .ASCIIZ  / INNER DIAMETER ADR #/
4923 040135      115      117      104  MSG25: .ASCIIZ  /MODIFY SECTOR ADDRESS LIMITS /
4924 040173      040      040      040  MSG26: .ASCIIZ  / MIN. SECTOR ADR #/
4925 040220      040      040      040  MSG27: .ASCIIZ  / MAX. SECTOR ADR #/
;-----
4926                                     .EVEN
4927

```

4930
4931
4932 040246 000000
4933 040450
4934
4935
4942
4943
4944 040450
040454
4945 040454
4946
4947 040454
4948 040454
4949 040460 177170
4950 040462 000264
4951 040464 000000
4952 040466 000000
4953 040470
4954 040470
4955 040474 177170
4956 040476 000264
4957 040500 000001
4958 040502 000000
4959 040504
4960 040504
4961 000001

```
.SBTTL - PATCH AREA  
:-----  
PATCH: 0 ;PATCH AREA  
.=.+200  
:-----  
  
LASTAD  
L$LAST:: ENDMOD  
  
BGNSETUP 2  
BGNPTAB  
177170  
264  
0  
0  
ENDPTAB  
BGNPTAB  
177170  
264  
1  
0  
ENDPTAB  
ENDSETUP  
  
.END
```

PARAMETER CODING
SYMBOL TABLE

ABORT	002270	BYTNUM	026052	C\$GPHR=	000042	DUC20	021000	EF09	=	000011	G			
ADR	= 000020	G	CKDVAV	014742	C\$GPLO=	000030	DUMSG1	013442	EF10	=	000012	G		
ADRS	025024	CKSML	007354	C\$GPRI=	000040	DUMSG2	013503	EF11	=	000013	G			
ADRTST	012774	CKSMRT	002310	C\$INIT=	000011	DVDNCK	021442	EF12	=	000014	G			
ADVTRK	021440	CLASWD	027620	C\$INLP=	000020	DVFT	= 000001	G	EF13	=	000015	G		
ASSEMB=	000010	CLRSTA	020656	C\$MANI=	000050	DVTST	024404	EF14	=	000016	G			
BAU234	025122	CMD	002332	C\$MEM =	000031	DX	025222	EF15	=	000017	G			
BC00	013706	CNSCLC	023316	C\$MSG =	000023	EA1211	016004	EF16	=	000020	G			
BDAU23	025246	CNTKLC	023320	C\$OPEN=	000034	EA243	027264	EG1211	015526					
BDA121	014756	CONTRL	013564	C\$PNTB=	000014	EA2433	030210	EH1211	015750					
BDA133	020666	CR	= 000015	G	C\$PNTF=	000017	EA2434	030274	EIA11	014126				
BDA241	025514	CRC	007434	C\$PNTS=	000016	EB24U1	030452	EIA12	014374					
BDA25	030716	CRCBAD	007444	C\$PNTX=	000015	EB243	027406	EIA121	015232					
BDA26	032426	CRCBRT	002312	C\$QIO =	000377	EB2433	030160	EIA24	025374					
BDA40	032506	CRCERT	002314	C\$RDBU=	000007	ECCLAS	030624	EIA25	031174					
BDBU23	025252	CSADR	025034	C\$REFG=	000047	ECLG	007604	EIA40	032670					
BDB20	021014	CSEC	023276	C\$RESE=	000033	ECTAB	003116	EIB121	015050					
BDB241	026034	CSRADR	025332	C\$REVI=	000003	EC1	003170	EIB20	021354					
BDVSCD	021434	CSREV	027072	C\$RFLA=	000021	EC10	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	G	CTK1	033547	C\$SPRI=	000041	EC13	003714	EIB26	032416				
BIT00	= 000001	G	CTRK	023306	C\$SVEC=	000037	EC14	003773	EIC11	011756				
BIT01	= 000002	G	CURSEC	023710	C\$TPRI=	000013	EC15	004021	EIC11	014212				
BIT02	= 000004	G	CURTRK	024240	DAERCT	026054	EC16	004107	EIC121	015212				
BIT03	= 000010	G	CVSTUT	004756	DARDRT	002320	EC17	004153	EIC20	021106				
BIT04	= 000020	G	CVUNIT	004752	DATA	007474	EC2	003236	EIC25	031126				
BIT05	= 000040	G	CVUTST	004654	DATART	002316	EC20	004207	EIC40	032652				
BIT06	= 000100	G	C\$AU =	000052	DATASB	026056	EC21	004254	EID121	015226				
BIT07	= 000200	G	C\$AUTO=	000061	DATAWS	026060	EC22	004311	EID23	023032				
BIT08	= 000400	G	C\$BRK =	000022	DATA0	017520	EC23	004360	EID232	024162				
BIT09	= 001000	G	C\$BSEG=	000004	DAT01	017536	EC24	004413	EID233	024366				
BIT1	= 000002	G	C\$BSUB=	000002	DATBUF	034406	EC2432	030064	EIE12	014564				
BIT10	= 002000	G	C\$CEFG=	000045	DATBYT	017746	EC25	004442	EIE21	022146				
BIT11	= 004000	G	C\$CLCK=	000062	DATPAT	034006	EC3	003304	EIE22	022456				
BIT12	= 010000	G	C\$CLEA=	000012	DAWTRT	002322	EC4	003332	EIE23	023134				
BIT13	= 020000	G	C\$CLOS=	000035	DBADR	025032	EC5	003400	EIF11	012224				
BIT14	= 040000	G	C\$CLP1=	000006	DDERCT	002330	EC6	003451	EIF20	021154				
BIT15	= 000040	G	C\$CVEC=	000036	DELAY	025230	EC7	003477	EIF21	022122				
BIT2	= 000004	G	C\$DCLN=	000044	DELDT	002244	EDB241	026042	EIF241	025742				
BIT3	= 000010	G	C\$DODU=	000051	DEN	002242	EDC20	021404	EIF25	031116				
BIT4	= 000020	G	C\$DRPT=	000024	DFPTBL	002160	G	ED00	013746	EIH20	021232			
BIT5	= 000040	G	C\$DU =	000053	DFTL	002216	ED1211	016000	EIH232	024012				
BIT6	= 000100	G	C\$EDIT=	000003	DIAGMC=	000000	ED2341	025102	EIH234	024712				
BIT7	= 000200	G	C\$ERDF=	000055	DLTER	007504	EF.CON=	000036	G	EI121	022116			
BIT8	= 000400	G	C\$ERHR=	000056	DLY	025224	EF.NEW=	000035	G	EI1231	023370			
BIT9	= 001000	G	C\$ERRO=	000060	DMSG1	026064	EF.PWR=	000034	G	EIJ23	023200			
BK243	027550	C\$ERSF=	000054	DMSG2	026161	EF.RES=	000037	G	EIK234	024560				
BOE	= 000400	G	C\$ERSO=	000057	DNBIT =	000040	G	EF.STA=	000040	G	EIM241	025702		
BRONPT	017462	C\$ESCA=	000010	DNFLAG	025226	EF01	= 000001	G	EI243	027576				
BRONTK	020126	C\$ESEG=	000005	DRIVEN	015270	EF02	= 000002	G	ELA10	014054				
BTHDRV	021432	C\$ESUB=	000003	DRVFN	021444	EF03	= 000003	G	ELA11	014120				
BTRK	033553	C\$ETST=	000001	DRVTST	023324	EF04	= 000004	G	ELA12	014270				
BTRP4	= 000004	G	C\$EXIT=	000032	DUA121	015246	EF05	= 000005	G	ELA20	020774			
BTRP6	= 000006	G	C\$GETB=	000026	DUA26	032434	EF06	= 000006	G	ELA231	023462			
BUFERL	007364	C\$GETW=	000027	DUB20	021370	EF07	= 000007	G	ELA241	025500				
BYTCNT	026050	C\$GMAN=	000043			EF08	= 000010	G	ELA25	030740				

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SYMBOL TABLE

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SEQ 0104

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	GTDFN	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	013714
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	IAREC	005112	IFA244	030506
ELJ21	022064	ERT3	031221	F\$JMP =	000050	IA00	013666	IFA25	030720
ELK11	012146	ERT4	031235	F\$MOD =	000000	IA1211	015324	IFA251	031700
ELK20	020744	ERT5	031247	F\$MSG =	000011	IA24U1	030360	IFA26	032354
ELK234	024552	ERT6	031263	F\$PROT=	000021	IA243	027242	IFA40	032510
ELI1	012210	ERT7	031315	F\$PWR =	000017	IA2431	027672	IFB11	011710
ELL20	021270	ERT8	031344	F\$RPT =	000012	IA2432	027724	IFB10	014024
ELM242	026650	ERT9	031360	F\$SEG =	000003	IA2433	020114	IFB12	014316
ELN21	021704	ESCLAS	033450	F\$SOFT=	000005	IA2434	030234	IFB121	015010
ENDCVT	004750	ESREV	027074	F\$SRV =	000010	IBATDP	012574	IFB13	017342
ENDI1	012324	ESRUUT	002250	F\$SUB =	000002	IBE =	010000 G	IFB20	021036
ENDLD	017742	ETCLAS	031656	F\$SW =	000014	IBU234	025126	IFB21	021546
ENDRPT	005406	ETSAV	027606	F\$TEST=	000001	IB00	013700	IFB22	022332

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SYMBOL TABLE

IFB23	022606	IFE251	032016	IFM20	021356	ITER2	017116	LOE	=	040000	G			
IFB231	023504	IFF11	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	I1ATDP	012644	ISPTAB	=	000041		LSENV1	002044	G		
IFC242	026266	IFH121	015076	I11211	015662	ISPWR	=	000041		LSERRT	002374	G		
IFC244	030536	IFH20	021210	I1243	027516	ISRPT	=	000041		LSETP	002102	G		
IFC25	031030	IFH21	021752	I1JATDP	012660	ISSEG	=	000041		LSEXP1	002046	G		
IFC251	031730	IFH23	023154	I1J1211	015672	ISSETU	=	000041		LSEXP4	002064	G		
IFC40	032614	IFH231	023432	I1J243	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	IF111	012104	INDITK	002210	LAREC		005130		LSHW	002160	G		
IFD23	022742	IF1121	015136	INIT	011250	LA2432		030006		LSICP	002104	G		
IFD231	023544	IF120	021064	INITER	011470	LA2433		030176		LSINIT	011250	G		
IFD232	024146	IF121	021774	INITL	014016	LBU234		025154		LSLADP	002026	G		
IFD233	024344	IF123	022552	INITTK	024252	LB1211		015366		LSLAST	040454	G		
IFD234	024612	IF1231	023346	INMSG2	012332	LB24U1		030424		LSLOAD	002100	G		
IFD241	025570	IF1241	025462	INMSG3	012432	LB2432		027762		LSLUN	002074	G		
IFD242	026444	IF1242	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		LSPRT	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	LSSOFT	035136	G		
IFE23	023064	IFK234	024532	ISR	=	000100	G	LF00		014010		LSSPC	002056	G
IFE232	024170	IFK241	025770	ITCSAD		015272		LH1211		015742		LSSPCP	002020	G
IFE233	024302	IFK242	026574	ITDBAD		015274		LINECT		005636		LSSPTP	002024	G
IFE234	024744	IFL11	012164	ITDROP		016064		LINES		005640		LSSTA	002030	G
IFE241	025604	IFL20	021246	ITERMG		016132		LINTYP		005642		LSSW	002172	G
IFE242	026460	IFL21	021476	ITERR		016016		LI1211		015732		LSTEST	002114	G
IFE244	030564	IFL241	026000	ITERUT		016153		LI243		027572		LSTIML	002014	G
IFE25	031074	IFL242	026656	ITER1		017032		LOAD		017704		LSUNIT	002012	G

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SEQ 0106

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	TBPRCT	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	PRTB0S	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	PRTERR	002404		SEQ5	020340	THF231	023560	
L10017	035400	OSBGNS=	000001	PRTHDR	005414		SEQ6	020422	THF241	025624	
L10020	040460	OSDU =	000001	PRT1	005504		SEQ7	020476	TKTBPT	020634	
L10021	040474	OSERRT=	000001	PRT2	005506		SETUP	011364	TKTL	024242	
L10022	040470	OSGNSW=	000001	PTDAT1	006243		SE1	033416	TKXX	010070	
L10024	040504	OSPOIN=	000001	PTEC	006200		SFERLG	030344	TRACK	002254	
MAXSEC	002214	OSSETU=	000001	PTECN	006327		SFERR	021446	TRAP	013260	
MAXTRK	024234	PAR	006026	PTFMN1	006315		SFPTBL	002172	TRBIT =	000200	G
MCRDRT	032321	PAT	017750	PTHEAD	026062		SFTSTS	033552	TRKADR	025036	
MCWTRT	032270	PATCH	040246	PTRDSC	006116		SOFT =	000003	TRKCNT	020636	G
MDRDRT	032213	PAT125	017622	PTRTY	031676		SSEC	023664	TRKDN	002260	
MDWTRT	032134	PAT333	017646	PTTK	006225		STCNTR	027616	TRKDNF	024230	
MINSEC	002212	PG	017524	PTTKN	006343		STDVDN	032352	TRKINC	024236	
MINTRK	024232	PLOC	011604	PTUNT1	006253		STERRG	027614	TRKSEQ	002202	
MRDRT	032244	PNT =	001000	PTUNT2	006274	G	STKSEQ	017752	TRKTBL	033554	
MSG1	035060	POWERF=	000001	PTWTSC	006147	G	STSCDN	023712	TRPMS1	013144	
MSG11	037312	PREPT1	006002	PT19SP	006105		STSCFG	023662	TSVCT	022162	
MSG14	037341	PREPT2	006030	PT20SP	006074		STSTPA	017376	TSEC	033551	
MSG15	037425	PREPT3	006050	RANDAT	017656		SUM	017744	TST	021422	
MSG16	037463	PRESCK	020536	RANGEN	004560		SUT	002232	TSTCK	027626	
MSG17	037521	PRESTK	020642	RANUM	004652		SUTCV	004754	TSTEV	025410	
MSG18	037557	PRI =	002000	RAN1	004646	G	SUTDRP	013440	TSTN	002176	
MSG19	037627	PRIDXX	006360	RAN2	004650		SUTPOS	015302	TSTPAT	002200	
MSG2	035073	PRID01	006426	RD	007454		SUTPTR	021426	TSTPTR	022152	
MSG20	037677	PRID02	006455	RDERCD	005026		SVCGBL=	000000	TSTSUT	022502	
MSG21	037747	PRID03	006504	RDYWD	025330		SVCINS=	177777	TSTWD	022156	
MSG22	040017	PRID04	006533	READRT	002324		SVCSUB=	177777	TTRK	033550	
MSG23	040055	PRID05	006562	READSC	007314		SVCTAG=	177777	T\$ARGC=	000004	
MSG24	040105	PRID06	006611	RECCMD	005136		SVCTST=	177777	T\$CODE=	001004	
MSG25	040135	PRID07	006640	REFCMD	015264		SVUTRG	033516	T\$ERRN=	000000	
MSG26	040173	PRID08	006667	REFDRV	015306		SWREG	002204	T\$EXCP=	000000	
MSG27	040220	PRID09	006716	REPORT	005140		SYFT =	000000	T\$FLAG=	000041	
MSG3	035106	PRID10	006745	RESTAR=	000002	G	SYSERR=	004000	T\$FREE=	040504	
MSG4	035121	PRID11	006774	RESTK	021450		SYSE10	033122	T\$GMAN=	000000	
MSG5	035400	PRID12	007023	RETRY	002304		SYSE11	033151	T\$HILI=	000032	
MSG6	035432	PRID13	007052	RTMASK	030474		SYSE12	033161	T\$LAST=	000001	
MSG7	035453	PRID14	007101	RTOFF	027624		SYSE13	033171	T\$LLOI=	000001	
MSG8	037263	PRID15	007130	RXXX	002172		SYSE14	033225	T\$LSYM=	010000	
MSG9	037370	PRID16	007157	RX2BIT=	004000	G	SYSE15	033242	T\$LTNO=	000001	
MSKRT	032110	PRID17	007206	RYDLY	025326		SYSE16	033302	T\$NEST=	177777	
MWTRT	032166	PRID18	007235	RYDX	025324		SYSE4	032700	T\$NS0 =	000000	
NEWTRK	020572	PRID19	007264	SAVDLY	016014		SYSE5	032733	T\$NS1 =	000005	
NOERL	007374	PRI00 =	000000	SCPSCT	023660	G	SYSE6	032764	T\$NS2 =	000003	
NONE	004506	PRI01 =	000040	SCSYEX	020676	G	SYSE7	033010	T\$PCNT=	000000	

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SEQ 0107

TSPTAB= 010023	TSSINI= 010006	UDU234 025156	UT11 002344	XERUUT 033544
TSPTHV= 000002	TSSMSG= 010003	U:243 027412	UUT 002234	XER1 002663
TSPTNU= 000002	TSSPC = 000002	UG00 013766	UUTADR 002236	XER2 002744
TSSAVL= 177777	TSSPRO= 010005	UKINT 007404	UUTOFF 002240	XID 020646
TSSEGL= 177777	TSSPTA= 010023	UK243 027554	UOADR 002220	XOD 020644
TSSEKO= 010003	TSSRPT= 010004	UNIT 002334	UOJECT 002224	XPG 017554
TSSIZE= 000014	TSSSEG= 010003	UNITDP 013436	U1ADR 002222	XPSUN0 014700
TSSUBN= 000002	TSSSOF= 010017	UNITST 005024	U1VECT 002226	XPSUN1 014740
TSTAGL= 177777	TSSSUB= 010015	UNPKHP 011656	VALWD 025030	XREC 005134
TSTAGN= 010025	TSSSW = 010001	UNT 012330	WATCH 025104	XUPSCT 030340
TSTEMP= 000000	TSSTES= 010013	UNTCB 015300	WC 033545	XU23 025322
TSTEST= 000001	TOMSG 013124	UNTCNT 015276	WDCNT 002252	XU234 025212
TSTSTM= 177777	T1 013564 G	UNTCOD 012326	WDCT 023326	XXPG 017630
TSTSTS= 000001	T1.1 013566	UPDVST 027230	WDOT 023330	XSALWA= 000000
TSSAU = 010012	T1.2 013706	UPSECT 030216	WRDS 025022	XSALS= 000040
TSSAUT= 010010	UAM = 000200 G	UTCNT 005412	WRITSC 007334	XSOFFS= 000400
TSSCLE= 010007	UAU234 025162	UTSCDN 023704	WRT 007464	XSTRUE= 000020
TSSDAT= 010024	UC00 013752	UTTST 005410	WRTRT 002326	X1211 016012
TSSDU = 010011	UDCRST 027722	UT00 002336	XATDP 012766	X24U1 030470
TSSHAR= 010016	UDHDST 027670	UT01 002340	XDVTST 022504	X2431 027720
TSSHW = 010000	UDSFST 030072	UT10 002342	XERPRT 003034	X2433 030214

. ABS. 040504 000
ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 31523 WORDS (124 PAGES)

DYNAMIC MEMORY: 20308 WORDS (78 PAGES)

ELAPSED TIME: 00:07:33

CZR XDB.BIN/DS:GBL/EN:AMA:ABS,CZR XDB.LST/CR/-SP/NL:CND:MD:BEX-LB1:[1,1]SVC/MLB,SY:[203,71]CZR XDB.MAC

CZRxDB		CREATED BY MACRO ON 1-AUG-79 AT 09:40		PAGE 1		E 9				
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	REF	V01	SEQ 0108				
ABORT		002270	#22-1111 *51-1909 *51-1924 57-2092 57-2115 *57-2126 *59-2149 59-2153 *61-2189 *68-2334 68-2351 68-2358 68-2365 68-2371 *72-2495							
ADR	=	000020 G	#20-979							
ADRS		025024	*108-3676 *108-3687 *108-3695 *108-3705 *108-3710 *108-3715 *108-3724 #108-3731 108-3752							
ADRTST		012774	57-2091 57-2114 #59-2148							
ADVTRK		021440	*88-3071 *88-3092 88-3095			*88-3103	#88-3124			
ASSEMB	=	000010	17-782 17-782							
BAU234		025122	#110-3763 110-3773							
BC00		013706	#68-2353 68-2368							
BDAU23		025246	#110-3794 110-3800							
BDA121		014756	#74-2536 74-2584							
BDA133		020666	#86-3020 86-3022							
BDA241		025514	#114-3854 114-3883							
BDA25		030716	#132-4380 132-4391							
BDA26		032426	#136-4560 136-4563							
BDA40		032506	#140-4588 140-4598							
BDBU23		025252	#110-3795 110-3798							
BDB20		021014	88-3047 #88-3052 88-3112							
BDB241		026034	#114-3895 114-3898							
BDVSCD		021434	*88-3038 88-3089 *88-3091 #88-3122 *100-3555 *100-3557							
BF243		027322	120-4079 #120-4081 120-4101							
BG00		013566	#68-2332 68-2370							
BIT0	=	000001 G	#20-979 #20-1010 20-1061 53-1989 53-2012							
BIT00	=	000001 G	#20-979 20-979 #20-999 20-1010							
BIT01	=	000002 G	#20-979 20-979 #20-998 20-1009							
BIT02	=	000004 G	#20-979 20-979 #20-997 20-1008 90-3150 96-3381 122-4216 128-4290							
BIT03	=	000010 G	#20-979 20-979 #20-996 20-1007 96-3388 122-4199							
BIT04	=	000020 G	#20-979 20-979 #20-995 20-1006 122-4212 122-4215							
BIT05	=	000040 G	#20-979 20-979 20-1005							
BIT06	=	000100 G	#20-979 20-979 #20-993 20-1004							
BIT07	=	000200 G	#20-979 20-979 #20-992 20-1003							
BIT08	=	000400 G	#20-979 20-979 #20-991 20-1002							
BIT09	=	001000 G	#20-979 20-979 #20-990 20-1001							
BIT1	=	000002 G	#20-979 #20-1009 20-1060 53-1998 53-2020 122-4213							
BIT10	=	002000 G	#20-979 #20-989							
BIT11	=	004000 G	#20-979 #20-988 20-1053 20-1062							
BIT12	=	010000 G	#20-979 #20-987 110-3768 122-4210 124-4235							
BIT13	=	020000 G	#20-979 #20-986 110-3776 122-4197							
BIT14	=	040000 G	#20-979 #20-985 70-2395 110-3778							
BIT15	=	000040 G	#20-979 #20-984 #20-994							
BIT2	=	000004 G	#20-979 #20-1008 53-1992 53-2015							
BIT3	=	000010 G	#20-979 #20-1007 53-2001 53-2023							
BIT4	=	000020 G	#20-979 #20-1006 78-2634							
BIT5	=	000040 G	#20-979 #20-1005							
BIT6	=	000100 G	#20-979 #20-1004							
BIT7	=	000200 G	#20-979 #20-1003							
BIT8	=	000400 G	#20-979 #20-1002 78-2616							
BIT9	=	001000 G	#20-979 #20-1001 78-2639							
BK243		027550	#120-4129 120-4132							
BOE	=	000400 G	#20-979							
BRONPT		017462	84-2777 84-2785 #84-2791							
BRONTK		020126	86-2895 86-2902 #86-2903 86-2998							

CZRxDB		CREATED BY MACRO ON 1-AUG-79 AT 09:40		PAGE 2		F 9				SEQ 0109
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01					
BTHDRV		021432	*88-3037	88-3062	88-3064	*88-3065	*88-3079	#88-3121	*136-4554	*136-4556
BTRK		033553	28-1257	#144-4714						
BTRP4	= 000004	G	#20-1058	59-2150	59-2152					
BTRP6	= 000006	G	#20-1059							
BUFERL		007364	#49-1833							
BYTCNT		026050	*114-3853	*114-3881	114-3882	#114-3902				
BYTNUM		026052	*114-3851	114-3856	114-3857	114-3863	114-3865	114-3878	*114-3880	#114-3903
CKDVAV		014742	72-2459	72-2484	#74-2533					
CKSML		007354	39-1622	#49-1832	122-4185					
CKSMRT		002310	#22-1121							
CLASWD		027620	*120-4087	#120-4145	122-4182	124-4225	124-4231			
CLRSTA		020656	82-2754	#86-3018						
CMD		002332	#24-1134	28-1253	*68-2343	*78-2662	*96-3428			
CNSCLC		023316	*96-3374	96-3375	96-3417	96-3419	96-3424	96-3431	#98-3451	
CNTKLC		023320	*96-3370	96-3371	96-3413	96-3423	96-3430	#98-3452		
CONTRL		013564	#68-2331							
CR	= 000015	G	#150-4876	150-4880	150-4881	150-4882	150-4883	150-4884	150-4885	150-4886
			150-4888	150-4889	150-4890	150-4891	150-4892	150-4893	150-4894	150-4895
			150-4897	150-4898	150-4899	150-4900	150-4901	150-4902	150-4903	150-4904
			150-4906	150-4907						
CRC		007434	#49-1838							
CRCBAD		007444	#49-1839							
CRCBRT		002312	#22-1122							
CRCERT		002314	#22-1123	134-4510	134-4525					
CSADR		025034	*96-3395	*96-3432	108-3671	108-3676	#108-3735	108-3747	108-3750	110-3766
CSEC		023276	96-3359	96-3372	#98-3442					
CSRADR		025332	*38-1536	*72-2439	*72-2448	*72-2476	*74-2552	*78-2641	*78-2650	*108-3747
			110-3802	*110-3803	110-3804	#110-3810	*116-3924	*116-3946		
CSREV		027072	*116-3918	116-3921	116-3964	116-3968	116-4019	#116-4026		
CSRUUT		002246	#22-1100	28-1253	*68-2340	*78-2656	*110-3802	116-3918	*144-4698	
CTKO		033546	28-1256	#144-4709						
CTK1		033547	28-1256	#144-4710						
CTRK		023306	96-3353	96-3368	#98-3446					
CURSEC		023710	*96-3375	*96-3417	96-3419	*100-3482	*100-3494	#100-3545		
CURTRK		024240	*96-3371	96-3413	*102-3575	*102-3588	102-3595	*102-3597	102-3598	102-3600
			*102-3613	#104-3625						
CVSTUT		004756	#36-1507	88-3045						
CVUNIT		004752	36-1485	36-1487	36-1493	#36-1500	*63-2220			
CVUTST		004654	#36-1483	63-2221						
C\$AU	= 000052		#17-782	65-2267						
C\$AUTO	= 000061		#17-782	57-2127						
C\$BRK	= 000022		#17-782							
C\$BSEG	= 000004		#17-782	74-2539	78-2609	88-3052				
C\$BSUB	= 000002		#17-782	68-2332	68-2353					
C\$CEFG	= 000045		#17-782							
C\$CLCK	= 000062		#17-782							
C\$CLEA	= 000012		#17-782	55-2067						
C\$CLOS	= 000035		#17-782							
C\$CLP1	= 000006		#17-782	68-2363						
C\$CVEC	= 000036		#17-782	55-2062	55-2065	59-2152				
C\$DCLN	= 000044		#17-782	51-1925	53-2033	57-2125	68-2373			
C\$DODU	= 000051		#17-782	57-2096	57-2099	57-2105	57-2108	57-2119	57-2122	80-2701

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
C\$DRPT	=	000024	#17-782 68-2375
C\$DU	=	000053	#17-782 63-2227
C\$EDIT	=	000003	#17-782 17-825
C\$ERDF	=	000055	#17-782
C\$ERHR	=	000056	#17-782
C\$ERRO	=	000060	#17-782 28-1245 59-2165 80-2693
C\$ERSF	=	000054	#17-782
C\$ERSO	=	000057	#17-782
C\$ESCA	=	000010	#17-782
C\$ESEG	=	000005	#17-782 74-2575 78-2677 88-3111
C\$ESUB	=	000003	#17-782 68-2347 68-2364
C\$ETST	=	000001	#17-782 144-4733
C\$EXIT	=	000032	#17-782 68-2376
C\$GETB	=	000026	#17-782
C\$GETW	=	000027	#17-782
C\$GMAN	=	000043	#17-782 78-2627
C\$GPHR	=	000042	#17-782 51-1918
C\$GPLO	=	000030	#17-782
C\$GPRI	=	000040	#17-782
C\$INIT	=	000011	#17-782 51-1930
C\$INLP	=	000020	#17-782 90-3145 96-3376
C\$MANI	=	000050	#17-782 78-2625
C\$MEM	=	000031	#17-782
C\$MSG	=	000023	#17-782 32-1345 32-1365
C\$OPEN	=	000034	#17-782
C\$PNTB	=	000014	#17-782 28-1253 32-1367 32-1370 114-3877 114-3878
C\$PNTF	=	000017	#17-782 51-1923 53-2032 53-2035 63-2217 63-2225
C\$PNTS	=	000016	#17-782 45-1740 45-1752 45-1762
C\$PNTX	=	000015	#17-782 28-1256 28-1257 30-1285
C\$QIO	=	000377	#17-782
C\$RDBU	=	000007	#17-782
C\$REFG	=	000047	#17-782 51-1893 51-1897 51-1906
C\$RESE	=	000033	#17-782 #17-782 55-2066 72-2436
C\$REVI	=	000003	#17-782 17-825
C\$RFLA	=	000021	#17-782 51-1892
C\$RPT	=	000025	#17-782 39-1646
C\$SEFG	=	000046	#17-782
C\$SPRI	=	000041	#17-782 110-3761 110-3779
C\$SVEC	=	000037	#17-782 51-1926 51-1929 59-2150
C\$TPRI	=	000013	#17-782
DAERCT	026054	*114-3836	*114-3860 114-3868 #114-3904
DARDRT	002320	#22-1125	
DATA	007474	#49-1842	
DART	002516	#22-1124	134-4507 134-4522
DATASB	026056	*114-3872	114-3878 #114-3905
DATAWS	026060	*114-3873	114-3878 #114-3906
DATAO	017520	84-2792	#84-2800
DATA1	017536	84-2793	#84-2806
DATBUF	034406	108-3693	114-3843 114-3855 114-3893 #144-4729
DATBYT	017746	*84-2800	*84-2806 *84-2809 *84-2821 *84-2824 *84-2827 *84-2831 *84-2834 *84-2838
		84-2848	84-2849 #84-2860
DATPAT	034006	84-2786	84-2789 96-3422 108-3691 114-3842 114-3854 #144-4726

CZR XDB		CREATED BY	MACRO	ON	1-AUG-79 AT 09:40		PAGE 4	H 9		SEQ 0111
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES				CREF	V01		
DAWTRT		002322	#22-1126							
DBADR		025032	*108-3673	108-3687	108-3695	108-3705	108-3710	108-3715	108-3724	#108-3734
DDERCT		002330	#22-1129							
DELAY		025230	38-1538	72-2440	72-2449	72-2477	74-2554	78-2643	78-2654	108-3749 #110-3790
			116-3926	116-3948						
DEL DAT		002244	#22-1099	*70-2418	*70-2420	88-3081	*88-3083	*88-3085	106-3646	116-4002
DEN		002242	#22-1098	38-1532	*70-2423	*70-2425	106-3659	116-3944	116-4014	
DFPTBL		002160	G #19-862							
DFTL		002216	#19-899	132-4415						
DIAGMC	=	000000	17-782	17-782						
DL DTER		007504	#49-1843							
DLY		025224	110-3763	#110-3783						
DMSG1		026064	114-3877	#114-3909						
DMSG2		026161	114-3878	#114-3910						
DNBIT	=	000040	G #20-1052	72-2438	72-2441	72-2447	72-2450	72-2472	72-2475	72-2478 74-2553
			78-2651	108-3674	110-3766	110-3774	116-3925	116-3947		
DNFLAG		025226	*110-3760	110-3764	#110-3784	*144-4696				
DRIVEN		015270	*74-2547	*74-2550	#76-2593					
DRVDN		021444	*88-3040	*88-3064	88-3075	*88-3086	#88-3126	*136-4564		
DRVFN		023332	96-3394	96-3428	96-3429	#98-3457	*106-3661			
DRVTST		023324	*88-3096	88-3098	96-3400	96-3420	96-3426	#98-3454		
DUA121		015246	#74-2582							
DUA26		032434	#136-4563							
DUB20		021370	88-3107	#88-3109						
DUC20		021000	#88-3049							
DUMSG1		013442	63-2225	#63-2232						
DUMSG2		013503	63-2217	#63-2233						
DVDNCK		021442	*88-3039	#88-3125	*90-3165	*90-3171	136-4548	*136-4551		
DVFT	=	000001	G #20-1056	132-4417	140-4609					
DVTST		024404	*96-3392	*96-3425	*96-3426	106-3638	#106-3664			
DX		025222	110-3762	#110-3782						
EA1211		016004	78-2672	#78-2677						
EA243		027264	120-4071	#120-4075						
EA2433		030210	124-4242	#124-4245						
EA2434		030274	126-4261	#126-4267						
EB24U1		030452	128-4299	#128-4306						
EB243		027406	120-4083	120-4097	#120-4099					
EB2433		030160	124-4238	#124-4240						
ECCLAS		030624	130-4326	#130-4349						
ECLOG		007604	39-1632	#49-1851	120-4107					
ECTAB		003116	30-1283	#30-1293						
EC1		003170	30-1293	#32-1318						
EC10		003555	30-1300	#32-1325						
EC11		003603	30-1301	#32-1326						
EC12		003660	30-1302	#32-1327						
EC13		003714	30-1303	#32-1328						
EC14		003773	30-1304	#32-1329						
EC15		004021	30-1305	#32-1330						
EC16		004107	30-1306	#32-1331						
EC17		004153	30-1307	#32-1332						
EC2		003236	30-1294	#32-1319						
EC20		004207	30-1308	#32-1333						

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES						
EC21		004254	30-1309	#32-1334					
EC22		004311	30-1310	#32-1335					
EC23		004360	30-1311	#32-1336					
EC24		004413	30-1312	#32-1337					
EC2432		030064	122-4214	#122-4217					
EC25		004442	30-1313	#32-1338					
EC3		003304	30-1295	#32-1320					
EC4		003332	30-1296	#32-1321					
EC5		003400	30-1297	#32-1322					
EC6		003451	30-1298	#32-1323					
EC7		003477	30-1299	#32-1324					
EDB241		026042	#114-3898						
EDC20		021404	88-3051	#88-3113					
ED00		013746	68-2359	68-2361	#68-2363				
ED1211		016000	78-2674	#78-2676					
ED2341		025102	108-3751	#108-3753					
EF.CON	=	000036	G #20-979	#20-1017					
EF.NEW	=	000035	G #20-979	#20-1018					
EF.PWR	=	000034	G #20-979	#20-1019	51-1893				
EF.RES	=	000037	G #20-979	#20-1016	51-1906				
EF.STA	=	000040	G #20-979	#20-1015	51-1897				
EF01	=	000001	G #20-1036						
EF02	=	000002	G #20-1035						
EF03	=	000003	G #20-1034						
EF04	=	000004	G #20-1033						
EF05	=	000005	G #20-1032						
EF06	=	000006	G #20-1031						
EF07	=	000007	G #20-1030						
EF08	=	000010	G #20-1029						
EF09	=	000011	G #20-1028						
EF10	=	000012	G #20-1027						
EF11	=	000013	G #20-1026						
EF12	=	000014	G #20-1025						
EF13	=	000015	G #20-1024						
EF14	=	000016	G #20-1023						
EF15	=	000017	G #20-1022						
EF16	=	000020	G #20-1021						
EG1211		015526	78-2636	78-2638	#78-2640				
EH1211		015750	78-2666	78-2668	#78-2670				
EIA11		014126	70-2412	#70-2414					
EIA12		014374	72-2445	72-2454	#72-2461				
EIA121		015232	74-2538	74-2577	#74-2579				
EIA24		025374	112-3823	#112-3825					
EIA25		031174	132-4392	#132-4430					
EIA40		032670	140-4599	#140-4623					
EIB121		015050	74-2548	#74-2551					
EIB20		021354	88-3088	88-3094	#88-3105				
EIB23		022646	96-3358	#96-3368					
EIB234		025012	108-3712	108-3717	108-3721 #108-3726				
EIB251		032102	134-4500	134-4509	134-4512 134-4515	134-4524	134-4527	#134-4530	
EIB26		032416	136-4555	#136-4557					
EIC11		011756	53-1977	#53-1981					

SYMBOL	VALUE	REFERENCES
E1C11	014212	70-2424 #70-2426
E1C121	015212	74-2558 74-2562 74-2566 #74-2574
E1C20	021106	88-3061 #88-3066
E1C25	031126	132-4405 132-4407 #132-4421
E1C40	032652	140-4611 140-4613 #140-4620
E1D121	015226	74-2568 74-2570 74-2572 #74-2578
E1D23	023032	96-3391 #96-3398
E1D232	024162	102-3604 #102-3608
E1D233	024366	106-3657 #106-3659
E1E12	014564	72-2487 #72-2489
E1E21	022146	90-3218 #90-3220
E1E22	022456	94-3312 94-3322 #94-3324
E1E23	023134	96-3415 #96-3417
E1F11	012224	53-1991 53-1994 53-2000 53-2003 53-2014 53-2017 53-2022 #53-2025
E1F20	021154	88-3070 #88-3075
E1F21	022122	90-3147 90-3158 90-3172 90-3174 90-3178 90-3180 90-3185 90-3188 90-3193
		90-3209 90-3212 #90-3214
E1F241	025742	114-3871 #114-3879
E1F25	031116	132-4413 132-4416 #132-4419
E1H20	021232	88-3084 #88-3086
E1H232	024012	102-3568 #102-3576
E1H234	024712	108-3697 #108-3712
E1I21	022116	90-3199 90-3205 #90-3213
E1I231	023370	100-3468 #100-3474
E1J23	023200	96-3378 96-3399 96-3421 #96-3425
E1K234	024560	108-3692 #108-3694
E1M241	025702	114-3875 #114-3878
E1243	027576	120-4126 120-4135 #120-4137
ELA10	014054	70-2392 #70-2394
ELA11	014120	70-2410 #70-2413
ELA12	014270	72-2442 #72-2446
ELA20	020774	88-3044 #88-3048
ELA231	023462	100-3481 #100-3494
ELA241	025500	114-3847 114-3849 #114-3851
ELA25	030740	132-4382 #132-4387
ELA40	032530	140-4590 #140-4595
ELB11	014162	70-2417 #70-2420
ELB12	014342	72-2451 #72-2455
ELB121	015036	74-2545 #74-2549
ELB20	021276	88-3057 #88-3095
ELB22	022352	94-3305 #94-3308
ELB231	023622	100-3499 #100-3524
ELB232	024206	102-3599 102-3611 #102-3613
ELB241	025744	114-3859 #114-3880
ELB25	031036	132-4400 #132-4408
ELB26	032410	136-4553 #136-4556
ELC11	014206	70-2422 #70-2425
ELC22	022400	94-3310 #94-3313
ELC231	023620	100-3505 #100-3523
ELC233	024340	106-3650 #106-3653
ELC242	026306	116-3928 #116-3931
ELC244	030614	130-4333 #130-4344

CZRXDB CREATED BY MACRO ON 1-AUG-79 AT 09:40

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
ELD11		012300	53-1979 #53-2035
ELD22		022422	94-3315 #94-3318
ELD231		023610	100-3510 #100-3521
ELD233		024362	106-3655 #106-3658
ELD234		024714	108-3701 #108-3713
ELD25		031170	132-4427 #132-4429
ELD251		032004	134-4504 #134-4513
ELE12		014556	72-2473 #72-2488
ELE22		022450	94-3320 #94-3323
ELE23		023130	96-3408 96-3410 #96-3416
ELE234		024764	108-3719 #108-3722
ELE244		030604	130-4339 #130-4342
ELF12		014546	72-2479 #72-2486
ELF20		021134	88-3069 #88-3071
ELF231		023602	100-3512 #100-3518
ELF232		024100	102-3591 #102-3594
ELF251		032072	134-4519 #134-4528
ELG11		012022	53-1988 #53-1992
ELG12		014622	72-2492 #72-2496
ELG21		021736	90-3182 #90-3186
ELG251		031772	134-4506 #134-4510
ELH11		012066	53-1997 #53-2001
ELH12		014412	72-2462 #72-2465
ELH20		021224	88-3082 #88-3085
ELH231		023452	100-3486 #100-3491
ELH234		024622	108-3684 #108-3702
ELH251		032060	134-4521 #134-4525
ELI11		012250	53-2006 #53-2032
ELJ21		022064	90-3201 #90-3206
ELK11		012146	53-2011 #53-2015
ELK20		020744	88-3034 #88-3042
ELK234		024552	108-3690 #108-3693
ELL11		012210	53-2019 #53-2023
ELL20		021270	88-3090 #88-3093
ELM242		026650	116-3985 #116-3988
ELN21		021704	90-3176 #90-3179
ENDCVT		004750	36-1490 36-1492 36-1496 #36-1498
END11		012324	53-2031 53-2034 #53-2036
ENDLD		017742	84-2852 #84-2857
ENDRPT		005406	#39-1646
ENDST		011240	#49-1854 86-3019
ENDTKS		020632	86-2893 86-2996 #86-2999
ENDUP		002576	28-1255 #28-1259
ENDXER		003112	30-1278 #30-1287
END00		014012	68-2374 #68-2376
END121		015260	74-2583 #74-2585
END13		017374	82-2752 #82-2756
END131		017702	84-2803 84-2816 84-2830 84-2841 #84-2844
END133		020674	#86-3023
END20		021420	88-3080 88-3110 #88-3115
END22		022500	#94-3329
END231		023642	100-3517 100-3520 100-3522 100-3523 #100-3528

CZRXDB
 SYMBOL CROSS REFERENCE
 SYMBOL VALUE
 END232 024214
 END233 024402
 END234 025016
 END241 026016
 END242 027064
 END243 027604
 END244 030620
 END251 032106
 END26 032442
 END30 032464
 END40 032676
 ERRBLK 002402
 ERRMSG 002400
 ERNBR 002376
 ERROR 002354
 ERRORS 033363
 ERRREG 002604
 ERRSAV 027610
 ERRSY 002274
 ERRTY 002276
 ERRTYP 002374
 ERSTAT 025026
 ERSVCT 027612
 ERTSAV 021452
 ERT1 031176
 ERT10 031371
 ERT11 031423
 ERT12 031435
 ERT13 031450
 ERT14 031507
 ERT15 031546
 ERT16 031601
 ERT2 031210
 ERT3 031221
 ERT4 031235
 ERT5 031247
 ERT6 031263
 ERT7 031315
 ERT8 031344
 ERT9 031360
 ESCLAS 033450
 ESREV 027074
 ESRUUT 002250
 ETCLAS 031656
 ETSAV 027606
 ETTAB 027630
 ET1 031616

CREATED BY MACRO ON 1-AUG-79 AT 09:40
 REFERENCES
 102-3594 102-3609 #102-3614
 #106-3662
 108-3680 #108-3727
 114-3885 114-3887 114-3889 #114-3891
 116-3930 116-3934 116-3952 116-4020 #116-4022
 #120-4138
 130-4323 130-4331 130-4337 130-4341 130-4343 #130-4345
 134-4495 134-4517 #134-4531
 136-4549 #136-4565
 138-4573 #138-4575
 #140-4625
 *28-1243 #28-1248 *59-2163 *80-2690
 #28-1248 *59-2162 *80-2689 *132-4402 *132-4410 *140-4608 *140-4617
 #28-1248 *59-2161 *80-2688 *132-4401 *132-4409 *140-4607 *140-4616
 #28-1243 132-4404 132-4419 140-4610 140-4619
 #142-4645
 *28-1259 #28-1262 *132-4377 *132-4421 *140-4620
 120-4122 *120-4137 #120-4141
 #22-1114 *38-1541 *61-2188 *68-2338 68-2348 68-2355 *70-2395 78-2644 *86-2892
 88-3109 *110-3778 *110-3801 *116-3929 *116-3933 116-3936 *116-3951 *116-3960 *116-3995
 *116-4013 *116-4018 *118-4050 *118-4060 *130-4330 140-4581 140-4620 *140-4624
 #22-1115 *68-2339 88-3106 *110-3768 *110-3776 *114-3850 *114-3861 *114-3862 114-3886
 *114-3890 *116-3955 *116-3966 *116-3974 *116-3980 *116-3986 *116-3988 *116-3991 *116-3992
 *116-4006 *116-4010 120-4075 120-4076 120-4111 120-4137 122-4199 *130-4336 *130-4340
 *130-4342 *130-4344 132-4377 132-4378 132-4421 132-4423 *132-4424
 #28-1248 *59-2164 *80-2691 *132-4403 *132-4411 *132-4417 *140-4609 *140-4618
 *108-3720 #108-3732
 *120-4124 120-4125 *120-4133 *120-4136 #120-4142
 *88-3041 #88-3129 114-3848 114-3888 *114-3892 *132-4423
 #132-4433 132-4450
 #132-4442 132-4459
 #132-4443 132-4460
 #132-4444 132-4461
 #132-4445 132-4462
 #132-4446 132-4463
 #132-4447 132-4464
 #132-4448 132-4465
 #132-4434 132-4451
 #132-4435 132-4452
 #132-4436 132-4453
 #132-4437 132-4454
 #132-4438 132-4455
 #132-4439 132-4456
 #132-4440 132-4457
 #132-4441 132-4458
 140-4601 #142-4663
 *116-3919 116-3962 116-3989 116-3993 116-4004 116-4008 116-4011 116-4016 #116-4027
 #22-1101 28-1253 *68-2341 *78-2657 *110-3804 116-3919 118-4046 118-4056 *144-4699
 132-4395 #132-4469
 120-4070 *120-4073 *120-4075 #120-4140
 120-4086 #120-4154
 132-4385 #132-4450

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 CREF V01

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SEQ 0115

CZRADB		CREATED BY MACRO ON 1-AUG-79 AT 09:40		PAGE 9		M 9			
SYMBOL CROSS REFERENCE		REFERENCES		CREF		V01		SEQ 0116	
SYMBOL	VALUE								
EVCMD	027066	*116-3940	*116-3942	*116-3943	*116-3944	116-3945	#116-4024		
EVDATA	025412	112-3824	#114-3836						
EVDVRE	027076	116-3935	#118-4035						
EVDVST	026206	112-3819	#116-3917						
EVL	= 000004	G #20-979	90-3152	96-3383	128-4292	132-4412			
EVTSTR	025334	88-3099	#112-3818						
EVUTEC	030476	112-3821	#130-4320						
EXADR	022154	*90-3141	90-3215	#90-3224					
EXADTB	022164	90-3139	#90-3229						
EXCMP	014020	*68-2333	68-2367	#68-2379	*138-4574				
EXHCP	021430	*88-3036	88-3072	*88-3074	*88-3087	#88-3120			
EXMSG	003114	*30-1284	30-1285	#30-1290					
EXN	021424	*88-3053	#88-3118	90-3137					
EX1	022204	90-3230	#92-3242						
EX2	022214	90-3231	#92-3246						
EX3	022230	90-3232	#92-3252						
EX4	022244	90-3233	#92-3258						
EX5	022254	90-3234	#92-3262						
EX6	022264	90-3235	#92-3266						
EX7	022300	90-3229	90-3236	#92-3272					
E\$END	= 002100	#17-782							
E\$LOAD	= 000035	#17-782	17-825						
FCKMSG	017223	78-2627	#80-2734						
FIN	011520	51-1896	51-1917	#51-1926					
FIRST	014074	*70-2396	#70-2399	82-2749					
FLAGS	062266	#22-1110	*51-1887	*51-1895	*51-1908	70-2388			
FLGDRS	002264	#22-1109	*51-1892	90-3152	96-3383	128-4292	132-4412		
FLOATO	017546	84-2794	#84-2809						
FLOAT1	017614	84-2795	#84-2824						
FNEV4	030622	*112-3820	130-4334	130-4338	#130-4347				
FORMCK	015304	#76-2599	78-2627	78-2628	*78-2630				
FUNCT	033335	#142-4644							
FUNEV	027070	*112-3818	116-3931	#116-4025					
FUNTY	030342	*120-4068	*126-4257	126-4258	126-4262	126-4264	#126-4280		
F\$AU	= 000015	#17-782	65-2259	65-2267					
F\$AUTO	= 000020	#17-782	57-2086	57-2127					
F\$BGN	= 000040	#17-782	17-808	19-910	20-972	32-1344	32-1363	38-1549	39-1602
		49-1872	51-1886	55-2054	57-2086	63-2207	65-2259	68-2330	68-2332
		68-2347	68-2353	68-2353	68-2364	68-2376	74-2539	78-2609	88-3052
		146-4794	146-4801	148-4835	148-4861	152-4945	152-4947	152-4948	152-4948
		152-4954	152-4954	152-4959	152-4960				
F\$CLEA	= 000007	#17-782	55-2054	55-2067					
F\$DU	= 000016	#17-782	63-2207	63-2227					
F\$END	= 000041	#17-782	17-782	17-782	17-782	17-782	17-782	17-782	17-782
		17-782	17-782	17-782	17-782	17-782	17-782	17-782	17-782
		19-910	20-972	32-1345	32-1365	38-1549	39-1602	39-1646	51-1930
		57-2127	63-2227	65-2267	68-2330	68-2330	68-2330	68-2332	68-2332
		68-2347	68-2353	68-2353	68-2364	68-2376	74-2575	78-2677	88-3111
		144-4733	144-4733	146-4801	146-4808	148-4861	148-4872	152-4945	152-4947
		152-4953	152-4954	152-4959	152-4960				
F\$HARD	= 000004	#17-782	146-4794	146-4801	146-4801	146-4808	148-4838	148-4847	148-4853
		148-4861							

CZRADB		CREATED BY MACRO ON 1-AUG-79 AT 09:40		PAGE 10		N 9			
SYMBOL CROSS REFERENCE		REFERENCES		CREF	V01	SEQ 0117			
SYMBOL	VALUE	REFERENCES							
F\$HW	= 000013	#17-782	19-862	19-875					
F\$INIT	= 000006	#17-782	51-1886	51-1930					
F\$JMP	= 000050	#17-782	68-2376	146-4801	148-4861				
F\$MOD	= 000000	#17-782	17-808	19-910	20-972	38-1549	39-1602	152-4945	
F\$MSG	= 000011	#17-782	32-1344	32-1345	32-1363	32-1365			
F\$PROT	= 000021	#17-782	49-1872	49-1876					
F\$PWR	= 000017	#17-782							
F\$RPT	= 000012	#17-782	39-1610	39-1646					
F\$SEG	= 000003	#17-782	74-2539	74-2575	78-2609	78-2677	88-3052	88-3111	
F\$SOFT	= 000005	#17-782	148-4835	148-4838	148-4847	148-4853	148-4857	148-4861	148-4861 148-4872
F\$SRV	= 000010	#17-782							
F\$SUB	= 000002	#17-782	68-2332	68-2347	68-2353	68-2364			
F\$SW	= 000014	#17-782	19-887	19-908					
F\$TEST	= 000001	#17-782	68-2330	144-4733					
GETSEC	023334	96-3418	#100-3464						
GETTRK	023742	96-3412	#102-3565						
GETTST	021454	88-3054	#90-3136						
GPSUNO	014626	72-2437	#72-2502						
GPSUN1	014702	72-2471	72-2513	#72-2519					
GTDRV	022320	88-3093	#94-3301						
GTDVFN	024254	96-3393	96-3427	#106-3637					
GTEX	017302	70-2394	#82-2743						
GTEXCD	014076	70-2390	#70-2408						
GTSYEX	014022	68-2346	#70-2387						
GTSYS	014216	70-2393	#72-2436						
GTTK	020062	86-2891	#86-2894						
G\$CNTO	= 000200	#17-782							
G\$DELM	= 000372	#17-782							
G\$DISP	= 000003	#17-782							
G\$EXCP	= 000400	#17-782							
G\$HILI	= 000002	#17-782							
G\$LOLI	= 000001	#17-782							
G\$NO	= 000000	#17-782							
G\$OFFS	= 000400	#17-782	78-2627	146-4796	146-4797	146-4798	146-4799	148-4837	148-4839 148-4840
			148-4841	148-4842	148-4843	148-4844	148-4845	148-4846	148-4848 148-4849 148-4850
			148-4851	148-4852	148-4854	148-4855	148-4856	148-4858	148-4859 148-4860
G\$OFFS1	= 000376	#17-782	78-2627	146-4796	146-4797	146-4798	146-4799	148-4837	148-4839 148-4840
			148-4841	148-4842	148-4843	148-4844	148-4845	148-4846	148-4848 148-4849 148-4850
			148-4851	148-4852	148-4854	148-4855	148-4856	148-4858	148-4859 148-4860
G\$PRMA	= 000001	#17-782	146-4796	146-4797					
G\$PRMD	= 000002	#17-782	146-4798	146-4799	148-4840	148-4841	148-4842	148-4843	148-4854 148-4855
			148-4858	148-4859					
G\$PRML	= 000000	#17-782	78-2627	148-4837	148-4839	148-4844	148-4845	148-4846	148-4848 148-4849
			148-4850	148-4851	148-4852	148-4856	148-4860		
G\$RADA	= 000140	#17-782							
G\$RADB	= 000000	#17-782							
G\$RADD	= 000040	#17-782	148-4843	148-4854	148-4855	148-4858	148-4859		
G\$RADL	= 000120	#17-782	78-2627	148-4837	148-4839	148-4844	148-4845	148-4846	148-4848 148-4849
			148-4850	148-4851	148-4852	148-4856	148-4860		
G\$RADO	= 000020	#17-782	146-4796	146-4797	146-4798	146-4799	148-4840	148-4841	148-4842
G\$XFER	= 000004	#17-782	146-4801	148-4838	148-4847	148-4853	148-4857	148-4861	
G\$YES	= 000010	#17-782	78-2627	146-4796	146-4797	146-4798	146-4799	148-4837	148-4839 148-4840

CZRxDB		CREATED BY	MACRO	ON	PAGE 11		B 10		SEQ 0118			
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES		CREF	V01						
			148-4841	148-4842	148-4843	148-4844	148-4845	148-4846	148-4848	148-4849	148-4850	
			148-4851	148-4852	148-4854	148-4855	148-4856	148-4858	148-4859	148-4860		
HARD	=	000002	G	#20-1055								
HARDER		002300		#22-1116	*128-4298	*128-4305	132-4399	*132-4420	132-4426	*132-4429		
HCRC		007524		#49-1845								
HCRCBD		007534		#49-1846								
HDATA		007564		#49-1849								
HDD		007574		#49-1850								
HDERCT		002302		#22-1117	*132-4414	132-4415	*132-4418					
HELP	=	000000		#16-761	17-769	17-773	17-799	17-817	17-827	17-846	19-869	19-901
				#20-915	20-962	20-1063	24-1179	24-1185	26-1206	26-1216	26-1224	32-1347
				32-1352	32-1357	34-1385	34-1392	34-1398	34-1405	34-1411	34-1418	34-1427
				34-1435	34-1442	34-1449	#39-1555	49-1856	51-1931	51-1940	55-2056	55-2069
				63-2201	63-2236	65-2261	65-2269	#146-4739	146-4803	146-4816	148-4863	152-4936
HOE	=	100000	G	#20-979								
HRD		007544		#49-1847								
HSEK		007514		#49-1844	128-4300							
HWRT		007554		#49-1848								
IAATDP		012552		#57-2087								
IAREC		005112		#38-1539								
IA00		013666		#68-2348								
IA1211		015324		78-2607	#78-2610							
IA24U1		030360		#128-4290								
IA243		027242		#120-4070								
IA2431		027672		#122-4182								
IA2432		027724		#122-4197								
IA2433		030114		#124-4231								
IA2434		030234		#126-4258								
IBATDP		012574		#57-2092								
IBE	=	010000	G	#20-979								
IBU234		025126		#110-3764	110-3771							
IB00		013700		68-2349	#68-2351							
IB1211		015334		#78-2612								
IB24U1		030400		128-4291	#128-4294							
IB243		027330		#120-4083								
IB2432		027734		#122-4199								
IB2433		030132		#124-4235								
IB2434		030250		126-4259	#126-4262							
ICATDP		012632		57-2098	#57-2100							
ICU234		025134		#110-3766								
IC1211		015372		78-2611	#78-2619							
IC243		027370		#120-4094								
IC2432		030022		122-4203	#122-4210							
IC2434		030260		#126-4264								
ID		020652		*70-2415	*82-2747	86-2885	#86-3008					
IDATDP		012676		57-2088	57-2093	57-2101	#57-2110					
IDCOMP		020512		#86-2977								
IDENT1		002606		28-1253	#28-1264							
IDU	=	000040	G	#20-979								
ID00		013714		#68-2355								
ID1211		015424		78-2617	#78-2625							
ID243		027304		#120-4078								

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
IEATDP		012720	#57-2115
IER	= 020000 G		#20-979
IEU234		025164	#110-3774
IE00		013726	#68-2358
IE1211		015444	#78-2628
IFA11		011670	#53-1964
IFATDP		012756	57-2111 57-2121 #57-2123
IFAUP		002444	#28-1254
IFAU23		025232	#110-3791
IFA10		014040	70-2389 #70-2391
IFA11		014100	#70-2409
IFA12		014244	#72-2441
IFA121		014760	#74-2537
IFA20		020750	#88-3043 88-3050
IFA21		021520	90-3143 90-3146 #90-3148
IFA22		022322	#94-3302
IFA23		022516	#96-3342
IFA231		023410	#100-3480
IFA232		024024	#102-3579
IFA233		024262	#106-3639
IFA234		024450	#108-3678
IFA24		025360	#112-3822
IFA241		025456	#114-3846
IFA242		026232	#116-3921
IFA244		030506	#130-4322
IFA25		030720	#132-4381
IFA251		031700	#134-4494
IFA26		032354	#136-4548
IFA40		032510	#140-4589
IFB11		011710	53-1965 #53-1969
IFB10		014024	#70-2388
IFB12		014316	#72-2450
IFB121		015010	#74-2544
IFB13		017342	#82-2749
IFB20		021036	#88-3056
IFB21		021546	90-3149 #90-3154
IFB22		022332	#94-3304
IFB23		022606	96-3350 #96-3357
IFB231		023504	#100-3498
IFB232		024120	102-3596 #102-3598
IFB233		024314	106-3640 106-3645 #106-3647
IFB242		026326	116-3922 #116-3935
IFB244		030524	#130-4328
IFB25		030770	#132-4397
IFB251		031706	#134-4496
IFB26		032370	#136-4552
IFB40		032554	#140-4603
IFC11		011724	53-1970 #53-1973
IFC11		014166	70-2419 #70-2421
IFC12		014420	72-2460 72-2464 #72-2466
IFC121		015116	74-2556 #74-2559
IFC13		017350	#82-2751

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SYMBOL	CROSS REFERENCE			CREF	V01
SYMBOL	VALUE	REFERENCES			
IFC20	021052	#88-3059			
IFC21	021570	90-3155	#90-3159		
IFC22	022360	94-3307	#94-3309		
IFC23	022714	96-3377	#96-3379		
IFC231	023526	100-3490	100-3493	#100-3504	
IFC232	024136	#102-3602			
IFC233	024322	#106-3649			
IFC234	024602	108-3682	#108-3698		
IFC241	025560	#114-3863			
IFC242	026266	#116-3927			
IFC244	030536	130-4329	#130-4332		
IFC25	031030	132-4398	#132-4406		
IFC251	031730	134-4497	#134-4501		
IFC40	032614	140-4604	#140-4612		
IFD11	011744	53-1974	#53-1978		
IFD12	014430	72-2467	#72-2469		
IFD121	015156	74-2564	#74-2567		
IFD21	021622	#90-3166			
IFD22	022402	94-3303	#94-3314		
IFD23	022742	96-3382	#96-3385		
IFD231	023544	#100-3509			
IFD232	024146	102-3603	#102-3605		
IFD233	024344	106-3648	106-3652	#106-3654	
IFD234	024612	#108-3700			
IFD241	025570	#114-3865			
IFD242	026444	116-3950	#116-3953		
IFD244	030544	#130-4334			
IFD25	031156	#132-4426			
IFD251	031740	#134-4503			
IFE11	011764	53-1968	53-1972	#53-1982	
IFE12	014444	#72-2472			
IFE121	015164	#74-2569			
IFE21	022136	#90-3217			
IFE22	022430	94-3317	#94-3319		
IFE23	023064	96-3403	96-3405	#96-3407	
IFE232	024170	102-3606	#102-3610		
IFE233	024302	#106-3644			
IFE234	024744	108-3699	#108-3718		
IFE241	025604	114-3864	114-3866	#114-3868	
IFE242	026460	116-3954	#116-3956		
IFE244	030564	130-4335	#130-4338		
IFE25	031074	#132-4415			
IFE251	032016	134-4502	#134-4516		
IFF11	011772	#53-1984			
IFF12	014502	#72-2478			
IFF121	015174	#74-2571			
IFF20	021122	#88-3068			
IFF21	021510	#90-3145			
IFF23	023072	#96-3409			
IFF231	023552	#100-3511			
IFF232	024064	#102-3590			
IFF241	025614	#114-3870			

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
IFF242		026722	116-3994 #116-3997
IFF25		031060	#132-4412
IFF251		032026	#134-4518
IFG11		011776	#53-1986
IFG12		014576	72-2468 72-2470 72-2485 #72-2491
IFG20		021142	#88-3072
IFG21		021714	90-3160 90-3162 #90-3181
IFG23		023040	96-3380 96-3384 #96-3400
IFG231		023422	#100-3483
IFG232		024102	102-3580 #102-3595
IFG242		026506	116-3937 #116-3962
IFG251		031750	#134-4505
IFH11		012040	53-1985 #53-1995
IFH12		014400	#72-2462
IFH121		015076	#74-2555
IFH20		021210	88-3073 #88-3081
IFH21		021752	90-3151 90-3153 #90-3189
IFH23		023154	96-3406 #96-3420
IFH231		023432	#100-3485
IFH232		023756	#102-3567
IFH234		024474	#108-3683
IFH242		026536	116-3963 #116-3968
IFH251		032036	#134-4520
IFI11		012104	53-1983 #53-2004
IFI121		015136	74-2560 #74-2563
IFI20		021064	88-3060 #88-3062
IFI21		021774	90-3190 90-3192 #90-3194
IFI23		022552	96-3347 #96-3349
IFI231		023346	#100-3467
IFI241		025462	#114-3848
IFI242		026516	#116-3964
IFJ11		012114	#53-2007
IFJ21		022030	90-3195 #90-3200
IFJ23		022706	#96-3376
IFJ241		025762	#114-3884
IFJ242		026546	116-3965 #116-3970
IFK11		012124	#53-2010
IFK20		020700	#88-3033
IFK21		021576	#90-3161
IFK234		024532	#108-3689
IFK241		025770	#114-3886
IFK242		026574	116-3973 #116-3976
IFL11		012164	53-2009 #53-2018
IFL20		021246	88-3063 #88-3089
IFL21		021476	#90-3142
IFL241		026000	#114-3888
IFL242		026656	116-3967 116-3975 116-3981 116-3987 #116-3989
IFM20		021356	#88-3106
IFM21		021654	90-3167 90-3169 #90-3173
IFM241		025634	#114-3874
IFM242		026622	116-3979 #116-3982
IFN21		021664	#90-3175

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CZRxDB	CREATED BY	MACRO	ON	1-AUG-79	AT	09:40										
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES													
IFN242		026702	116-3959	116-3969	116-3990	#116-3993										
IFO21		022076	#90-3208													
IFO242		026742	#116-4002													
IFP242		026750	#116-4004													
IFQ242		026770	116-4003	#116-4008												
IFR242		027006	116-4005	116-4007	116-4009	#116-4011										
IFS242		027050	116-3961	116-3996	116-3999	116-4001	116-4015	116-4017	#116-4019							
IFU242		027024	116-4012	#116-4014												
IFV242		027032	#116-4016													
IFX242		026424	#116-3949													
IF00		013776	68-2366	#68-2371												
IF1211		015464	#78-2632													
IGATDP		012602	#57-2094													
IG1211		015502	78-2633	#78-2635												
IG243		027422	120-4074	#120-4102												
IHATDP		012616	57-2095	#57-2097												
IH1211		015554	#78-2644													
IH243		027456	120-4105	#120-4111												
I1ATDP		012644	#57-2103													
I11211		015662	#78-2658													
I1243		027516	120-4114	#120-4122												
I1JATDP		012660	57-2104	#57-2106												
I1J1211		015672	#78-2660													
I1J243		027530	#120-4125													
IKATDP		012726	#57-2117													
ILATDP		012742	57-2118	#57-2120												
INCSAD		033542	*144-4682	*144-4689	144-4697	#144-4702										
INCTRK		021436	*88-3095	*88-3102	#88-3123	96-3409	96-3411									
INDITK		002210	#19-896	70-2415	82-2747	102-3565										
INIT		011250	#51-1887													
INITER		011470	51-1905	#51-1923												
INITL		014016	*68-2335	#68-2378	88-3033	*88-3104	90-3142	96-3357	100-3467							
INITTK		024252	*88-3035	102-3567	*102-3569	#104-3630										
INMSG2		012332	53-2032	#53-2041												
INMSG3		012432	53-2035	#53-2042												
INTCMD		015266	*74-2546	*74-2549	74-2551	#76-2592										
INTER		007414	#49-1836													
INTER1		011606	51-1923	#51-1953												
INTER2		016167	72-2443	72-2488	#80-2719											
INTER3		016235	72-2452	72-2486	#80-2720											
INTER4		016305	72-2493	#80-2721												
INTHO		033466	51-1926	#144-4682												
INTH1		033502	51-1929	#144-4689												
INTLV		023706	100-3483	100-3491	100-3501	#100-3544										
ISR	=	000100	#20-979													
ITCSAD		015272	*74-2533	74-2551	74-2552	74-2563	#76-2594	78-2640	78-2641	78-2650	78-2656					
			78-2658	78-2660	78-2663											
			*74-2535	74-2555	74-2559	74-2571	#76-2595	78-2612	78-2619	78-2646	78-2657					
ITDBAD		015274	74-2576	78-2678	#80-2700											
ITDROP		016064	80-2689	#80-2717												
ITERMG		016132	72-2444	72-2453	72-2489	74-2574	78-2670	78-2676	#80-2688							
ITERR		016016	80-2709	#80-2718												
ITERUT		016153														

SYMBOL	VALUE	CROSS REFERENCE	REFERENCES							
ITER1	017032		78-2665 #80-2731							
ITER2	017116		78-2667 #80-2732							
ITER3	017200		74-2557 #80-2733							
ITMSG	016130		*72-2443 *72-2452 *72-2486 *72-2488 *74-2557 *74-2561 *74-2565 *74-2573 *78-2614							
			*78-2622 *78-2665 *78-2667 *78-2669 *78-2673 *78-2675							
ITMSG1	016334		74-2561 #80-2722							
ITMSG2	016357		74-2573 #80-2723							
ITMSG3	016401		78-2614 #80-2724							
ITMSG4	016454		78-2669 #80-2725							
ITMSG5	016521		74-2565 #80-2726							
ITMSG6	016576		78-2622 #80-2727							
ITMSG7	016652		78-2673 #80-2728							
ITMSG8	016704		78-2675 #80-2729							
ITMSG9	016753		78-2648 #80-2730							
ITPRNT	016102		78-2615 78-2623 80-2694 #80-2708							
IXE	= 004000	G	#20-979							
ISAU	= 000041		#17-782 #65-2259 #65-2267							
ISAUTO	= 000041		#17-782 #57-2086 #57-2127							
ISCLN	= 000041		#17-782 #55-2054 #55-2067							
ISDU	= 000041		#17-782 #63-2207 #63-2227							
ISHRD	= 000041		#146-4794 #146-4808							
ISINIT	= 000041		#17-782 #51-1886 #51-1930							
ISMOD	= 000041		#17-782 17-808 #17-808 19-910 #19-910 20-972 #20-972 38-1549 #38-1549							
			39-1602 #39-1602 152-4945 #152-4945							
ISMSG	= 000041		#17-782 #32-1344 #32-1345 #32-1363 #32-1365							
ISPROT	= 000040		#17-782 #49-1872							
ISPTAB	= 000041		#17-782 152-4948 #152-4948 152-4953 #152-4953 152-4954 #152-4954 152-4959 #152-4959							
ISPWR	= 000041		#17-782							
ISRPT	= 000041		#17-782 #39-1610 #39-1646							
ISSEG	= 000041		#17-782 68-2330 68-2332 68-2353 #74-2539 #74-2575 #78-2609 #78-2677 #88-3052							
			#88-3111							
ISSETU	= 000041		#17-782 152-4947 #152-4947 152-4948 152-4954 152-4960 #152-4960							
ISSFT	= 000041		#148-4835 #148-4872							
ISSRV	= 000041		#17-782							
ISSUB	= 000041		#17-782 68-2330 68-2332 #68-2332 68-2347 #68-2347 #68-2347 #68-2347 68-2353 #68-2353							
			68-2364 #68-2364 #68-2364							
ISTST	= 000041		#17-782 68-2330 #68-2330 68-2332 68-2353 68-2376 144-4733 #144-4733 #144-4733							
JSJMP	= 000167		#17-782							
LAREC	005130		38-1540 #38-1543							
LA2432	030006		122-4198 #122-4208							
LA2433	030176		124-4234 #124-4243							
LBU234	025154		110-3765 #110-3770							
LB1211	015366		78-2613 #78-2618							
LB24U1	030424		128-4293 128-4295 #128-4300							
LB2432	027762		122-4200 #122-4204							
LB2433	030152		124-4236 #124-4239							
LB2434	030270		126-4263 #126-4266							
LC243	027402		120-4095 #120-4098							
LC2432	030050		122-4211 #122-4215							
LD00	013742		68-2356 #68-2362							
LD1211	015772		78-2626 #78-2675							
LEU234	025204		110-3775 #110-3778							

CZRADB
SYMBOL CROSS REFERENCE

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SYMBOL	VALUE	REFERENCES
LE1211	015762	78-2629 #78-2673
LF	= 000012 G	#150-4877 150-4880 150-4881 150-4882 150-4883 150-4884 150-4885 150-4886 150-4887 150-4888 150-4889 150-4890 150-4891 150-4892 150-4893 150-4894 150-4895 150-4896 150-4897 150-4898 150-4899 150-4900 150-4901 150-4902 150-4903 150-4904 150-4905 150-4906 150-4907
LFOO	014010	68-2372 #68-2375
LH1211	015742	78-2645 #78-2669
LINECT	005636	*39-1620 *39-1630 *39-1640 41-1679 *41-1695 41-1696 #41-1700 41-1696 #41-1701 *43-1711 *43-1728 43-1729
LINES	005640	*39-1624 *39-1634 *39-1643 41-1680 #41-1702
LINTYP	005642	*39-1635 *39-1644
LI1211	015732	78-2659 #78-2667
LI243	027572	120-4123 #120-4136
LOAD	017704	84-2801 84-2814 84-2828 84-2839 #84-2848
LOE	= 040000 G	#20-979
LOGOFF	027622	*120-4093 #120-4146 122-4184 *122-4201 *122-4204 *122-4208 *124-4241 *124-4244 128-4287 128-4306
LOT	= 000010 G	#20-979
LSACP	002110 G	#17-825
LSAPT	002036 G	#17-825
LSAU	013562 G	17-825 #65-2259
LSAUT	002070 G	#17-825
LSAUTO	012552 G	17-825 #57-2086
LSCCP	002106 G	#17-825
LSCLEA	012522 G	17-825 #55-2054
LSCO	002032 G	#17-825
LSDEPO	002011 G	#17-825
LSDESC	002122 G	17-825 #17-833
LSDESP	002076 G	#17-825
LSDEVP	002060 G	#17-825
SDISP	002154 G	17-825 #17-844
SDLY	002116 G	#17-825
SDTP	002040 G	#17-825
SDTYP	002034 G	#17-825
SDU	013274 G	17-825 #63-2207
SDUT	002072 G	#17-825
SDVTY	002346 G	17-825 #26-1205
LSEF	002052 G	#17-825
SENV1	002044 G	#17-825
SERRT	002374 G	17-825 #28-1248
SETP	002102 G	#17-825
SEXP1	002046 G	#17-825
SEXP4	002064 G	#17-825
SEXP5	002066 G	#17-825
SHARD	035012 G	17-825 146-4794 #146-4794
SHIME	002120 G	#17-825
SHPCP	002016 G	#17-825
SHPTP	002022 G	#17-825
SHW	002160 G	17-825 19-862 #19-862
SICP	002104 G	#17-825
SINIT	011250 G	17-825 #51-1886
SLADP	002026 G	#17-825
SLAST	040454 G	17-825 #152-4944 152-4960

SYMBOL	VALUE	CROSS REFERENCE	REFERENCES
LSLOAD	002100	G	#17-825
LSLUN	002074	G	#17-825 *28-1244 *59-2156 *59-2158 *59-2160 *80-2692
LSMREV	002050	G	#17-825
LSNAME	002000	G	#17-825
LSPRIO	002042	G	#17-825
LSPROT	011242	G	17-825 #49-1872
LSPRT	002112	G	#17-825
LSREPP	002062	G	#17-825
LSREV	002010	G	#17-825
LSRPT	005140	G	17-825 #39-1610
LSSOFT	035136	G	17-825 148-4835 #148-4835
LSSPC	002056	G	#17-825
LSSPCP	002020	G	#17-825
LSSPTP	002024	G	#17-825
LSSTA	002030	G	#17-825
LSSW	002172	G	17-825 19-887 #19-887
LSTEST	002114	G	#17-825
LSTIML	002014	G	#17-825
LSUNIT	002012	G	#17-825 51-1904 51-1916
L10000	002170		19-862 #19-875
L10001	002220		19-887 #19-908
L10002	004506		#32-1345
L10003	004514		#32-1365
L10004	005406		#39-1646
L10006	011602		#51-1930
L10007	012550		#55-2067
L10010	012772		#57-2127
L10011	013434		#63-2227
L10012	013562		#65-2267
L10013	035006		68-2376 #144-4733
L10014	013664		#68-2347
L10015	013750		#68-2364
L10016	035060		146-4794 146-4801 #146-4808
L10017	035400		148-4835 148-4861 #148-4872
L10020	040460		#152-4948
L10021	040474		152-4948 #152-4954
L10022	040470		152-4948 #152-4953
L10024	040504		152-4954 #152-4959
MAXSEC	002214		#19-898 100-3498 100-3504 100-3509 100-3511
MAXTRK	024234		*102-3565 102-3595 102-3602 102-3605 102-3610 #104-3623
MCRDRT	032321		134-4526 #134-4539
MCWTRT	032270		134-4511 #134-4538
MDRDRT	032213		134-4523 #134-4536
MDWTRT	032134		134-4508 #134-4534
MINSEC	002212		#19-897 100-3480 100-3494 100-3495 100-3496 100-3498
MINTRK	024232		*102-3566 102-3575 102-3597 102-3598 102-3610 102-3613 #104-3622
MRDRT	032244		134-4529 #134-4537
MSG1	035060		146-4796 #146-4810
MSG11	037312		148-4841 #150-4910
MSG14	037341		148-4842 #150-4911
MSG15	037425		148-4844 #150-4913
MSG16	037463		148-4845 #150-4914

SYMBOL	VALUE		REFERENCES						
PLOC	011604		*51-1918	#51-1951	53-1963				
PNT	= 001000	G	#20-979						
POWERF	= 000001	G	#20-1061	51-1895	70-2388				
PREPT1	006002		41-1664	41-1681	41-1691	43-1714	#45-1740		
PREPT2	006030		41-1657	41-1684	#45-1752				
PREPT3	006050		43-1723	#45-1762					
PRESCK	020536		86-2981	#86-2983					
PRESTK	020642		*86-2880	*86-2882	86-2912	86-2920	86-2964	86-2983	*86-2997 #86-3004
PRI	= 002000	G	#20-979						
PRIDXX	006360		39-1623	#47-1782					
PRID01	006426		47-1782	#47-1804					
PRID02	006455		47-1783	#47-1805					
PRID03	006504		47-1784	#47-1806					
PRID04	006533		47-1785	#47-1807					
PRID05	006562		47-1786	#47-1808					
PRID06	006611		47-1787	#47-1809					
PRID07	006640		47-1788	#47-1810					
PRID08	006667		47-1789	#47-1811					
PRID09	006716		47-1790	#47-1812					
PRID10	006745		47-1791	#47-1813					
PRID11	006774		47-1792	#47-1814					
PRID12	007023		47-1793	#47-1815					
PRID13	007052		47-1794	#47-1816					
PRID14	007101		47-1795	#47-1817					
PRID15	007130		47-1796	#47-1818					
PRID16	007157		47-1797	#47-1819					
PRID17	007206		47-1798	#47-1820					
PRID18	007235		47-1799	#47-1821					
PRID19	007264		47-1800	#47-1822					
PR100	= 000000	G	#20-979	#20-1047	110-3761				
PR101	= 000040	G	#20-979	#20-1046					
PR102	= 000100	G	#20-979	#20-1045					
PR103	= 000140	G	#20-979	#20-1044					
PR104	:: 000200	G	#20-979	#20-1043					
PR105	:: 000240	G	#20-979	#20-1042					
PR106	= 000300	G	#20-979	#20-1041					
PR107	= 000340	G	#20-979	#20-1040	51-1926	51-1929	59-2150	110-3779	
PRNUM	005644		*39-1621	*39-1631	*39-1641	41-1677	#41-1703		
PRTBOS	004516		#32-1367	72-2494	80-2712				
PRTB1	004510	G	#32-1363	59-2163					
PRTB1S	004536		32-1364	#32-1370	78-2649	80-2710	134-4530		
PRTCTR	005646		39-1615	#43-1710					
PRTDAT	005510		39-1625	39-1636	39-1645	#41-1676			
PRTECD	002272		#22-1112	28-1254	*28-1258	*38-1530			
PRTERR	002404		#28-1253	78-2671	132-4422	140-4621			
PRTHDR	005414		39-1614	39-1618	39-1628	39-1639	#41-1655		
PRT1	005504		*39-1612	*39-1616	*39-1626	*39-1637	41-1656	#41-1670	
PRT2	005506		*39-1613	*39-1617	*39-1627	*39-1638	41-1663	#41-1671	
PTDAT1	006243		41-1690	#45-1771					
PTEC	006200		39-1626	#45-1769					
PTECN	006327		39-1633	39-1635	#45-1775				
PTFMN1	006315		43-1722	#45-1774					

CZRADB	CREATED BY	MACRO	ON	1-AUG-79	AT	09:40	PAGE	21											
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES				CREF	V01											
PTHEAD		026062	*114-3838	114-3874	*114-3876	#114-3907													
PTRDSC		006116	43-1713	#45-1767															
PRTY		031676	132-4428	#134-4493															
PTTK		006225	39-1637	#45-1770															
PTTKN		006343	39-1644	#45-1776															
PTUNT1		006253	39-1617	39-1627	39-1638	#45-1772													
PTUNT2		006274	39-1613	#45-1773															
PTWTSC		006147	43-1732	#45-1768															
PT19SP		006105	39-1616	#45-1766															
PT20SP		006074	39-1612	#45-1765															
RANDAT		017656	84-2798	#84-2837	84-2842														
RANGEN		004560	#34-1456	84-2837	86-2975														
RANUM		004652	*34-1471	#34-1476	84-2838	*86-2976	86-2977	86-2980	86-2983	86-2985									
RAN1		004646	34-1457	*34-1463	34-1468	#34-1474													
RAN2		004650	34-1458	34-1465	*34-1470	#34-1475													
RD		007454	#49-1840																
RDERCD		005026	#38-1528	78-2664	116-4021														
RDYWD		025330	*38-1537	*72-2438	*72-2447	*72-2475	*74-2553	*78-2642	*78-2651	*108-3674	*108-3685								
			*108-3694	*108-3702	*108-3709	*108-3713	*108-3722	108-3748	*108-3748	108-3750	110-3791								
			110-3795	#110-3809	*116-3925	*116-3947													
			#22-1127	134-4528															
READRT		002324	43-1712	#49-1830	86-3018	*126-4269	*126-4271	*126-4273	*126-4275	*126-4277									
READSC		007314	*38-1531	*38-1532	38-1533	#38-1546													
RECCMD		005136	#76-2591	*78-2616	*78-2624	*78-2631	*78-2634	*78-2639	78-2640	78-2662									
REFCMD		015264	74-2578	#78-2606															
REFDRV		015306	#39-1611																
REPORT		005140	#20-1060	51-1908															
RESTAR	=	000002	G	*88-3066	*88-3067	*88-3077	*88-3078	#88-3128	96-3349	96-3351	*96-3356								
RESTK		021450	*22-1119	*68-2336	90-3148	90-3189	90-3191	90-3194	*90-3197	90-3200	*90-3203								
RETRY		002304	*90-3210	96-3379	96-3385	*96-3398	*120-4134	*128-4297	*128-4303	134-4494	134-4496								
			134-4501	134-4503	134-4505	134-4516	134-4518	134-4520											
RTMASK		030474	*122-4205	*122-4212	*122-4213	*122-4215	*122-4216	*124-4237	*124-4239	*124-4243	128-4297								
			128-4303	#128-4313															
RTOFF		027624	#120-4147	*122-4202	*122-4206	*122-4209	*124-4230	*124-4240	128-4288										
RXXX		002172	#19-889	53-1982	57-2100	72-2461	72-2466	72-2511	74-2567	78-2635	96-3342								
			106-3647	118-4039															
RX2BIT	=	004000	G	#20-1053	74-2563														
RYDLY		025326	110-3794	#110-3808															
RYDX		025324	78-2652	*78-2653	*78-2655	110-3793	#110-3807												
SAVDLY		016014	*78-2652	78-2655	#78-2681														
SCPSCT		023660	100-3483	*100-3497	*100-3508	*100-3516	*100-3526	#100-3533											
SCSYEX		020676	68-2354	#88-3032															
SDD		002230	#22-1093	*63-2224	*68-2337	*88-3075	138-4572												
SECADR		025040	*96-3431	96-3435	108-3703	#108-3737													
SECDN		002262	#22-1107	90-3159	*96-3355	96-3407	*100-3528												
SECTOR		002256	#22-1105	*96-3435	114-3877														
SEEK		023322	*96-3390	*96-3397	*96-3414	*96-3416	#98-3453												
SEEKCK		026046	*114-3837	*114-3867	114-3884	#114-3901													
SEEKRT		002306	#22-1120	120-4127	128-4289	134-4498													
SEK		007424	#49-1837	128-4307															
SEQUEN		020654	*82-2745	*86-2894	86-2896	*86-2898	86-2899	#86-3009											
SEQ1		020164	86-2904	#86-2912	86-2933														

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SVCSUB = 177777	#17-782	#17-790	68-2332	68-2332	68-2332	68-2353	68-2353	68-2353	
SVCTAG = 177777	#17-782	#17-792	19-875	19-875	19-875	19-908	19-908	19-908	32-1345
	32-1345	32-1345	32-1365	32-1365	32-1365	39-1646	39-1646	39-1646	51-1930
	51-1930	51-1930	55-2067	55-2067	55-2067	57-2127	57-2127	57-2127	63-2227
	63-2227	63-2227	65-2267	65-2267	65-2267	68-2347	68-2347	68-2347	68-2364
	68-2364	68-2364	74-2575	74-2575	74-2575	78-2627	78-2627	78-2627	78-2677
	78-2677	78-2677	88-3111	88-3111	88-3111	144-4733	144-4733	144-4733	146-4808
	146-4808	146-4808	148-4872	148-4872	148-4872	152-4948	152-4948	152-4948	152-4953
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SVCTST = 177777	#17-782	#17-789	68-2330	68-2330	68-2330				
SVUTRG 033516	144-4683	144-4690	#144-4696						
SWREG 002204	#19-894	68-2369	70-2391	70-2409	70-2416	70-2421	78-2610	82-2751	#82-2753

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
SYFT	=	000000 G	90-3150 96-3381 96-3388 114-3870 128-4290
SYSERR	=	004000 G	#20-1057 140-4618
SYSE10		033122	#20-1062 61-2188
SYSE11		033151	#142-4637 142-4653
SYSE12		033161	#142-4638 142-4654
SYSE13		033171	#142-4639 142-4655
SYSE14		033225	#142-4640 142-4656
SYSE15		033242	#142-4641 142-4657
SYSE16		033302	#142-4642 142-4658
SYSE4		032700	#142-4643 142-4659
SYSE5		032733	#142-4631 142-4647
SYSE6		032764	#142-4632 142-4648
SYSE7		033010	#142-4633 142-4649
SYSE8		033033	#142-4634 142-4650
SYSE9		033072	#142-4635 142-4651
S&LSYM	=	010000	#142-4636 142-4652
			#17-782 #19-875 #19-908 #32-1345 #32-1365 #39-1646 #51-1930 #55-2067 #57-2127
			#63-2227 #65-2267 #68-2347 #68-2364 74-2539 74-2539 #74-2539 78-2609 78-2609
			#78-2609 78-2627 78-2627 78-2627 #78-2627 88-3052 88-3052 #88-3052 #144-4733
TARGET		020640	#146-4808 #148-4872
			*86-2881 *86-2883 *86-2914 *86-2916 *86-2922 *86-2924 *86-2937 *86-2940 *86-2944
			*86-2952 *86-2956 *86-2959 *86-2966 *86-2969 *86-2971 *86-2985 *86-2988 86-2994
			86-2995 86-2997 #86-3003
TBPRCT		022160	*90-3157 90-3161 *90-3164 90-3181 *90-3183 *90-3186 *90-3211 *90-3213 #90-3226
THA234		024464	108-3679 #108-3681
THA25		030756	132-4386 #132-4393
THA40		032544	140-4594 #140-4600
TMB231		023514	#100-3500
THC13		017366	82-2750 #82-2754
TMD23		022772	96-3389 #96-3392
TME22		022440	94-3313 #94-3321
TME234		024754	#108-3720
THF231		023560	100-3484 #100-3513
THF241		025624	114-3869 #114-3872
TKTBPT		020634	*86-2879 *86-2992 86-2993 #86-3001
TKTL		024242	102-3570 102-3581 #104-3626
TKXX		010070	39-1642 #49-1852 120-4119
TRACK		002254	#22-1104 *96-3434 114-3877 120-4115
TRAP		013260	59-2150 #61-2188
TRBIT	=	000200 G	#20-1051 38-1537 78-2642 108-3685 108-3694 108-3702 108-3709 108-3713 108-3722
TRKADR		025036	*96-3430 96-3434 108-3707 #108-3736
TRKCNT		020636	*86-2888 *86-2889 *86-2890 *86-2942 *86-2986 #86-3002
TRKDN		002260	#22-1106 90-3168 *90-3170 *102-3614
TRKDNF		024230	*102-3578 *102-3592 *102-3607 *102-3612 102-3614 #104-3621
TRKINC		024236	*96-3411 102-3579 *102-3615 #104-3624
TRKSEQ		002202	#19-893 82-2745 86-2894
TRKTBL		033554	86-2991 102-3584 #144-4719
TRPMS1		013144	59-2155 #59-2169
TSVACT		022162	*90-3198 *90-3204 *90-3206 90-3208 #90-3227
TSEC		033551	28-1257 #144-4712
TST		021422	*88-3055 88-3056 88-3059 88-3068 88-3096 88-3100 #88-3117
TSTCK		027626	*112-3825 120-4068 #120-4148 122-4197 122-4210 124-4235

CZRADB
SYMBOL CROSS REFERENCE
SYMBOL VALUE

CREATED BY MACRO ON 1-AUG-79 AT 09:40

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CREF V01

C 11

SEQ 0132

SYMBOL	VALUE	REFERENCES	112-3818	112-3820	112-3822	112-3825	#112-3829	116-3970	116-3976	116-3982
TSTEV	025410	*88-3098	112-3818	112-3820	112-3822	112-3825	#112-3829	116-3970	116-3976	116-3982
		116-3997	118-4035							
TSTN	002176	#19-891	88-3053							
TSTPAT	002200	#19-892	82-2743							
TSTPTR	022152	*90-3144	90-3154	*90-3156	*90-3163	*90-3177	*90-3179	*90-3184	*90-3187	*90-3196
		*90-3202	*90-3207	90-3214	*90-3219	#90-3223				
TSTSUT	022502	*94-3306	*94-3308	94-3309	*94-3316	*94-3318	94-3319	#94-3331		
TSTWD	022156	88-3055	90-3166	90-3173	90-3175	*90-3216	#90-3225			
TTRK	033550	28-1257	#144-4711							
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		63-2217	#63-2225	63-2225	#63-2225	63-2225	63-2225	#114-3877	114-3877	#114-3877
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		#148-4861	148-4861							
		#17-782								
T\$ERRN	= 000000	#146-4796	146-4796	#146-4797	146-4797	#146-4798	146-4798	#146-4799	146-4799	#148-4840
T\$EXCP	= 000000	148-4840	#148-4841	148-4841	#148-4842	148-4842	#148-4843	148-4843	#148-4854	148-4854
		#148-4855	148-4855	#148-4858	148-4858	#148-4859	148-4859			
T\$FLAG	= 000041	#68-2376	#68-2376	68-2376	68-2376	#146-4801	146-4801	146-4801	#148-4861	148-4861

CZRxDB
SYMBOL
SYMBOL

CREATED BY
CROSS REFERENCE
VALUE

MACRO ON 1-AUG-79 AT 09:40

PAGE 26
CREF V01

D 11

SEQ 0133

REFERENCES

TSFREE = 040504
TSGMAN = 000000
TSHILI = 000032

148-4861
152-4944 #152-4960
#17-782
#146-4796 146-4796 #146-4797 146-4797 #146-4798 146-4798 #146-4799 146-4799 #148-4840
148-4840 #148-4841 148-4841 #148-4842 148-4842 #148-4843 148-4843 #148-4854 148-4854
#148-4855 148-4855 #148-4858 148-4858 #148-4859 148-4859

TSLAST = 000001
T\$LOLI = 000001

#17-782 #152-4944 152-4947
#146-4796 146-4796 #146-4797 146-4797 #146-4798 146-4798 #146-4799 146-4799 #148-4840
148-4840 #148-4841 148-4841 #148-4842 148-4842 #148-4843 148-4843 #148-4854 148-4854
#148-4855 148-4855 #148-4858 148-4858 #148-4859 148-4859

T\$LSYM = 010000

#17-782 17-782 19-875 19-908 32-1345 32-1365 39-1646 51-1930 55-2067
57-2127 63-2227 65-2267 68-2347 68-2364 144-4733 146-4808 148-4872

T\$LTNO = 000001
T\$NEST = 177777

#152-4944
#17-782 17-808 #17-808 17-808 19-862 #19-862 19-862 19-875 19-875
19-875 #19-875 19-887 #19-887 19-887 19-908 19-908 19-908 #19-908
19-910 19-910 19-910 #19-910 20-972 #20-972 20-972 32-1344 #32-1344
32-1344 32-1345 32-1345 32-1345 #32-1345 32-1363 #32-1363 32-1363 32-1365
32-1365 32-1365 #32-1365 38-1549 38-1549 38-1549 #38-1549 39-1602 #39-1602
39-1602 39-1610 #39-1610 39-1610 39-1646 39-1646 39-1646 #39-1646 49-1872
#49-1872 49-1872 49-1876 49-1876 49-1876 #49-1876 51-1886 #51-1886 51-1886
51-1930 51-1930 51-1930 #51-1930 55-2054 #55-2054 55-2054 55-2067 55-2067
55-2067 #55-2067 57-2086 #57-2086 57-2086 57-2127 57-2127 57-2127 #57-2127
63-2207 #63-2207 63-2207 63-2227 63-2227 63-2227 #63-2227 65-2259 #65-2259
65-2259 65-2267 65-2267 65-2267 65-2267 #65-2267 68-2330 #68-2330 68-2330
#68-2332 68-2332 68-2347 68-2347 68-2347 #68-2347 68-2353 #68-2353 68-2353
68-2364 68-2364 68-2364 #68-2364 74-2539 #74-2539 74-2539 74-2575 74-2575
74-2575 #74-2575 78-2609 #78-2609 78-2609 78-2677 78-2677 78-2677 #78-2677
88-3052 #88-3052 88-3052 88-3111 88-3111 88-3111 #88-3111 144-4733 144-4733
144-4733 #144-4733 146-4794 #146-4794 146-4794 146-4801 146-4801 146-4808 146-4808
146-4808 #146-4808 148-4835 #148-4835 148-4835 148-4838 148-4847 148-4853 148-4853
148-4861 148-4861 148-4872 148-4872 148-4872 #148-4872 152-4945 152-4945 152-4945
#152-4945

T\$NSO = 000000
T\$NS1 = 000005

#17-808 19-910 #20-972 38-1549 #39-1602 152-4945
#19-862 19-875 #19-887 19-908 #32-1344 32-1345 #32-1363 32-1365 #39-1610
39-1646 #49-1872 49-1876 #51-1886 51-1930 #55-2054 55-2067 #57-2086 57-2127
#63-2207 63-2227 #65-2259 65-2267 #68-2330 144-4733 #146-4794 146-4801 146-4801
146-4808 #148-4835 148-4838 148-4847 148-4853 148-4857 148-4861 148-4861 148-4872
#68-2332 68-2347 #68-2353 68-2364 #74-2539 74-2575 #78-2609 78-2677 #88-3052
88-3111

T\$NS2 = 000003

#152-4947 152-4948 #152-4948 152-4948 152-4954 #152-4954 152-4954

T\$PCNT = 000000
T\$PTAB = 010023
T\$PTHV = 000002
T\$PTNU = 000002
T\$SAVL = 177777
T\$SEGL = 177777

#152-4948 152-4948 #152-4948 152-4954 152-4954
17-825 #152-4960
#17-782 152-4948 #152-4948 152-4954 #152-4954 152-4960 152-4960
#17-782 74-2539 #74-2539 74-2539 74-2575 74-2575 74-2575 #74-2575 74-2575
78-2609 #78-2609 78-2609 78-2677 78-2677 78-2677 #78-2677 78-2677 88-3052
#88-3052 88-3052 88-3111 88-3111 88-3111 #88-3111 88-3111
#74-2539 74-2575 #78-2609 78-2677 #88-3052 88-3111

T\$SEKO = 010003
T\$SIZE = 000014
T\$SUBN = 000002
T\$TAGL = 177777
T\$TAGN = 010025

#152-4947 152-4948 #152-4948 152-4948 152-4954 #152-4954 152-4954
#17-782 152-4948 #152-4948 152-4954 #152-4954 152-4960 152-4960
#17-782 74-2539 #74-2539 74-2539 74-2575 74-2575 74-2575 #74-2575 74-2575
78-2609 #78-2609 78-2609 78-2677 78-2677 78-2677 #78-2677 78-2677 88-3052
#88-3052 88-3052 88-3111 88-3111 88-3111 #88-3111 88-3111
#74-2539 74-2575 #78-2609 78-2677 #88-3052 88-3111
152-4944 #152-4960
#17-782 #68-2330 68-2332 #68-2332 68-2332 68-2332 #68-2332 68-2332 68-2332
#17-782 #17-782 19-862 19-862 #19-862 19-887 19-887 #19-887 32-1344 32-1344

SYMBOL CROSS REFERENCE

SYMBOL VALUE REFERENCES

#32-1344	32-1363	32-1363	#32-1363	39-1610	39-1610	#39-1610	49-1872	49-1872
#49-1872	51-1886	51-1886	#51-1886	55-2054	55-2054	#55-2054	57-2086	57-2086
#57-2086	63-2207	63-2207	#63-2207	65-2259	65-2259	#65-2259	68-2330	68-2330
#68-2330	68-2332	68-2332	#68-2332	68-2353	68-2353	#68-2353	146-4794	146-4794
#146-4794	148-4835	148-4835	#148-4835	152-4947	152-4947	#152-4947	152-4948	152-4948
#152-4948	152-4948	152-4948	#152-4948	152-4954	152-4954	#152-4954	152-4954	152-4954
#152-4954								

T\$TEMP = 000000

#17-844	17-844	17-844	#17-844	#19-875	19-875	#19-908	19-908	#19-910
19-910	#32-1345	32-1345	#32-1365	32-1365	#38-1549	38-1549	#39-1646	39-1646
#49-1876	49-1876	#51-1930	51-1930	#55-2067	55-2067	#57-2127	57-2127	#63-2227
63-2227	#65-2267	65-2267	#68-2347	68-2347	#68-2364	68-2364	#68-2376	68-2376
#74-2575	74-2575	#78-2627	78-2627	#78-2627	78-2627	#78-2627	78-2627	#78-2677
78-2677	#88-3111	88-3111	#144-4733	144-4733	#146-4796	146-4796	#146-4796	146-4796
#146-4796	146-4796	#146-4797	146-4797	#146-4797	146-4797	#146-4797	146-4797	#146-4798
146-4798	#146-4798	146-4798	#146-4798	146-4798	#146-4799	146-4799	#146-4799	146-4799
#146-4799	146-4799	#146-4801	146-4801	#146-4808	146-4808	#148-4837	148-4837	#148-4837
148-4837	#148-4837	148-4837	#148-4839	148-4839	#148-4839	148-4839	#148-4839	148-4839
#148-4840	148-4840	#148-4840	148-4840	#148-4840	148-4840	#148-4841	148-4841	#148-4841
148-4841	#148-4841	148-4841	#148-4842	148-4842	#148-4842	148-4842	#148-4842	148-4842
#148-4843	148-4843	#148-4843	148-4843	#148-4843	148-4843	#148-4844	148-4844	#148-4844
148-4844	#148-4844	148-4844	#148-4845	148-4845	#148-4845	148-4845	#148-4845	148-4845
#148-4846	148-4846	#148-4846	148-4846	#148-4846	148-4846	#148-4848	148-4848	#148-4848
148-4848	#148-4848	148-4848	#148-4849	148-4849	#148-4849	148-4849	#148-4849	148-4849
#148-4850	148-4850	#148-4850	148-4850	#148-4850	148-4850	#148-4851	148-4851	#148-4851
148-4851	#148-4851	148-4851	#148-4852	148-4852	#148-4852	148-4852	#148-4852	148-4852
#148-4854	148-4854	#148-4854	148-4854	#148-4854	148-4854	#148-4855	148-4855	#148-4855
148-4855	#148-4855	148-4855	#148-4856	148-4856	#148-4856	148-4856	#148-4856	148-4856
#148-4858	148-4858	#148-4858	148-4858	#148-4858	148-4858	#148-4859	148-4859	#148-4859
148-4859	#148-4859	148-4859	#148-4860	148-4860	#148-4860	148-4860	#148-4860	148-4860
#148-4861	148-4861	#148-4872	148-4872	#152-4945	152-4945			

T\$TEST = 000001

T\$TSTM = 177777

#17-782	68-2330	#68-2330	68-2330	68-2332	68-2353	152-4944		
#17-782	28-1245	28-1253	28-1256	28-1257	30-1285	32-1345	32-1365	32-1367
32-1370	39-1646	45-1740	45-1752	45-1762	51-1892	51-1893	51-1897	51-1906
51-1918	51-1923	51-1925	51-1926	51-1929	51-1930	53-2032	53-2033	53-2035
55-2062	55-2065	55-2066	55-2067	57-2096	57-2099	57-2105	57-2108	57-2119
57-2122	57-2125	57-2127	59-2150	59-2152	59-2165	63-2217	63-2225	63-2227
65-2267	68-2332	68-2347	68-2353	68-2363	68-2364	68-2373	68-2375	68-2376
72-2436	74-2539	74-2575	78-2609	78-2625	78-2627	78-2677	80-2693	80-2701
88-3052	88-3111	90-3145	96-3376	110-3761	110-3779	114-3877	114-3878	144-4733

T\$TSTS = 000001

T\$SAU = 010012

T\$SAUT = 010010

T\$SCLE = 010007

T\$SDAT = 010024

T\$SDU = 010011

T\$SHAR = 010016

T\$SHW = 010000

T\$SINI = 010006

T\$SMG = 010003

T\$SPC = 000002

T\$SPRO = 010005

T\$SPTA = 010023

#17-782	#68-2330							
#65-2259	65-2267							
#57-2086	57-2127							
#55-2054	55-2067							
#152-4948	152-4948	152-4953	#152-4954	152-4954	152-4959			
#63-2207	63-2227							
#146-4794	146-4794	146-4801	146-4808					
#19-862	19-862	19-875						
#51-1886	51-1930							
#32-1344	32-1345	#32-1363	32-1365					
#152-4947	152-4960							
#49-1872								
#152-4947	152-4948	#152-4948	152-4954	#152-4954				

CZRADB		CREATED BY		MACRO ON 1-AUG-79 AT 09:40		PAGE 28		F 11		SEQ 0135		
SYMBOL	CROSS REFERENCE	VALUE	REFERENCES	CREF	V01							
TSSRPT	=	010004	#39-1610	39-1646								
TSSSEG	=	010003	#74-2539	74-2539	#74-2575	74-2575	#78-2609	78-2609	#78-2677	78-2677	#88-3052	
			88-3052	#88-3111	88-3111							
TSSSOF	=	010017	#148-4835	148-4835	148-4861	148-4872						
TSSSUB	=	010015	#68-2332	68-2347	#68-2353	68-2364						
TSSSW	=	010001	#19-887	19-887	19-908							
TSSTES	=	010013	#68-2330	68-2376	144-4733							
TOMSG		013124	59-2162	#59-2168								
T1		013564	G	17-844	#68-2330							
T1.1		013566		#68-2332								
T1.2		013706		#68-2353								
UAM	=	000200	G	#20-979								
UAU234		025162		#110-3773								
UCOO		013752		#68-2365								
UDCRST		027722		120-4072	#122-4196							
UDHDST		027670		120-4098	#122-4181							
UDSFST		030072		120-4096	#124-4225							
UDU234		025156		#110-3771								
UF243		027412		#120-4100								
UGOO		013766		68-2352	#68-2369							
UKINT		007404		#49-1835								
UK243		027554		#120-4131								
UNIT		002334		#24-1135	28-1244	28-1253	*36-1518	*51-1910	*51-1915	51-1916	51-1918	53-1964
				53-2029	53-2032	53-2035	*72-2502	*72-2505	*72-2509	*72-2519	*72-2522	*72-2526
				*74-2543	78-2647	80-2692	80-2701	80-2708	*94-3328	114-3877		
UNITDP		013436		*63-2209	63-2212	63-2217	63-2225	#63-2229				
UNITST		005024		*36-1514	#36-1521	88-3046						
UNPKHP		011656		51-1921	#53-1961							
UNT		012330		*53-1962	*53-1981	53-2010	53-2018	#53-2039				
UNTCO		015300		*72-2457	*72-2482	74-2540	74-2544	74-2569	*74-2581	#76-2597	78-2632	78-2637
UNTCNT		015276		*72-2455	*72-2481	*74-2580	74-2582	#76-2596				
UNTCOD		012326		*53-1990	*53-1993	*53-1999	*53-2002	*53-2013	*53-2016	*53-2021	*53-2024	53-2026
				#53-2038								
UPDVST		027230		112-3826	#120-4068							
UPSECT		030216		120-4069	#126-4254							
UTCNT		005412		#39-1649	*41-1659	*41-1666	*41-1686	*41-1693	*43-1716	*43-1726		
UTSCDN		023704		*100-3464	*100-3513	*100-3524	100-3528	#100-3543				
UTTST		005410		#39-1648	*41-1658	41-1660	41-1662	*41-1665	*41-1685	41-1688	*41-1692	*43-1715
				43-1717	*43-1724							
UT00		002336		#24-1136	36-1517	41-1658	41-1685	43-1715	*51-1911	53-2025	57-2089	57-2094
				57-2096	63-2211	72-2503	72-2505	74-2542	94-3327			
UT01		002340		#24-1137	*51-1912	57-2097	57-2099	72-2507	72-2509			
UT10		002342		#24-1138	*51-1913	57-2102	57-2103	57-2105	57-2112	57-2117	57-2119	72-2520
				72-2522								
UT11		002344		#24-1139	*51-1914	57-2106	57-2108	57-2120	57-2122	72-2524	72-2526	
UUT		002234		#22-1095	*88-3046	88-3066	88-3077	94-3302	94-3304	*94-3311	94-3314	*94-3321
				*94-3323	94-3324	96-3344	100-3465	100-3553	102-3576	106-3649	106-3654	116-3938
				118-4041	118-4051	126-4254	136-4552	136-4558				
UUTADR		002236		#22-1096	38-1529	38-1534	38-1536	*78-2663	*96-3346	*96-3348	96-3395	96-3432
				116-3917	116-3924	116-3946	116-3956					
UUTOFF		002240		#22-1097	*36-1516	*94-3326	96-3341	120-4109	120-4120	122-4186	128-4301	128-4308
UOADR		002220		#22-1088	*51-1899	*53-1966	53-1969	57-2087	57-2090	57-2123	72-2439	72-2441

CZRXDB
 MACRO CROSS REFERENCE
 MACRO NAME REFERENCES

BGNAU	#65-2259						
BGNAUT	57-2086						
BGNCLN	#55-2054						
BGNDU	#63-2207						
BGNHRD	146-4794						
BGNHW	#19-862						
BGNINI	51-1886						
BGNMOD	17-808	20-972	39-1602				
BGNMSG	#32-1344	#32-1363					
BGNPRO	49-1872						
BGNPTA	#152-4948	#152-4954					
BGNRPT	39-1610						
BGNSEG	74-2539	78-2609	88-3052				
BGNSET	#152-4947						
BGNSFT	#148-4835						
BGNSUB	#68-2332	#68-2353					
BGNSW	#19-887						
BGNTST	68-2330						
BNCOMP	51-1894	51-1898	51-1907	51-1919	78-2626	90-3146	96-3377
BRESET	#55-2066	#72-2436					
CKLOOP	#68-2363						
CLRVEC	55-2062	55-2065	59-2152				
DESCRI	#17-833						
DEVTYP	#26-1205						
DISPAT	17-844						
DOCLN	#51-1925	#53-2033	#57-2125	#68-2373			
DODU	57-2096	57-2099	57-2105	57-2108	57-2119	57-2122	80-2701
DORPT	68-2375						
ENDAU	65-2267						
ENDAUT	#57-2127						
ENDCLN	55-2067						
ENDDU	63-2227						
ENDHRD	#146-4808						
ENDHW	19-875						
ENDINI	#51-1930						
ENDMOD	19-910	38-1549	152-4945				
ENDMSG	32-1345	32-1365					
ENDPRO	#49-1876						
ENDPTA	152-4953	152-4959					
ENDRPT	#39-1646						
ENDSEG	74-2575	78-2677	88-3111				
ENDSET	#152-4960						
ENDSFT	148-4872						
ENDSUB	68-2347	68-2364					
ENDSW	19-908						
ENDTST	144-4733						
EQUALS	20-979						
ERROR	#28-1245	#59-2165	#80-2693				
ERRTBL	28-1248						
EXIT	#68-2376	#146-4801	#148-4861				
GMANIL	#78-2627						
GPHARD	51-1918						

MACRO CROSS REFERENCE
MACRO NAME

REFERENCES

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#45-1740	#45-1740	45-1740	#45-1740	45-1740	#45-1740	45-1740	45-1740	#45-1740	45-1740
45-1740	#45-1752	#45-1752	45-1752	#45-1752	45-1752	45-1752	#45-1752	45-1752	45-1752
#45-1762	#45-1762	45-1762	#45-1762	45-1762	#45-1762	45-1762	#45-1762	45-1762	45-1762
#45-1762	45-1762	45-1762	#51-1892	51-1892	#51-1892	51-1892	#51-1893	51-1893	#51-1893
51-1893	#51-1894	51-1894	#51-1897	51-1897	#51-1897	51-1897	#51-1898	51-1898	#51-1906
51-1906	#51-1906	51-1906	#51-1907	51-1907	#51-1918	51-1918	#51-1918	51-1918	#51-1918
51-1918	#51-1919	51-1919	#51-1923	#51-1923	51-1923	#51-1923	51-1923	51-1923	#51-1923
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51-1926	#51-1926	51-1926	#51-1926	51-1926	51-1926	#51-1929	#51-1929	51-1929	#51-1929
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#53-2032	#53-2032	53-2032	#53-2032	53-2032	#53-2032	53-2032	53-2032	#53-2032	53-2032
53-2032	#53-2033	53-2033	#53-2035	#53-2035	53-2035	#53-2035	53-2035	#53-2035	53-2035
53-2035	#53-2035	53-2035	53-2035	#55-2062	55-2062	#55-2062	55-2062	#55-2065	55-2065
#55-2065	55-2065	#55-2066	55-2066	#55-2067	55-2067	#57-2096	57-2096	#57-2096	57-2096
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