RH11/RS03

DATA RELIABILITY
MD-11-DERSB-B

EP-DERSB-B-DL-A

FICHE 1 OF 1

NOV 1976
digital
MADE IN U.S.A

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DERSB-B-D
PRODUCT NAME:	RH11-RS03-RS04 DATA RELIABILITY DIAGNOSTIC
DATE CREATED:	MARCH-1975
MAINTAINER;	DIAGNOSTIC GROUP
AUTHORS:	STANLEY HARACKIEWICZ

CONTENTS

DESCRIPTION

1. ABSTRACT

THIS DIAGNOSTIC WAS DESIGNED TO TEST RS03 AND RS04 DRIVES.

THE DERSB DISK DATA TEST IS A SERIES OF ADDRESS AND DATA RELIABILITY ROUTINES WHICH VERIFY TO THE USER THAT THE CONTROLLER (RH11) AND THE DISKS (RS03 OR RS04) ARE OPERATING CORRECTLY. THIS TEST SHOULD BE USED IN CONJUNCTION WITH THE DERSA DIAGNOSTIC.

NOTE

THIS PROGRAM WILL DESTROY ALL DATA ON THE DISKS. TURN OFF ALL DRIVES THAT YOU DO NOT WANT TO TEST.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP11 STANDARD COMPUTER WITH A MINIMUM OF 8K OF MEMORY, AND AN RH11 CONTROLLER WITH AN RS03 OR AN RS04 DISK.

2.2 PRELIMINARY PROGRAMS

DZRSA

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR ABS TAPES.

E01

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE 5.1 (ALL DOWN FOR WORST CASE TESTING)

4.2 STARTING ADDRESS

PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY USING ABS LOADER.

1. STARTING ADDRESS 200.

A. SET SWITCHES (SEE SEC 5.1). ALL DOWN FOR WORST CASE

B. THE DISPLAY ON THE 11/45 WILL SHOW THE ITERATION COUNT IN THE LEFT BYTE AND TEST NUMBER IN THE RIGHT. TO USE, SET THE DATA DISPLAY SWITCH TO THE DISPLAY POSITION.

C. PRESS START.

THE PROGRAM WILL NOW MAP THE DATA BUFFERS IN 4K SEGMENTS ON -A- PORT FOR ALL MEMORY IT WILL THEN TYPE OUT THE PARAMETERS OF THE DATA BUFFERS. THE PROGRAM WILL ONLY DO THIS THE FIRST TIME IT IS STARTED, FOR IT STORES THESE ADDRESSES AND CONTINUES USING THEM. TO HAVE THE PROGRAM REMAP THE SYSTEM, THE PROGRAM MUST BE RELOADED. ALL OF MEMORY WILL BE TESTED. YOU MAY ENTER CONVERSATION MODE AND PUT DATA BUFFER WHERE YOU WISH AND WHAT EVER SIZE YOU WISH.

DESCRIPTION

5. OPERATIONAL SWITCH SETTINGS

SWITCH SETTINGS ARE:

SW<15> = 1 ..... HALT ON ERROR
SW<14> = 1 ..... LOOP ON FUNCTION
SW<13> = 1 ..... INHIBIT PRINTOUT
SW<12> = 1 ..... INHIBIT COMPARISON
WITH THIS SWITCH SET, THE
PROGRAM WILL NOT COMPARE THE
DATA IT READ FROM THE DISK WITH
THE KNOWN GOOD DATA.
SW<11> = 1 ..... HALT ON COMPLETION OF TRANSFER
SW<10> = 1 ..... ENTER CONVERSATION MODE
SW<09> = 1 ..... LOOP ON ERROR
SW<07> = 1 ..... WAIT IN WAIT MODE
PROGRAM RUNS IN A BACKGROUND TEST
WHILE WAITING FOR INTERRUPT, WITH
SW SET PROGRAM WAITS IN A WAIT
INSTRUCTION.
SW<06> = 1 ..... OPTIONAL TYPEOUT OF RETRY ERRORS
SW<05> = 1 ..... INHIBIT PASS COUNT
SW<04> = 1 ..... ALLOWS 8 ERROR TYPEOUTS IN THE
COMPARE ROUTINE BEFORE EXECUTING NEXT READ
COMMAND. WHEN SWITCH IS 0, ONLY 1 ERROR
TYPEOUT IS RECORDED.
SW<03> = 1 ..... TYPEOUT 8 OF ERRORS
SW<02> = 1 ..... INHIBIT MEMORY MANAGEMENT
SW<01> = 1 ..... DATA TEST ONLY
SW<00> = 1 ..... DROPS DRIVE AFTER 20 ERRORS

5.1 DATA RELIABILITY TEST MODE

WITH SW8 SET, THE PROGRAM WILL SET THE "BAI" BIT IN RHCS2 AND TRANSFER 64K OF DATA AT A TIME FOR ALL PATTERNS EXCEPT RANDOM. RANDOM WILL BE EXECUTED AS USUAL WITH STANDARD BUFFERS. NO COMPARES ARE DONE IN THIS MODE OF OPERATION EXCEPT ON RANDOM PATTERNS. THIS OPTION SHOULD ONLY BE USED IN DATA TEST OR CONVERSATION MODE. WHEN USED IN CONVERSATION MODE IT OVER RIDES THE NON STANDARD WORD COUNT. YOU SHOULD NOT SELECT A DESIRED DISK ADDRESS IN CONVERSATION MODE FOR IT CAN PRODUCE A DISK ADDRESS OVERFLOW ERROR FOR THIS DATA RELIABILITY TEST MODE ONLY DOES 64K WORD TRANSFERS. IF SW8 IS CHANGED, WHILE THE PROGRAM IS RUNNING, THE PROGRAM WILL FINISH ITS PASS BEFORE EXECUTING THE SWITCH CHANGE.

5.2 CONVERSATION MODE FOR PROGRAM PARAMETERS FOR DATA TEST ONLY

IN CONVERSATION MODE THE OPERATOR CAN SPECIFY ANY ONE OR ALL OF THE PROGRAM PARAMETERS.

NOTE

ONCE IN CONVERSATION MODE, THE ONLY WAY TO REMAP THE SYSTEM IS TO RELOAD THE PROGRAM. TO RESTART THE PROGRAM IN CONVERSATION MODE WITHOUT HAVING TO REANSWER THE QUESTIONS, THE STARTING ADDRESS IS 210. RESET SWITCH 10. TO RESTART THE PROGRAM WITHOUT HAVING TO REANSWER THE PORT SIZING QUESTIONS, RESTART AT 220. RESET SWITCH 10.

DESCRIPTION

THE PROGRAM WILL NOW ASK SEVERAL QUESTIONS, THE TABLE BELOW WILL HELP YOU ANSWER THE QUESTIONS.

TYPE TO START AT		TYPE TO START AT	
0	000000		
1	020000	20	400000
2	040000	21	420000
3	060000	22	440000
4	100000	23	460000
5	120000	24	500000
6	140000	25	520000
7	160000	26	540000
10	200000	27	560000
11	220000	30	600000
12	240000	31	620000
13	260000	32	640000
14	300000	33	660000
15	320000	34	700000
16	340000	35	720000
17	360000	36	740000
		37	760000

TYPE TO START AT		TYPE TO START AT	
40	1000000	60	1400000
41	1020000	61	14200000
42	1040000	62	1440000
43	1060000	63	1460000
44	1100000	64	1500000
45	1120000	65	1520000
46	1140000	66	1540000
47	1160000	67	1560000
50	1200000	70	1600000
51	1220000	71	1620000
52	1240000	72	1640000
53	1260000	73	1660000
54	1300000	74	1700000
55	1320000	75	1720000
56	1340000	76	1740000
57	1360000	77	1760000

TYPE TO START AT		TYPE TO START AT	
100	2000000	120	2500000
101	2020000	121	25200000
102	2040000	122	2540000
103	2060000	123	2560000

```
  300                                          104       2200000   124       2600000
  301                                          105       2220000   125       2620000
```

DESCRIPTION

106	2240000	126	2640000
107	2260000	127	2660000
110	2300000	130	2700000
111	2320000	131	2720000
112	2340000	132	2740000
113	2360000	133	2760000
114	2400000	134	3000000
115	2420000	135	3020000
116	2440000	136	3040000
117	2460000	137	3060000

NOTE:THE FORMULA TO GET NUMBERS
TO BE TYPED IS: EVERY 4KBOUNDRY END
IN FOUR ZEROS
SO DISREGARD THE LAST FOUR DIGITS AND
DIVID THE REMAINING
ADDRESS BY TWO. THE RESULTING NUMBER IS
TO BE TYPED IN FOR
THAT 4K
BANK.

NOTE: TYPE ONLY NUMBERS SHOWN!!!

1. TYPE STARTING 4K BANK # FOR DATA BUFFER ON PORT A

   THIS WILL DETERMINE WHERE YOUR BUFFER AREA WILL START ON -A-
   PORT. USE TABLE ABOVE

   NOTE:

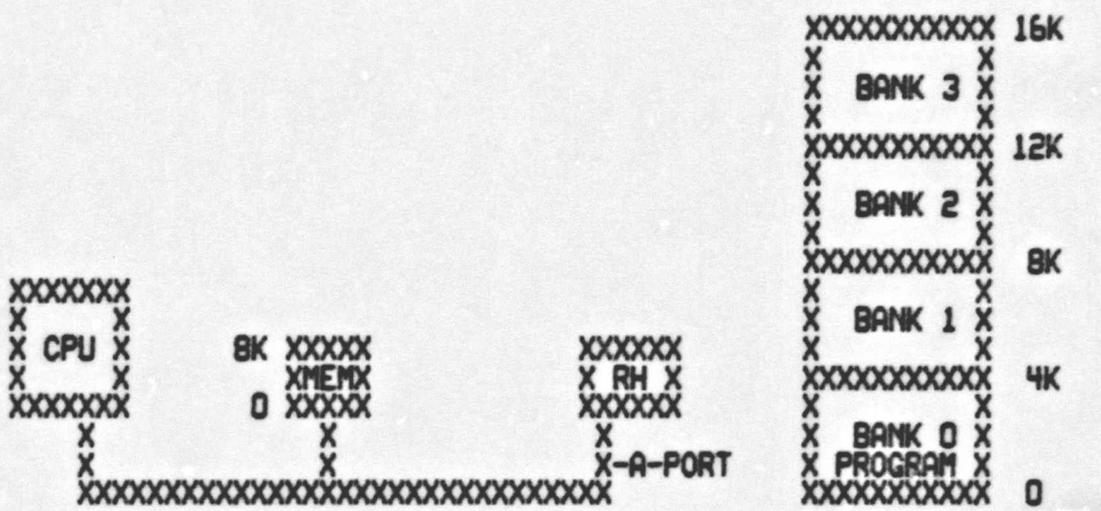
   PROGRAM IS LOCATED IN 1ST 4K BANK.
   THEREFORE, THIS BANK CAN NOT BE USED AS
   A BUFFER.

2. HOW MANY 4K BANKS IN DATA BUFFER? (OCTAL)

   THIS WILL DETERMINE THE SIZE OF -A- PORT BUFFER. THE SIZE OF
   THE DATA BUFFER CAN NOT EXCEED 24K.

DESCRIPTION

EXAMPLE:



THESE ANSWERS GIVEN BELOW WILL TEST THE CONFIGURATION IN THE GIVEN EXAMPLE. ANSWERS:

TO TEST -A- PORT
1) 1
2) 1

PROGRAM CONVERSATION

MULTI DRIVE MODE? (YES-NO)

MULTI DISK MODE IS A MODE IN THE PROGRAM WHICH ALLOWS THE OPERATOR TO EXERCISE ALL THE DISKS ON THE SYSTEM WITHOUT RE-STARTING THE PROGRAM. THE PROGRAM, AFTER EXERCISING ONE DISK WILL REPORT A MESSAGE TELLING THE OPERATOR WHICH DISK WILL BE SELECTED NEXT, AND THEN THE PROGRAM WILL EXERCISE THAT DISK. WHEN A COMPLETE PASS IS ACCOMPLISHED, A PASS COMPLETE WILL BE REPORTED AND THE TEST WILL RECYCLE.

IF THE ANSWER TO THE MULTI DRIVE MODE WAS "NO", THE FOLLOWING QUESTION IS ASKED.

TYPE UNIT #

THE OPERATOR CAN NOW SELECT THE UNIT HE WISHES TO TEST BY TYPING THE UNIT NUMBER.

OPTIONAL WORD COUNT (YES-NO)

IF THE OPERATOR ANSWERS "NO" TO THIS QUESTION THE NEXT QUESTION WILL BE DELETED FROM THE CONVERSATION.

WD CT

THE OPERATOR CAN SPECIFY ANY LENGTH TRANSFER FROM 1(8) TO 60000(8) WORDS. THE NORMAL TRANSFER LENGTH IS N(8) WORDS WHERE N IS THE MAXIMUM BUFFER SIZE FOR THE AVAILABLE CORE. IN EITHER CASE, BUFFER WILL NOT EXCEED 24 K.

THIS PROGRAM MAPS THE SYSTEM IN 4K SEGMENTS. IF THERE IS A 1K BLOCK OF MEMORY ON THE SYSTEM THAT YOU WOULD LIKE TO REACH, YOU CAN TYPE IN THAT 4K BANK # AND THEN SPECIFY A WC OF 2000.

IF THE WORD COUNT NUMBER TYPED, IS LARGER THAN THE CORE SIZE GIVEN IN THE SETUP ROUTINE, THE QUESTION WILL BE REPEATED.

OPTIONAL DSK ADDR (YES-NO)

IF THE ANSWER TO THIS QUESTION IS NO, THE WHOLE DISK WILL BE WRITTEN AND THE NEXT QUESTION IS NOT ASKED.

DSK ADDR

THE OPERATOR CAN NOW SPECIFY THE STARTING SECTOR

DATA PATTERN NO.?

IF NO OPTIONAL DATA PATTERN IS REQUESTED (#22) THE PROGRAM WILL EXECUTE THE FOLLOWING LIST OF DATA PATTERNS.

PATTERN	0	= 000000
"	1	= 177777
"	2	= 031463
"	3	= 066666
"	4	= 100001
"	5	= 107070
"	6	= 070707
"	7	= 052525
"	10	= 125252
"	11	= 177737
"	12	= 146314
"	13	= 136363
"	14	= 063636
"	15	= 000001
"	16	= 100005
"	17	= 155555
"	20	= 133333
"	21	= RANDOM DATA
"	22	= RUN ALL DATA PATTERNS UNDER PROGRAM CONTROL

IN THIS SECTION OF THE PROGRAM PARAMETER CONVERSATION MODE, THE OPERATOR CAN SELECT ANY ONE OR ALL THREE OF THE CONTROL FUNCTIONS TO BE EXECUTED. THE NORMAL SEQUENCE OF DISK FUNCTIONS UNDER PROGRAM CONTROL ARE WRITE, WRITE CHECK, AND THEN READ. BY ENTERING THE CONVERSATION MODE THE OPERATOR HAS GAINED COMPLETE CONTROL OVER THE DISK FUNCTIONS. HE MUST SPECIFY YES OR NO TO ALL OF THE FOLLOWING QUESTIONS.

WRITE? (YES - NO)
READ? (YES - NO)
WRITE CHECK? (YES - NO)

TO PERFORM A WRITE CHECK ONLY THE OPERATOR MUST FIRST WRITE SOME KNOWN DATA ON THE DISK. THIS COURSE OF ACTION ALSO PREVAILS FOR A READ ONLY OPERATION.
* IF AN ERROR OCCURS IN THE LINE THE OPERATOR IS TYPING, DEPRESS THE RUB-OUT KEY AND RETYPE ANSWER.
ALL ANSWERS SHOULD BE FOLLOWED BY A CARRIAGE-RETURN

5.3 ROUTINE ABSTRACTS

ADDRESS TEST

THIS TEST WRITES EACH SECTOR WITH ITS OWN ADDRESS THEN READS IT BACK

```
   486                          AND COMPARES IT FOR THE CORRECT DATA.
```

DESCRIPTION

RANEX - RANDOM DATA, ADDRESS AND WORD COUNT TEST

THIS ROUTINE TESTS THE ABILITY OF THE SYSTEM TO ACCESS RANDOM ADDRESSES WITH RANDOM DATA. TWO SECTORS OF RANDOM DATA ARE WRITTEN AT A STARTING RANDOM ADDRESS ON THE DISK. IT IS THEN WRITE CHECKED AND READ. ALL ERRORS ARE REPORTED. THIS IS REPEATED 1000 TIMES.

DATA RELIABILITY - DATA PATTERN TEST

IN THIS PORTION OF THE TEST, THE RELIABILITY OF THE DISK SURFACE IS TESTED BY WRITE, WRITE CHECK, AND READ FUNCTIONS. THE ROUTINE FIRST WRITES THE COMPLETE SURFACE WITH A SET DATA PATTERN, THEN A WRITE CHECK OF THE COMPLETE SURFACE IS ACCOMPLISHED, THUS REPORTING ALL ERRORS BETWEEN THE DATA WRITTEN AND THE DATA IN MEMORY. THE DISK IS THEN READ. THE DATA READ FROM THE DISK IS COMPARED AGAINST THE KNOWN DATA PATTERN. THIS COMPARE IS TAKING PLACE THE SAME TIME THE DISK IS BEING READ. THE BUFFER IS CLEARED AS IT IS BEING COMPARED.

5.4 SUBROUTINE ABSTRACTS

5.4.1 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUBTEST AS IT IS BEING ENTERED IN LOCATION "LAD". IF A SCOPE LOOP IS REQUESTED, THE CURRENT SUBTEST WILL BE LOOPED UPON. THE CONTENTS OF LAD MAY BE USED TO DETERMINE THE LAST SUBTEST SUCCESSFULLY COMPLETED.

5.4.2 HLT

THIS ROUTINE PRINTS OUT AN ERROR MESSAGE (SEE 6.1). TO INHIBIT TYPEOUTS, PUT SW<13> ON A 1.

5.4.3 TRAPCATCHER

A ".+2" - "HALT" SEQUENCE IS REPEATED FROM 0 - 776 TO CATCH ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR INTERRUPTS WILL HALT AT THE VECTOR + 2.

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

```
ADR    CS1 = ----- CS2 = ----- ER = -----
GOOD       = ----- BAD = -----
```

WHERE:

CS1,CS2,ER ETC.	= RS11 DISK REGISTERS.
GOOD	= EXPECTED DATA.
BAD	= DATA RECEIVED.

TO FIND THE FAILING TEST, LOOK AT THE LISTING ABOVE THE ADDRESS TYPED.

IF SWD IS SET, A DRIVE WILL BE DROPPED FROM THE TEST SEQUENCE AFTER 20 ERRORS. THE PROGRAM WILL STATE WHICH DRIVE WAS DROPPED AND ON WHICH PASS IT WAS DROPPED. IF ALL THE DRIVES HAVE BEEN DROPPED, THE PROGRAM WILL TYPE "TESTING UNIT 0" AND HALT", INDICATING THAT IT COULD NOT FIND ANY MORE DRIVES ON THE SYSTEM TO TEST.

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIME

PASS COMPLETE WILL BE TYPED OUT AT END OF PASS. IT WILL TAKE BETWEEN 15 TO 20 MINUTES TO COMPLETE A PASS. ADD 30 SECONDS FOR EACH 4K. FOR DATA TEST.

8.2 STACK POINTER

STACK IS INITIALLY SET TO 500

DESCRIPTION

8.3 POWER FAIL

THE STARTING ADDRESS FOR THE WRITE POWER FAIL TEST IS 270. A MESSAGE WILL BE TYPED OUT "LOAD SW WITH UNIT # AND CONT." THE OPERATOR NOW HAS TO LOAD THE UNIT # IN OCTAL INTO THE SW REGISTER IN BITS 00-01 AND 02. THEN HIT CONTINUE. THE PROGRAM WILL TELL THE OPERATOR WHEN TO POWER DOWN. WHEN THE SYSTEM IS POWERED UP, ONLY ONE ERROR IS ALLOWED. THE STARTING ADDRESS FOR THE WRITECHECK POWER FAIL TEST IS 274. HERE AS IN THE WRITE POWER FAIL TEST, THE PROGRAM WILL TELL THE OPERATOR WHEN TO POWER DOWN. WHEN THE POWER COMES BACK, NO ERRORS SHOULD OCCUR.

```
                        %
                        .TITLE  MAINDEC-11-DERSB-A      RH11-RS03 DATA AND RELIABILITY TEST
                        ;COPYRIGHT 1973,1974,1975, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
                        ;PROGRAM BY STANLEY HARACKIEWICZ

                        ;               SWITCH                  USE
                        ;               ------          --------------------
                                SW15=   100000          ;HALT ON ERROR
                                SW14=   40000           ;LOOP ON FUNCTION
                                SW13=   20000           ;INHIBIT ERROR TYPEOUTS
                                SW12=   10000           ;INHIBIT COMPARISON
                                SW11=   4000            ;HALT ON COMPLETION OF TRANSFER
                                SW10=   2000            ;CONVERSATION MODE
                                SW9=    1000            ;LOOP ON ERROR
                                SW8=    400             ;
                                SW7=    200             ;WAIT IN BACKGROUND TEST
                                SW6=    100             ;OPTIONAL TYPEOUT OF RETRY ERRORS
                                SW5=    40              ;INHIBIT PASS COUNT AND UNIT #
                                SW4=    20              ;ALLOWS 8 LOCATIONS TO BE TESTED IN COMPARE ROUTINE
                                SW3=    10              ;TYPE OUT TOTAL # OF ERRORS
                                SW2=    4               ;INHIBIT MEMORY MANAGEMENT
                                SW1=    2               ;DATA TEST ONLY
                                SW0=    1               ;DROP DRIVE AFTER 20 ERRORS
                        000000  .=      0               ;TRAP CATCHER FROM 0 - 776
                        000046  .=      46              ;HOOKS FOR ACT 11
000046  014020          $ENDAD
                        000052  .=      52
000052  040000          BIT14

                        000200  .=      200
000200  000137  001234          JMP     @#BEGIN         ;START TEST

                        000210  .=      210
000210  012706  000500          MOV     #500,SP         ;SETUP STACK
000214  000137  003226          JMP     @#ADTST         ;RESTART ADDR

                        000220  .=      220
000220  012706  000500          MOV     #500,SP         ;CONVERSATION MODE WITHOUT
000224  000137  002346          JMP     @#A1            ;DATA BUFFER QUESTIONS

                        000230  .=      230
000230  000137  015164          JMP     @#RLDR          ;RESTORE LOADER
```

```
                    000260                  .=      260
000260  000137  003302                      JMP     @#ADTL          ;TRACK AND SECTOR SELECT TEST
                                                                    ;WRITE EACH WORD ADDR ON ITSELF AND READ IT BACK
                                                                    ;LOCATION 1150 CONTAINS UNIT NO.
                    000264                  .=      264
000264  000137  005160                      JMP     @#RANEL         ;RANDOM ADDRESS, DATA TEST
                                                                    ;LOCATION 1150 CONTAINS UNIT NO.
                    000270                  .=      270
000270  000137  012356                      JMP     @#PFT1          ;DISK WRITE POWER FAIL TEST
                    000274                  .=      274
000274  000137  012712                      JMP     @#PFT2          ;DISK WRITE CHECK POWER FAIL TEST
```

```
                                        ;RH11 DATA PATTERNS
                                        
000300  000000                  PAT0:   0
000302  177777                  PAT1:   177777
000304  031463                  PAT2:   031463
000306  066666                  PAT3:   066666
000310  100001                  PAT4:   100001
000312  107070                  PAT5:   107070
000314  070707                  PAT6:   070707
000316  052525                  PAT7:   052525
000320  125252                  PAT10:  125252
000322  177737                  PAT11:  177737
000324  146314                  PAT12:  146314
000326  136363                  PAT13:  136363
000330  063636                  PAT14:  063636
000332  000001                  PAT15:  000001
000334  100005                  PAT16:  100005
000336  155555                  PAT17:  155555
000340  133333                  PAT20:  133333
                                ;PAT21  RANDOM DATA
                                
                                ;CLEAR ALL REGISTERS
000342  012777  000040  000464  .CLRDV: MOV     #40,@RSCS2      ;CLEAR ALL REG
000350  013777  001164  000456          MOV     UNNUM,@RSCS2    ;GET UNIT #
000356  000002                        RTI
```

```
                                .SBTTL          $KMMR - KERNAL MEMORY MANAGEMENT REGISTER ASSIGNMENTS

            177572                      SR0=177572              ;ADDRESS OF MEM MGMT REGISTER SR0
            177574                      SR1=177574              ;    "    "    "        "      SR1
            177576                      SR2=177576              ;    "    "    "        "      SR2
            172516                      SR3=172516              ;ADDRESS OF MEM MGMT REGISTER SR3

            172300                      KIPDR0=172300           ;ADDRESS OF KERNEL 'I' PAGE
            172302                      KIPDR1=172302           ;DESCRIPTOR REGISTERS
            172304                      KIPDR2=172304
            172306                      KIPDR3=172306
            172310                      KIPDR4=172310
            172312                      KIPDR5=172312
            172314                      KIPDR6=172314
            172316                      KIPDR7=172316

            172320                      KDPDR0=172320           ;ADDRESSES OF KERNEL 'D' PAGE
            172322                      KDPDR1=172322           ;DESCRIPTOR REGISTERS
            172324                      KDPDR2=172324
            172326                      KDPDR3=172326
            172330                      KDPDR4=172330
            172332                      KDPDR5=172332
            172334                      KDPDR6=172334
            172336                      KDPDR7=172336

            172340                      KIPAR0=172340           ;ADDRESSES OF KERNEL 'I' PAGE
            172342                      KIPAR1=172342           ;ADRESS REGISTERS
            172344                      KIPAR2=172344
            172346                      KIPAR3=172346
            172350                      KIPAR4=172350
            172352                      KIPAR5=172352
            172354                      KIPAR6=172354
            172356                      KIPAR7=172356

            172360                      KDPAR0=172360           ;ADDRESSES OF KERNEL 'D' PAGE
            172362                      KDPAR1=172362           ;ADDRESS REGISTERS
            172364                      KDPAR2=172364
            172366                      KDPAR3=172366
            172370                      KDPAR4=172370
            172372                      KDPAR5=172372
            172374                      KDPAR6=172374
            172376                      KDPAR7=172376
```

```
                        
000001          N=      1               ;INITALIZE FOR NEWTST
104000          HLT=    EMT             ;SET HLT TO EMT FOR ERROR TYPEOUTS
177776          PS=     177776          ;PROCESSOR STATUS
177776          PSW=    PS              ;PROCESSOR STATUS WORD
177570          SWR=    177570          ;SWITCH REGISTER
177570          DISPLAY=SWR             ;DISPLAY REGISTER
000007          BELL=   7               ;BELL
000000          R0=     %0              ;R0 - DEFINE REGISTERS
000001          R1=     %1              ;R1
000002          R2=     %2              ;R2
000003          R3=     %3              ;R3
000004          R4=     %4              ;R4
000005          R5=     %5              ;R5
000006          SP=     %6              ;R6 - STACK POINTER
000007          PC=     %7              ;R7 - PROGRAM COUNTER
000001          BIT0=   1               ;BIT EQUATES
000002          BIT1=   2
000004          BIT2=   4
000010          BIT3=   10
000020          BIT4=   20
000040          BIT5=   40
000100          BIT6=   100
000200          BIT7=   200
000400          BIT8=   400
001000          BIT9=   1000
002000          BIT10=  2000
004000          BIT11=  4000
010000          BIT12=  10000
020000          BIT13=  20000
040000          BIT14=  40000
100000          BIT15=  100000
000001  GOOD=    R1                      ;FOR GOOD DATA
000000  BAD=     R0                      ;FOR BAD DATA
```

```
                000510                          .=      510
                
000510  005015  044524  042515  NOINT:  .ASCIZ  <15><12>"TIMED OUT NO INTERRUPT"
000516  020104  052517  020124
000524  047516  044440  052116
000532  051105  052522  052120
000540     000
                
000541     015  046412  046505  MTRAP:  .ASCIZ  <15><12>"MEM MGMT TRAP"
000546  046440  046507  020124
000554  051124  050101     000
                
000561     015  046012  040517  LOADSW: .ASCIZ  <15><12>"LOAD SW WITH UNIT # AND CONT"
000566  020104  053523  053440
000574  052111  020110  047125
000602  052111  021440  040440
000610  042116  041440  047117
000616  000124
                
000620  005015  040504  040524  DATA:   .ASCIZ  <15><12>"DATA "
000626  000040
                
000630  051127  052111  020105  WRTERR: .ASCIZ  "WRITE ERR"
000636  051105  000122
                
000642  051127  052111  020105  WCKERR: .ASCIZ  "WRITE CK ERR"
000650  045503  042440  051122
000656     000
                
000657     122  040505  020104  RDERR:  .ASCIZ  "READ ERR"
000664  051105  000122
                
000670  005015  040522  042116  RANDM:  .ASCIZ  <15><12>"RANDOM "
000676  046517  000040
                
000702  005015  042522  047503  RECOV:  .ASCIZ  <15><12>"RECOVERED RETRY CT "
000710  042526  042522  020104
000716  042522  051124  020131
000724  052103  000040
                
000730  005015  047503  046125  NOFND:  .ASCIZ  <15><12>"COULD NOT FIND DRIVE"
000736  020104  047516  020124
000744  044506  042116  042040
000752  044522  042526     000
000757     015  005012     000  CRLFLF: .ASCIZ  <15><12><12>
                
000763     040  054450  047440  YORN:   .ASCIZ  " (Y OR N)"
000770  020122  024516     000
                
                000776                          .EVEN
```

```
                001000                  .=      1000
                
001000  000000                  ICNT:   0               ;LH = ITERATION COUNT  ;RH = TEST NO.
001002  000000                  ERRORS: 0               ;ERROR COUNT
001004  000000  000000          PCNT:   0,0             ;2 WORD PASS COUNT
001010  000000                  LAD:    0               ;LOOP ADDRESS FOR SCOPE
001012  000000                  HLTADR: 0               ;ADDRESS OF LAST HLT INSTRUCTION  EXECUTED
001014  001000                  FILCHR: 1000            ;FILCHR=0 (CHAR)  ;FILCHR+1=2 (COUNT)
001016  177564                  TPS:    177564          ;OUTPUT STATUS REGISTER
001020  177566                  TPB:    177566          ;OUTPUT BUFFER
                
001022  000000                  TEMP1:  0
001024  000000                  TEMP2:  0
001026  000000                  TEMP3:  0
001030  000000                  TEMP4:  0
                
                
                
                
                                ;DISK I/O REGISTERS
                
001032  172040                  RSCS1:  172040          ;DISK CONTROL + STATUS REGISTER
001034  172050                  RSCS2:  172050          ;DISK CONTROL + STATUS REGISTER
001036  172042                  RSWC:   172042          ;WORD COUNT REGISTER
001040  172044                  RSBA:   172044          ;BUS ADDRESS
001042  172046                  RSDA:   172046          ;DISK ADDRESS (DESIRED ADDRESS)
001044  172052                  RSDS:   172052          ;DRIVE STATUS
001046  172054                  RSER:   172054          ;ERROR REG.
001050  172056                  RSAS:   172056          ;ATTENTION SUMMARY
001052  172060                  RSLA:   172060          ;LOOK AHEAD
001054  172062                  RSDB:   172062          ;DATA BUFFER REGISTER
001056  172064                  RSMR:   172064          ;MAINTENANCE REGISTER
001060  172066                  RSDT:   172066          ;DRIVE TYPE REGISTER
001062  172070                  RSBAE:172070            ;BUS ADDRESS EXTENSION
001064  172072                  RSCS3:  172072          ;CONTROL AND STATUS 3
001066  000204                  RSVEC:  204             ;INTERUPT RSVEC
                
                                ;BIT ASSIGNMENTS FOR ERROR TYPE OUTS
                
                        000002          DB=2            ;DATA BUFFER
                        000004          DA=4            ;DESIRED ADD
                        000010          WC=10           ;WORD COUNT
                        000020          BA=20           ;BUS ADDRESS
                        000040          DS=40           ;DRIVE STATUS
                        000100          AS=100          ;ATTENTION SUMMARY
                        000204          LA=204          ;LOOK AHEAD
                        000220          MR=220          ;MAINTENANCE
                        000240          DT=240          ;DRIVE TYPE
                
001070  000206                  STATUS: 206                     ;DISK INTERRUPT STATUS
001072  000200                  PRIORITY:BIT7                   ;DISK PRIORITY LEVEL
```

```
                000006                  RW=6                    ;R/W IN PDR REG
                000000                  UP=0                    ;UP BITY IN PDR REG
                000250                  MMVEC=250               ;ADDR OF MEM MGMT ERROR TRAP
001074          000000                  STAMEM: 0               ;STARTING LOC FOR -A- PORT
001076          000000                  SAVAST: 0               ;SAVE LOC FOR STAMEM
001100          000000                  STBCOM: 0               ;STARTING LOC FOR -B- PORT
001102          000000                  SAVCPU: 0               ;SAVE LOC FOR CPUBM
001104          000000                  SAVMGA: 0               ;STARTING ADDR FOR -A- PORT  WITH MEM MGMT
001106          000000                  SAVMGB: 0               ;STARTING ADDR FOR B PORT W/MEM MGMT
001110          000000                  SAVMGC: 0               ;STARTING LOC FOR CPU W/MEM MGMT
001112          000000                  SIZEAP: 0               ;SIZE OF A PORT
001114          000000                  SIZEBP: 0               ;SIZE OF B PORT
001116          000000                  WDCTB:  0               ;WC FOR A PORT
001120          000000                  AOB1:   0               ;FLAG FOR PORT BEING TESTED
001122          000000                  VADDR:  0               ;VIRTUAL ADDR
001124          000000                  PHADDR: 0               ;PHYSICAL ADDR
001126          000000                  FLAG2:  0               ;FLAG FOR RESTART AND FOUND DRIVE
001130          000000                  DROP:   0               ;BAD UNITS ON SYSTEM THAT GET DUMPED

                                ;DISCRIPTION OF FLAG2

                                ;BIT0 = RESTART
                                ;BIT1 = FOUND DRIVE
                                ;BIT2 = ERROR DO A CRLF FOR UNIT #
                                ;BIT3 = DOING COMPARE
                                ;BIT4 = SET A16 IN CS1
                                ;BIT5 = SET A17 IN CS1
                                ;BIT6 = SET IF MEMORY HAS ALREADY BEEN FOUND
                                ;BIT7 = WHEN SET MAKE WC UP TO 28K
                                ;BIT8 = FOUND MEMORY ON -B- PORT
                                ;BIT9 = POWER DID FAIL
                                ;BIT10 = WAITING IN BACKGROUND TEST
                                ;BIT11 = PARITY ERROR ROUTINE
                                ;BIT12 = POWER FAIL TEST
                                ;BIT13 = IN MAP ROUTINE
                                ;BIT14 = IN POWER FAIL OR CONVERSATION MODE
                                ;BIT15 = ERROR IN POWER FAIL

                                ;DISCRIPTION OF FLAG

                                ;BIT0 = USED FOR WRITE COUNTER
                                ;BIT1 = USED FOR WRITE COUNTER
                                ;BIT2 = TRANSFER MODE 64K
                                ;BIT5 = OPTIONAL DMA
                                ;BIT6 = TEST -B- PORT
                                ;BIT7 = LAST DISK BUFFER FLAG
                                ;BIT8 = PROGRAM IS IN ADDRESS OR RANDOM TEST
                                ;BIT9 = ERROR DURING TRANSFER
                                ;BIT10 = DATA TEST ONLY
                                ;BIT11 = MULTIPORT
                                ;BIT12 = READ
                                ;BIT13 = WRITE CHECK
                                ;BIT14 = WRITE
                                ;BIT15 = PROGRAM CONTROL MODE
```

```
                                ;RH11 DEDICATE REGISTERS (MEMORY)

001132  000000                  FLAG:    0              ;TEST REGISTER
001134  000000                  WRDCT:   0              ;WORKING WORD COUNT
001136  000000                  TRACK:   0              ;WORKING DAE
001140  000000                  DMA:     0              ;WORKING DAR
001142  000000                  PATNU:   0              ;DATA PATTERN INDEX
001144  000000                  BUF:     0              ;WORKING DATA BUFFER (OUT-IN)
001146  000000                  TDMA:    0              ;TEMP DAR
001150  000000                  SWRDCT:  0              ;STANDARD WORD COUNT
001152  000000                  ERCOUNT: 0              ;ERROR COUNT FOR MESSAGES.
001154  000000                  SAVE:    0
001156  000000                  HRDER:   0              ;POINTER FOR HARD ERROR
001160  000000                  BLOCK:   0
001162  000000                  PASSC:   0
001164  000000                  UNNUM:   0              ;UNIT CURRENTLY BEING TESTED
001166  000000                  UNITSV:  0              ;SET BIT=UNIT ON BUS
001170  000000                  UNCMP:   0              ;FOR COMPARING FOR # OF DEVICE
001172  000000                  RS04DT:  0              ;FLAG FOR RS04
001174  000000                  NUMS:    0              ;WORK LOC FOR NUMBER INPUTS
001176  000000                  CMD:     0              ;LOC FOR CS2 COMMANDS
001200  000000                  SWITCH:  0              ;FLAG FOR WHICH RANDOM NUMBER GEN
001202  000000                  INTFLG:  0              ;FLAG FOR INTERRUPT
001204  000000                  LOPCNT:  0              ;ERROR FLAG AND LOOP COUNTER FLAG
001206  000000                  WRITER:  0              ;CONTAINS # OF WRITE ERRORS
001210  000000                  WCERR:   0              ;CONTAINS # OF WRITE CHECK ERRORS
001212  000000                  READER:  0              ;CONTAINS # OF READ ERRORS
001214  000000                  COMERR:  0              ;CONTAINS # OF COMPARE ERRORS
001216  000000                  MMAVA:   0              ;MEM MGMT AVAILABLE INDICATOR
001220  000000                  SAVWC:   0              ;SAVE LOC FOR CONVERSATION WC ROUTINE
001222  000000                  FLAG3:   0              ;LOOP IN ADDRESS + RANDOM TST FLAG
001224  000000                  SAVWCB:  0              ;SAVE WC SIZE FOR -B- PORT

                                ;RH11 WORK REGISTERS
                                ;(CAN BE CHANGED IN ANY ROUTINE)
001226  000000                  WORK:    0
001230  000000                  WORK1:   0
001232  000000                  WORK2:   0
        000004                  ERRVEC=4
        177740                  LERADD=177740
        177742                  HERADD=177742
        177744                  MEMERR=177744
```

M02


```
  948  001234  012706  000500          BEGIN:  MOV     #500,SP         ;SET STACK TO  *** 500 ***
  949  001240  012737  016372  000024          MOV     #.POWER,@#24    ;SET UP PF VECTOR
  950  001246  012737  000340  000026          MOV     #340,@#26       ;LOCK OUT THE WORLD
  951  001254  012737  016036  000030          MOV     #.HLT,@#30      ;SET EMT VECTOR
  952  001262  012737  000340  000032          MOV     #340,@#32       ;LOCK UP
  953  001270  012737  016766  000034          MOV     #.TRAP,@#34     ;SET TRAP VECTOR
  954  001276  012737  000340  000036          MOV     #340,@#36       ;LOCK UP
  955  001304  005037  001000                  CLR     ICNT            ;INIT ICNT
  956  001310  005037  001010                  CLR     LAD             ;INIT LAD
  957  001314  042737  177677  001132          BIC     #177677,FLAG    ;CLEAR FLAG
  958  001322  042737  177776  001126          BIC     #177776,FLAG2   ;CLEAR ALL EXECPT RESTART
  959  001330  005037  001222                  CLR     FLAG3           ;CLEAR LOOP IN ADDRESS + RANDOM TST FLAG
  960  001334  032737  000001  001126          BIT     #BIT0,FLAG2     ;IS THIS THE FIRST TIME?
  961  001342  001002                          BNE     1$              ;NO
  962  001344  004737  020000                  JSR     PC,LDR          ;SAVE LOADER
  963  001350  000005                  1$:     RESET                   ;CLEAR THE WORLD
  964  001352  012737  000340  177776          MOV     #340,PS         ;LOCK UP INTERRUPT LEVELS
  965  001360  004537  012322                  JSR     R5,ERRCL        ;CLEAR ERROR COUNTER + PASS CNT
  966  001364  005037  001216                  CLR     MMAVA           ;CLEAR MEM MGMT FLAG
  967  001370  005037  001120                  CLR     AOB1            ;TEST A PORT FIRST
  968  001374  032737  000004  177570          BIT     #BIT2,SWR       ;WANT MEM MGMT?
  969  001402  001021                          BNE     3$              ;NO
  970  001404  012737  001432  000004          MOV     #5$,4           ;SET TIMEOUT TRAP
  971  001412  012737  000340  000006          MOV     #340,6          ;SET PS
  972  001420  005037  177572                  CLR     @#SR0           ;IS MEM MGMT AVAILABLE?
  973  001424  005137  001216                  COM     MMAVA           ;YES
  974  001430  000401                          BR      4$              ;CONT
  975  001432  022626                  5$:     CMP     (6)+,(6)+       ;CLEAR STACK
  976  001434  012737  000006  000004  4$:     MOV     #6,4            ;RESET
  977  001442  005037  000006                  CLR     6               ;TRAP
  978  001446  032737  000001  001126  3$:     BIT     #BIT0,FLAG2     ;IS THIS THE FIRST TIME
  979  001454  001002                          BNE     CALM            ;NO
  980  001456  000137  020070                  JMP     SIZZAP          ;SIZE BUFFERS
  981  001462  004737  011514          CALM:   JSR     PC,@#EXTMEM     ;SET UP DATA BUFFERS
  982  001466  004737  015212          CALM1:  JSR     PC,.MAMK        ;TURN ON PARITY MEM
  983  001472  032737  000001  001126          BIT     #BIT0,FLAG2     ;1ST TIME ?
  984  001500  001003                          BNE     3$              ;NO
  985  001502  013737  001150  001220          MOV     SWRDCT,SAVWC    ;SAVE WC FOR CONVERSATION MODE COMPARE
  986  001510  052737  000001  001126  3$:     BIS     #BIT0,FLAG2     ;SET 1ST TIME FLAG
  987  001516  005037  001140                  CLR     DMA             ;CLEAR DAR REGISTERS
  988  001522  005037  001142                  CLR     PATNU           ;CLEAR PATTER COUNT
  989  001526  013737  001150  001134          MOV     SWRDCT,WRDCT
  990  001534  032737  000002  177570          BIT     #BIT1,SWR       ;DATA TEST ONLY?
  991  001542  001403                          BEQ     2$              ;NO
  992  001544  052737  002000  001132          BIS     #BIT10,FLAG     ;YES
  993  001552  032737  002000  177570  2$:     BIT     #BIT10,SWR      ;ENTER CONVERSATION MODE?
  994  001560  001015                          BNE     1$              ;YES GO TO CONVERSATION MODE
  995  001562  052737  074000  001132          BIS     #74000,FLAG
  996  001570  004537  010244                  JSR     R5,RESTOR       ;RESTORE ORIGINAL WD CNT
  997  001574  012737  017450  000004          MOV     #TIEOUT,ERRVEC
  998  001602  012737  000340  000006          MOV     #340,ERRVEC+2
  999  001610  000137  003226                  JMP     ADTST
 1000  001614  000137  002220          1$:     JMP     @#CONM          ;ENTER CONVERSATION MODE
```

```
1001                                    ;FIND OUT HOW MANY DRIVES
1002                                    ;FIRST TEST RSAS
1003
1004  001620  012701  000010            DRVENO: MOV     #8.,R1          ;PUT 8 INTO R1 FOR COUNT
1005  001624  042737  000002  001126            BIC     #BIT1,FLAG2     ;CLEAR FOUND DRIVE FLG
1006  001632  012777  000000  177174            MOV     #0,@RSCS2       ;SET DEVICE TO ZERO
1007  001640  012777  000007  177200    TRY:    MOV     #7,@RSER        ;CAUSE AN ERROR +SETS BIT IN AS REG
1008  001646  005301                            DEC     R1              ;DO A MAXIMUN OF 16 TIMES
1009  001650  001403                            BEQ     DVNUM           ;TESTED FOR ALL DRIVES GET OUT
1010  001652  005277  177156                    INC     @RSCS2          ;INCREMENT DRIVE UNIT
1011  001656  000770                            BR      TRY             ;REPEAT FOR NEXT DRIVE
1012  001660  017737  177164  001166  DVNUM:   MOV     @RSAS,UNITSV    ;SAVE
1013  001666  043737  001130  001166            BIC     DROP,UNITSV     ;DROP BAD DRIVES
1014  001674  012737  000401  001170            MOV     #401,UNCMP      ;SETUP TO CMP WITH UNITSV
1015  001702  012737  000000  001164            MOV     #0,UNNUM        ;PUT 0 INTO UNIT NO.
1016  001710  032737  000040  177570            BIT     #BIT5,SWR       ;INHIBIT TYPE OUT?
1017  001716  001015                            BNE     STTEST          ;YES
1018  001720  104402  001724                    TYPE    ,.+2            ;.ASCIZ <15><12>"TESTING UNIT "
1019  001744  042737  000004  001126            BIC     #BIT2,FLAG2     ;CLEAR ERROR FLAG
1020  001752  033737  001170  001166  STTEST: BIT     UNCMP,UNITSV    ;IS THIS DRIVE ON THE SYSTEM
1021  001760  001463                            BEQ     TRYNX           ;NO
1022  001762  013777  001164  177044  UNTYP:  MOV     UNNUM,@RSCS2    ;YES PUT UNIT # INTO CS2
1023  001770  005037  001172                    CLR     RS04DT          ;CLEAR DRIVE TYPE FLAG
1024  001774  005777  177060                    TST     @RSDT           ;IS THIS A RS03?
1025  002000  001417                            BEQ     1$              ;YES
1026  002002  022777  000001  177050  2$:      CMP     #1,@RSDT        ;IS THIS A RS03 4US?
1027  002010  001413                            BEQ     1$              ;YES
1028  002012  022777  000002  177040  3$:      CMP     #2,@RSDT        ;IS THIS A RS04?
1029  002020  001404                            BEQ     6$              ;YES
1030  002022  022777  000003  177030            CMP     #3,@RSDT        ;RS04?
1031  002030  001037                            BNE     TRYNX           ;GET A NEW NUMBER
1032  002032  052737  177777  001172  6$:      BIS     #-1,RS04DT      ;YES RS04
1033  002040  032737  040000  001126  1$:      BIT     #BIT14,FLAG2    ;IN POWER FAIL OR CONVERSATION?
1034  002046  001401                            BEQ     7$              ;NO
1035  002050  000207                            RTS     PC              ;YES
1036  002052  032777  000200  176764  7$:      BIT     #BIT7,@RSDS     ;IS THIS DRIVE READY ?
1037  002060  001423                            BEQ     TRYNX           ;NO GET ANOTHER DRIVE
1038  002062  032737  000040  177570            BIT     #BIT5,SWR       ;TYPEOUT?
1039  002070  001016                            BNE     4$              ;NO
1040  002072  032737  000004  001126            BIT     #BIT2,FLAG2     ;WAS THERE AN ERRER?
1041  002100  001402                            BEQ     5$              ;NO
1042  002102  104402  000757                    TYPE    ,CRLFLF
1043  002106                            5$:
1044  002106  013746  001164                    MOV     UNNUM,-(6)      ;PUT UNNUM ON STACK
1045  002112  104406                            TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
1046  002114  104402  000040                    TYPE    ,40             ;TYPE SPACE
1047  002120  042737  000004  001126            BIC     #BIT2,FLAG2     ;CLEAR ERROR FLAG
1048  002126  000430                    4$:     BR      NOWGO           ;NOW TEST
```

```
002130  006337  001170          TRYNX:  ASL     UNCMP           ;CHECK NEXT BIT FOR DRIVE
002134  103403                          BCS     CHCKDV          ;DID WE TEST ANY REG?
002136  005237  001164                  INC     UNNUM           ;INC UNIT #
002142  000703                          BR      STTEST          ;CHECK FOR NEXT DRIVE

002144  032737  000002  001126  CHCKDV: BIT     #BIT1,FLAG2     ;FOUND DRIVE?
002152  001014                          BNE     DONEE           ;YES WE DID TEST A DRIVE
002154  012737  100000  001170          MOV     #100000,UNCMP   ;NO DRIVES TESTED, COULD NOT SET
002162  005037  001164                  CLR     UNNUM           ;ANY AS BITS, THUS DEFAULTS TO 0
002166  013746  001164                  MOV     UNNUM,-(6)      ;PUT UNNUM ON STACK
002172  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
002174  104402  000730                  TYPE    ,NOFND
002200  000000                          HALT                    ;COULD NOT SET ANY ATA BITS
                                                                ;BY SETTING ERROR BITS
                                                                ;GO BACK AND USE OTHER DIAG.
002202  000402                          BR      NOWGO           ;TEST DRIVE 0
002204  000137  013366          DONEE:  JMP     OUT             ;GET OUT
002210  052737  000002  001126  NOWGO:  BIS     #BIT1,FLAG2     ;FOUND DRIVE
002216  000207                          RTS     PC

                                ;ENTER OPERATOR CONVERSATION MODE

002220  104402  006616          CONM:   TYPE    ,STABUF
002224  104420                          RDOCT
002226  012637  001074                  MOV     (6)+,STAMEM     ;START BUFFER AT 4K
002232  104402  006643          3$:     TYPE    ,BUFSIZ
002236  104420                          RDOCT                   ;GET NUMBER
002240  011637  001112                  MOV     (6),SIZEAP      ;SAVE IT
                                ;XYZ*************?**********************************************************
                                ;*****************************************************************************
                                ;****************************************************************************
                                ;XYZ*************?**********************************************************
                                ;*****************************************************************************
                                ;****************************************************************************
                                ;XYZ*************?**********************************************************
                                ;*****************************************************************************
                                ;****************************************************************************
002244  063716  001074                  ADD     STAMEM,(6)      ;GET STARTING BANK
002250  023726  001022                  CMP     TEMP1,(6)+      ;IS TOTAL MEMORY MORE THAN LAST BANK
002254  002766                          BLT     3$              ;GREATER THEN 24K
002256  000137  002334                  JMP     NOPORT          ;GET OUT
```

```
1090  002262  104402  006616          1$:     TYPE    ,STABUF
1091  002266  104402  002272                  TYPE    ,.+2            ;.ASCIZ "B "
1092  002276  104420                          RDOCT                   ;GET ANS
1093  002300  012637  001100                  MOV     (6)+,STBCOM     ;AND SAVE IT
1094  002304  104402  006643          4$:     TYPE    ,BUFSIZ
1095  002310  104420                          RDOCT                   ;GET ANS
1096  002312  012637  001114                  MOV     (6)+,SIZEBP     ;SAVE IT
1097  002316  022737  000006  001114          CMP     #6,SIZEBP       ;GREATER THEN 24K?
1098  002324  002767                          BLT     4$              ;YES ASK AGAIN
1099  002326  052737  000100  001132          BIS     #BIT6,FLAG      ;SET B PORT FLAG
1100  002334  004737  011514          NOPORT: JSR     PC,EXTMEM       ;CAL BUFFERS AND WC
1101  002340  013737  001150  001134          MOV     SWRDCT,WRDCT    ;GET STANDARD WC
1102  002346  052737  002000  001132  A1:     BIS     #BIT10,FLAG     ;SET BIT FOR DATA TEST ONLY
1103  002354  004537  012322                  JSR     R5,ERRCL        ;CLEAR ERROR CNT + PASS CNT
1104  002360  042737  174040  001132          BIC     #174040,FLAG    ;CLEAR MULTI FLAG MODE +PATTERN SELECT
1105  002366  104402  002372                  TYPE    ,.+2            ;.ASCIZ <15><12>"MULTI DRIVE"
1106  002410  004737  003264                  JSR     PC,CMPY         ;COMPARE FOR YES
1107  002414  001004                          BNE     DATTES          ;ANS IS NO
1108  002416  052737  004000  001132          BIS     #BIT11,FLAG     ;SET BIT FOR MULTI DRIVE
1109  002424  000444                  1$:     BR      ASKWC
1110  002426                          DATTES:
1111  002426  104402  002432                  TYPE    ,.+2            ;.ASCIZ <15><12>"TYPE UNIT # "
1112  002452  104420                          RDOCT
1113  002454  012637  001174                  MOV     (6)+,NUM$       ;GET NUMBER
1114  002460  022737  000010  001174          CMP     #10,NUM$        ;CORRECT # ?
1115  002466  103757                          BLO     DATTES          ;NO
1116  002470  013737  001174  001164          MOV     NUM$,UNNUM      ;SET UNIT #
1117  002476  004737  006770                  JSR     PC,FNDTYP               ;TEST FOR RS04 OR 03
1118  002502  005002                  1$:     CLR     R2              ;CLEAR WORK AREA
1119  002504  000261                          SEC                     ;SET CARRY
1120  002506  006102                  2$:     ROL     R2              ;SET BIT IN WORK
1121  002510  005737  001174                  TST     NUM$            ;IS THIS THE RIGHT BIT FOR THE RIGHT DISK
1122  002514  001403                          BEQ     3$              ;YES
1123  002516  005337  001174                  DEC     NUM$            ;NO TRY AGAIN
1124  002522  000771                          BR      2$              ;TEST AGAIN
1125  002524  010237  001166          3$:     MOV     R2,UNITSV       ;SET DRIVE BIT IN UNITSV
1126  002530  052737  000002  001126          BIS     #BIT1,FLAG2     ;SET FOUND DRIVE FLAG
1127
1128  002536                          ASKWC:
1129  002536  104402  002542                  TYPE    ,.+2            ;.ASCIZ <15><12>"OPTIONAL WD CT"
1130  002564  004737  003264                  JSR     PC,CMPY         ;COMPARE FOR YES
1131  002570  001403                          BEQ     WCCON           ;YES
1132  002572  004537  010244                  JSR     R5,RESTOR       ;RESTORE ORIGINAL WD CNT
1133  002576  000431                          BR      OPDAR           ;CONT
```

```
1134  002600                                  WCCON:
1135  002600  104402  002604                        TYPE    ,.+2            ;.ASCIZ <15><12>"WD CT "
1136  002616  104420                              RDOCT
1137  002620  012637  001174                        MOV     (6)+,NUM$       ;GET NUMBER
1138  002624  005737  001174                        TST     NUM$            ;IS IT 0?
1139  002630  001763                              BEQ     WCCON           ;YES ASK AGAIN FOR LENGTH
1140  002632  013702  001220                        MOV     SAVWC,R2        ;GET STANDARD WC FOR -A- PORT
1141  002636  005202                        1$:   INC     R2
1142  002640  020237  001174                        CMP     R2,NUM$         ;IS NUM$ LESS THAN SWRDCT
1143  002644  101755                              BLOS    WCCON           ;YES ASK FOR COUNT AGAIN
1144  002646  013737  001174  001150              MOV     NUM$,SWRDCT     ;OPERATING WORD COUNT
1145  002654  013737  001150  001134              MOV     SWRDCT,WRDCT
1146
1147  002662                                  OPDAR:
1148  002662  104402  002666                        TYPE    .+2             ;.ASCIZ <15><12>"OPTIONAL DSK ADDR"
1149  002712  004737  003264                        JSR     PC,CMPY         ;COMPARE FOR YES
1150  002716  001034                              BNE     OPPAT           ;ANS IS NO
1151  002720  052737  000040  001132              BIS     #BIT5,FLAG      ;SET OPTIONAL DMA FLAG
1152  002726  104402  002732                        TYPE    ,.+2            ;.ASCIZ <15><12>"DSK ADDR "
1153  002746  104420                              RDOCT
1154  002750  012637  001174                        MOV     (6)+,NUM$       ;GET NUMBER
1155  002754  005737  001172                        TST     RS04DT          ;IS THIS A RS04?
1156  002760  001404                              BEQ     1$              ;NO
1157  002762  022737  017777  001174              CMP     #17777,NUM$     ;IS ADD. CORRECT?
1158  002770  000403                              BR      2$              ;GET OUT
1159  002772  022737  007777  001174  1$:         CMP     #7777,NUM$      ;IS ADD. CORRECT?
1160  003000  101730                        2$:   BLOS    OPDAR           ;NO
1161  003002  013737  001174  001146              MOV     NUM$,TDMA       ;TEMP SECTOR REGISTER
```

```
1162  003010                                  OPPAT:
1163  003010  104402  003014                         TYPE    ,.+2            ;.ASCIZ <15><12>"DATA PATTERN # "
1164  003036  104420                                 RDOCT
1165  003040  012637  001174                         MOV     (6)+,NUM$       ;GET NUMBER
1166  003044  022737  000023  001174                 CMP     #23,NUM$        ;TEST FOR CORRECT NO
1167  003052  101756                                 BLOS    OPPAT           ;ASK AGAIN
1168  003054  005037  001142                         CLR     PATNU           ;CLEAR PATTERN #
1169  003060  022737  000022  001174                 CMP     #22,NUM$
1170  003066  001411                                 BEQ     OPWRT           ;DATA PATTERN UNDER PROGRAM CONTROL
1171  003070  052737  100000  001132                 BIS     #BIT15,FLAG     ;SET PROGRAM FLAG
1172  003076  013737  001174  001142                 MOV     NUM$,PATNU      ;OPERATOR WANTS TO SELECT DATA
1173  003104  000241                                 CLC
1174  003106  006137  001142                         ROL     PATNU
1175
1176  003112                                  OPWRT:
1177  003112  104402  003116                         TYPE    ,.+2            ;.ASCIZ <15><12>"WRITE"
1178  003126  004737  003264                         JSR     PC,CMPY         ;COMPARE FOR YES
1179  003132  001003                                 BNE     OPRD            ;ASK ABOUT WRITE CHECK
1180  003134  052737  040000  001132                 BIS     #BIT14,FLAG     ;YES SET FLAG BIT
1181
1182  003142                                  OPRD:
1183  003142  104402  003146                         TYPE    ,.+2            ;.ASCIZ <15><12>"READ"
1184  003156  004737  003264                         JSR     PC,CMPY         ;COMPARE FOR YES
1185  003162  001003                                 BNE     OPWCK
1186  003164  052737  010000  001132                 BIS     #BIT12,FLAG     ;SET FLAG TO READ
1187
1188  003172                                  OPWCK:
1189  003172  104402  003176                         TYPE    ,.+2            ;.ASCIZ <15><12>"WRITE CK"
1190  003212  004737  003264                         JSR     PC,CMPY         ;COMPARE FOR YES
1191  003216  001003                                 BNE     ADTST
1192  003220  052737  020000  001132                 BIS     #BIT13,FLAG
1193
1194  003226  032737  004000  001132  ADTST:         BIT     #BIT11,FLAG     ;ARE WE IN MULTI DRIVE MODE
1195  003234  001402                                 BEQ     EXMFLG          ;BRANCH IF NO.
1196  003236  004737  001620                         JSR     PC,DRVENO       ;GET DRIVES TO BE TESTED
1197  003242  042737  000004  001132  EXMFLG:        BIC     #BIT2,FLAG      ;CLEAR XFER MODE FLAG
1198  003250  032737  002000  001132  1$:            BIT     #BIT10,FLAG     ;TEST FOR DATA TEST ONLY
1199  003256  001414                                 BEQ     ADT1            ;DO COMPLETE TEST
1200  003260  000137  003710                         JMP     DATAT           ;DO DATA TEST ONLY
1201
1202  003264  104402  000763          CMPY:          TYPE    ,YORN
1203  003270  104422                                 RDLIN
1204  003272  122737  000131  017270                 CMPB    #'Y,INPUT       ;TEST FOR YES
1205  003300  000207                                 RTS     PC
1206  003302  052737  100000  001222  ADTL:          BIS     #BIT15,FLAG3    ;SET LOOP IN ADDRESS TEST FLAG GOT HERE
1207                                                                          ;BECAUSE PROGRAM WAS STARTED AT 260
```

```
                                        ;RH11 ADDRESS TEST #1 (TRACK AND SECTOR SELECTION TEST)
                                        ;WRITE 100(OCTAL) RS03, 200(OCTAL) RS04, WORDS IN EACH SECTOR
                                        ;THE WORD CONTAINS THE ADDRESS OF EACH SECTOR
                                        ;WHEN THE COMPLETE DISK IS WRITTEN READ
                                        ;BACK EACH SECTOR AND COMPARE FOR THE CORRECT
                                        ;DATA IN THE SECTOR
                                        ;PS IS AT LEVEL 7 SO NO INTERRUPTS

003310                                  ADT1:                           ;ADDRESS TEST
                                        ;*****************************************************************************
                                        ;TEST 1         ADDRESS TEST
                                        ;*****************************************************************************
003310  104400                          TST1:   SCOPE
003312  012737  000340  177776          ADT1A:  MOV     #340,PS         ;LOCK UP PS
003320  005037  001024                          CLR TEMP2
003324  012737  020000  017350                  MOV     #20000,OUTBUF   ;START BUF AT 20000
003332  052737  000400  001132                  BIS     #BIT8,FLAG      ;SET TEST FLAG
003340  013737  001150  001154                  MOV     SWRDCT,SAVE     ;SAVE STD WD COUNT
003346  005037  001140                          CLR     DMA             ;CLEAR DISK ADD
003352  104426                                  CLRDV                   ;INIT DRIVE
003354  012737  000200  001134                  MOV     #200,WRDCT      ;SETUP WC
003362  012737  000200  001150                  MOV     #200,SWRDCT
003370  005737  001172                          TST     RS04DT          ;IS THIS A RS04?
003374  001006                                  BNE     2$              ;YES
003376  012737  000100  001134  1$:     MOV     #100,WRDCT      ;SETUP WORD COUNT
003404  012737  000100  001150                  MOV     #100,SWRDCT
003412  013737  017350  001144  2$:     MOV     OUTBUF,BUF      ;SET UP CURRENT ADDRESS
003420  104414                  SEABUF: ERCLR                   ;CLEAR RS REGISTERS IF ERROR
003422  013700  017350                  MOV     OUTBUF,R0       ;SET UP ADDRESS BUFFER
003426  013701  001134                  MOV     WRDCT,R1        ;
003432  013720  001140          XSEABUF:MOV     DMA,(0)+        ;LOAD OUTBUF WITH DATA TO BE WRITTEN
003436  005301                          DEC     R1              ;FILL OUTBUF
003440  001374                          BNE     XSEABUF         ;WITH DATA
003442  012737  000061  001176          MOV     #61,CMD         ;WRITE NO I/E
003450  104416                          DKCMD                   ;GO WRITE
003452  105777  175354                  TSTB    @RSCS1          ;CHECK FOR READY
003456  100375                          BPL     .-4
003460  005777  175346                  TST     @RSCS1          ;TEST FOR ERROR
003464  100010                          BPL     WRNEXB          ;BRANCH IF NO ERROR
003466  012737  003420  001010          MOV     #SEABUF,LAD     ;SET UP LOOP ADDRESS
003474  052737  001000  001132          BIS     #BIT9,FLAG      ;SET ERROR BIT IN FLAG
003502  104430                          LOGW                    ;LOG WRITE ERROR
003504  104034                          HLT     !WC!DA!BA
003506  104400                  WRNEXB: SCOPE
003510  004737  007234                  JSR     PC,DISBUF       ;SET UP NEXT DISK ADDR.
003514  000741                          BR      SEABUF          ;WRITE NEXT SECTOR
003516  104400                  RRDSEC: SCOPE
```

```
1255  003520  104414                    RDSECT: ERCLR                   ;CLEAR ERRORS
1256  003522  012737  000071  001176            MOV     #71,CMD         ;READ NO I/E
1257  003530  104416                            DKCMD                   ;DO A READ
1258  003532  105777  175274                    TSTB    @RSCS1          ;CHECK FOR READY
1259  003536  100375                            BPL     .-4             ;NOT READY BRANCH BACK
1260  003540  005777  175266                    TST     @RSCS1          ;TEST FOR ERROR
1261  003544  100006                            BPL     ADHGT           ;BRANCH IF NO ERROR
1262  003546  052737  001000  001132            BIS     #BIT9,FLAG      ;SET ERROR FLAG
1263  003554  104432                            LOGR                    ;LOG READ ERROR
1264  003556  104014                            HLT     !WC!DA
1265  003560  104400                            SCOPE
1266  003562  013702  017350            ADHGT:  MOV     OUTBUF,R2
1267  003566  005737  001172                    TST     RS04DT          ;RS04?
1268  003572  001403                            BEQ     1$              ;NO
1269  003574  012703  000200                    MOV     #200,R3         ;YES
1270  003600  000402                            BR      SANHT           ;CONT
1271  003602  012703  000100            1$:     MOV     #100,R3
1272  003606  023712  001140            SANHT:  CMP     DMA,(2)         ;CMP FOR CORRECT ADDR.
1273  003612  001004                            BNE     ADERR           ;BRANCH IF DATA DID NOT COMPARE
1274  003614  005722                            TST     (2)+            ;GET NEXT ADDRESS OF INBUF
1275  003616  005303                            DEC     R3              ;DEC SECTOR COUNT
1276  003620  001372                            BNE     SANHT           ;TEST NEXT WORD
1277  003622  000412                            BR      CHKADT
1278  003624  013701  001140            ADERR:  MOV     DMA,GOOD        ;CORRECT ADDRESS
1279  003630  011200                            MOV     (2),BAD         ;DATA IN ERROR
1280  003632  104000                            HLT                     ;DISK ADD DID NOT MATCH WRITTEN ADDRESS
1281  003634  104436                            LOGC                    ;LOG COMPARE ERROR
1282  003636  004737  014134                    JSR     PC,PRNT         ;INHIBIT TYPEOUT?
1283  003642  001002                            BNE     CHKADT          ;YES
1284  003644  104402  000757                    TYPE    ,CRLFLF
1285
1286                                    ;*****REPORT ONLY ONE ERROR PER SECTOR*****
1287
1288  003650  104400                    CHKADT: SCOPE
1289  003652  004737  007234                    JSR     PC,DISBUF       ;SET UP NEXT DISK BUFFER
1290  003656  000717                            BR      RRDSEC          ;CHECK NEXT SECTOR
1291  003660  013737  001154  001150            MOV     SAVE,SWRDCT     ;GET STD WD COUNT
1292  003666  042737  000400  001132            BIC     #BIT8,FLAG      ;CLEAR TEST FLAG
1293  003674  032737  100000  001222            BIT     #BIT15,FLAG3    ;DOES OPERATOR WANT TO LOOP ON TEST
1294  003702  001402                            BEQ     .+6             ;NO
1295  003704  000137  003312                    JMP     ADT1A           ;YES
1296  003710                            DATAT:                          ;DATA TEST
1297                                    ;*************************************************************************
1298                                    ;TEST 2         DATA TEST
1299                                    ;*************************************************************************
1300  003710  104400                    TST2:   SCOPE
1301                                    ;XYZ***********?*********************************************************
1302                                    ;*************************************************************************
1303                                    ;*************************************************************************
1304                                    ;XYZ***********?*********************************************************
1305                                    ;*************************************************************************
1306                                    ;*************************************************************************
1307                                    ;XYZ***********?*********************************************************
1308                                    ;*************************************************************************
1309  003712  012737  177777  001024            MOV     #-1,TEMP2               ;TEST 2 INDICATOR
1310  003720  013737  001074  001026            MOV     STAMEM,TEMP3
```

```
1311  003726  013737  001150  001134  LDAT3:  MOV     SWRDCT,WRDCT
1312  003734  005037  001140          LDAT2:  CLR     DMA             ;CLEAR DISK ADDRESS
1313  003740  104426                          CLRDV                   ;CLEAR RS REGISTERS
1314  003742  004737  011426                  JSR     PC,APORT
1315  003746  004737  007160                  JSR     PC,VECTRR       ;SETUP INT VECTOR
1316  003752  012777  000340  175110  2$:     MOV     #340,@STATUS    ;SET DISK STATUS REG LOC (206)
1317  003760  012737  004012  001156          MOV     #LDAT,HRDER     ;SETUP FOR HARD ERROR RETURN
1318  003766  013737  017350  001144          MOV     OUTBUF,BUF      ;SETUP OUTPUT BUFFER
1319  003774  052737  000003  001132          BIS     #3,FLAG         ;SET COUNTER TO 3
1320  004002  004537  007700                  JSR     R5,PASEL        ;SET UP DATA BUFFERS
1321  004006  005037  001204          LDAT1:  CLR     LOPCNT          ;CLEAR ERROR FLAG
1322  004012  104414                  LDAT:   ERCLR                   ;CLEAR RS REG. IF ERROR
1323  004014  004537  006576                  JSR     R5,OPDSEL       ;SET UP DISK ADDRESS
1324  004020  032737  040000  001132          BIT     #BIT14,FLAG     ;TEST FOR WRITE
1325  004026  001462                          BEQ     SLH             ;TEST FOR READ
1326  004030  012737  000161  001176          MOV     #161,CMD        ;WRITE WITH I/E
1327  004036  104416                          DKCMD                   ;DO A WRITE
1328  004040  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
1329  004044  012737  004012  001010          MOV     #LDAT,LAD       ;SETUP SCOPE LOOP
1330  004052  032737  001000  001132          BIT     #BIT9,FLAG      ;WAS THERE AN ERROR?
1331  004060  001427                          BEQ     WRXBL           ;CONT
1332  004062  104430                          LOGW                    ;LOG WRITE ERROR
1333  004064  005237  001204                  INC     LOPCNT          ;SET ERROR FLAG
1334  004070  022737  000001  001204          CMP     #1,LOPCNT       ;IS THIS THE FIRST TIME?
1335  004076  001000                          BNE     2$              ;NO
1336  004100  004737  014134          2$:     JSR     PC,PRNT         ;TYPE ?
1337  004104  001004                          BNE     1$              ;NO
1338  004106  104402  000620                  TYPE    ,DATA
1339  004112  104402  000630                  TYPE    ,WRTERR
1340  004116  104044          1$:     HLT     !DS!DA                  ;WRITE ERROR
1341  004120  005337  001132                  DEC     FLAG            ;DEC COUNTER
1342  004124  032737  000003  001132          BIT     #3,FLAG         ;DONE YET WITH 3RD TRY?
1343  004132  001327                          BNE     LDAT            ;NOT 3 TRIES YET? TRY AGAIN
1344  004134  004737  011474                  JSR     PC,WTNO         ;TYPE CAN NOT WRITE
```

```
1345  004140  005737  001204          WRXBL:  TST     LOPCNT          ;WAS THERE AN ERROR?
1346  004144  001402                          BEQ     WRX1            ;NO
1347  004146  004737  011644                  JSR     PC,TYPREC       ;TYPE RECOVERED
1348  004152  005037  001204          WRX1:   CLR     LOPCNT          ;CLEAR ERROR FLAG
1349  004156  104400                          SCOPE
1350  004160  052737  000003  001132          BIS     #3,FLAG         ;CLEAR RETRY COUNT
1351  004166  004737  007234                  JSR     PC,DISBUF       ;SET BUFFER FOR WRITE CHECK
1352  004172  000705                          BR      LDAT1
1353  004174  104400                  SLH:    SCOPE
1354  004176  104414                  SLH2:   ERCLR                   ;CLEAR RS REG IF ERRORS
1355  004200  004537  006576                  JSR     R5,OPDSEL       ;IS THE OPERATOR SELECTING THE TRACK
1356  004204  032737  020000  001132          BIT     #BIT13,FLAG     ;TEST FOR WRITE CHECK
1357  004212  001002                          BNE     1$              ;YES
1358  004214  000137  004520                  JMP     ESH1            ;NO
1359  004220  013737  017350  001144  1$:     MOV     OUTBUF,BUF      ;SET UP CURRENT ADDRESS
1360  004226  012737  000151  001176          MOV     #151,CMD        ;WRITE CHECKWITH I/E
1361  004234  104416                          DKCMD                   ;GO WRITE CHECK
1362  004236  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
1363  004242  032737  001000  001132  XESH:   BIT     #BIT9,FLAG      ;IS THERE AN ERROR?
1364  004250  001505                          BEQ     1$              ;NO ERROR
1365  004252  005737  001204                  TST     LOPCNT          ;1ST ERROR?
1366  004256  001001                          BNE     2$              ;NO
1367  004260  104434                          LOGWC                   ;YES LOG ERROR
1368  004262  032737  000100  177570  2$:     BIT     #BIT6,SWR       ;TYPE ALL ERRORS?
1369  004270  001007                          BNE     3$              ;YES
1370  004272  032737  001000  177570          BIT     #BIT9,SWR       ;LOOP ON ERROR?
1371  004300  001003                          BNE     3$              ;YES
1372  004302  005737  001204                  TST     LOPCNT          ;FIRST ERROR?
1373  004306  001056                          BNE     10$             ;NO
1374  004310  004737  014134          3$:     JSR     PC,PRNT         ;TYPE OUT?
1375  004314  001052                          BNE     4$              ;NO
1376  004316  104402  000620                  TYPE    ,DATA
1377  004322  104402  000642                  TYPE    ,WCKERR
1378  004326  017702  174506                  MOV     @RSBA,R2        ;GET CORRECT BA
1379  004332  023702  017350                  CMP     OUTBUF,R2       ;DID A WD GET XFERED?
1380  004336  001406                          BEQ     9$              ;NO
1381  004340  032737  000400  177570          BIT     #BIT8,SWR       ;XFER MODE?
1382  004346  001002                          BNE     9$              ;YES
1383  004350  162702  000002                  SUB     #2,R2
1384  004354  004737  014134          9$:     JSR     PC,PRNT         ;TYPEOUT ERRORS?
1385  004360  001030                          BNE     4$              ;NO
1386  004362  005737  001216                  TST     MMAVA           ;IS MEM MGMT AVAILABLE?
1387  004366  001402                          BEQ     7$              ;NO
```

```
1388  004370  004737  007012                  JSR     PC,PHYCOV       ;YES GET VITURAL ADDR
1389  004374  010237  001226          7$:     MOV     R2,WORK         ;GET BA
1390  004400                          8$:
1391  004400  104402  004404                  TYPE    ,.+2            ;.ASCIZ <15><12>"(BA)="
1392  004414                          6$:
1393  004414  017746  174606                  MOV     @WORK,-(6)      ;PUT @WORK ON STACK
1394  004420  104404                          TYPEO                   ;TYPE STACK IN OCTAL
1395  004422  104402  004426                  TYPE    ,.+2            ;.ASCIZ "  WC="
1396  004434  017746  174376                  MOV     @RSWC,-(6)      ;PUT @RSWC ON STACK
1397  004440  104404                          TYPEO                   ;TYPE STACK IN OCTAL
1398  004442  104026          4$:     HLT     !DA!DB!BA               ;NOTE: BA REG. = +2 OF ACTUAL MEMORY
1399                                                                  ;LOC AFTER WORDS HAVE BEEN XFERED
1400  004444  005237  001204          10$:    INC     LOPCNT          ;INC ERROR COUNT
1401  004450  022737  000010  001204        CMP     #10,LOPCNT      ;10 TRYS YET?
1402  004456  001247                        BNE     SLH2            ;NO
1403  004460  004737  006750                JSR     PC,NOREC        ;TYPE UNRECOVERABLE
1404  004464  005737  001204          1$:     TST     LOPCNT          ;ANY ERRORS?
1405  004470  001402                        BEQ     5$              ;NO
1406  004472  004737  011644                JSR     PC,TYPREC       ;TYPE RECOVERED
1407  004476  005037  001204          5$:     CLR     LOPCNT          ;CLEAR ERROR COUNTER
1408  004502  104400                        SCOPE
1409  004504  012737  004176  001010        MOV     #SLH2,LAD       ;SETUP LOOP ADDRESS
1410  004512  004737  007234                JSR     PC,DISBUF       ;SET UP THE DISK BUFFER
1411  004516  000422                        BR      SLH2A
1412  004520  004537  011342          ESH1:   JSR     R5,CLEAR        ;CLEAR BUFFER
1413  004524  004537  006576          ESH:    JSR     R5,OPDSEL       ;OPERATOR SELECTED DISK ADDRESS?
1414  004530  032737  010000  001132        BIT     #BIT12,FLAG     ;TEST FOR READ
1415  004536  001002                        BNE     1$              ;YES
1416  004540  000137  004754                JMP     MSTR            ;NO READ
1417  004544  104400                1$:     SCOPE
1418  004546  042737  000003  001132        BIC     #3,FLAG         ;CLEAR RE-READ COUNT
1419  004554  005037  001204                CLR     LOPCNT          ;CLEAR FLAG
1420  004560  000137  004570                JMP     DSKRD           ;CONT
1421  004564  000137  004176          SLH2A:  JMP     SLH2
1422  004570  104414          DSKRD:  ERCLR                           ;CLEAR RS REG IF ERRORS
1423  004572  012737  000171  001176        MOV     #171,CMD        ;READ WITH I/E
1424  004600  104416                        DKCMD                   ;READ
1425  004602  032737  010000  177570        BIT     #10000,SWR      ;COMPARE?
1426  004610  001007                        BNE     TAG             ;NO
1427  004612  032737  000004  001132        BIT     #BIT2,FLAG      ;COMPARE?
1428  004620  001003                        BNE     TAG             ;NO
1429  004622  004537  010444                JSR     R5,COMPARE      ;COMPARE
1430  004626  000402                        BR      ELH
```

```
1431  004630  004737  011622          TAG:    JSR     PC,WATT         ;WAIT FOR INTERRUPT
1432  004634  032737  001000  001132  ELH:    BIT     #BIT9,FLAG      ;IS THERE AN ERROR?
1433  004642  001433                          BEQ     ADRD            ;NO
1434  004644  032737  000100  177570          BIT     #BIT6,SWR       ;SOFT ERROR TYPEOUT?
1435  004652  001003                          BNE     3$              ;YES
1436  004654  005737  001204                  TST     LOPCNT          ;FIRST ERROR?
1437  004660  001011                          BNE     2$              ;NO
1438  004662  004737  014134          3$:     JSR     PC,PRNT         ;TYPEOUT?
1439  004666  001004                          BNE     1$              ;NO
1440  004670  104402  000620                  TYPE    ,DATA
1441  004674  104402  000657                  TYPE    ,RDERR
1442  004700  104432                  1$:     LOGR                    ;LOG READ ERROR
1443  004702  104044                          HLT     !DS!DA
1444  004704  104400                  2$:     SCOPE
1445  004706  005237  001204                  INC     LOPCNT          ;COUNT ERRORS
1446  004712  022737  000010  001204          CMP     #10,LOPCNT      ;LAST RETRY?
1447  004720  001323                          BNE     DSKRD           ;NO
1448  004722  004737  006750                  JSR     PC,NOREC        ;TYPE UNRECOVERABLE
1449  004726  000137  004746          4$:     JMP     ADR1            ;CONT
1450  004732  104400                  ADRD:   SCOPE
1451  004734  005737  001204                  TST     LOPCNT          ;ANY ERRORS?
1452  004740  001402                          BEQ     ADR1            ;NO
1453  004742  004737  011644                  JSR     PC,TYPREC       ;TYPE RECOVERED
1454  004746  004737  007234          ADR1:   JSR     PC,DISBUF       ;GO SET UP DISK BUFFER.
1455  004752  000500                          BR      READCT          ;CONT. READING
1456  004754  005737  001132          MSTR:   TST     FLAG
1457  004760  100467                          BMI     3$              ;OPERATOR SELECTED PATTERN
1458                  ;*****************************************************************
1459                  ;*****************************************************************
1460                  ;*****************************************************************
1461                  ;*****************************************************************
1462                  ;*****************************************************************
1463                  ;*****************************************************************
1464                  ;*****************************************************************
1465                  ;*****************************************************************
1466
1467  004762  013746  001134                  MOV     WRDCT,-(SP)
1468  004766  000316                          SWAB    (SP)
1469  004770  042716  177400                  BIC     #177400,(SP)
1470  004774  006216                          ASR     (SP)
1471  004776  006216                          ASR     (SP)
1472  005000  006216                          ASR     (SP)
1473  005002  006216                          ASR     (SP)
1474  005004  061637  001026                  ADD     (SP),TEMP3
1475  005010  023737  001022  001026          CMP     TEMP1,TEMP3
1476  005016  003424                          BLE     5$
1477  005020  061637  001026                  ADD     (SP),TEMP3
1478  005024  023737  001022  001026          CMP     TEMP1,TEMP3
1479  005032  003416                          BLE     4$
1480  005034  162637  001026                  SUB     (SP)+,TEMP3
1481  005040  005037  017350                  CLR     OUTBUF
1482  005044  013746  001026                  MOV     TEMP3,-(SP)
1483  005050  062737  020000  017350  6$:     ADD     #20000,OUTBUF
1484  005056  005316                          DEC     (SP)
1485  005060  001373                          BNE     6$
1486  005062  005726                          TST     (SP)+
```

```
1487  005064  000137  003726          JMP     LDAT3
1488  005070                  4$:
1489  005070  005726                  5$:     TST     (SP)+
1490  005072  062737  000002  001142          ADD     #2,PATNU        ;INC PATTERN INDEX
1491  005100  022737  000044  001142          CMP     #44,PATNU
1492  005106  001402                  BEQ     .+6
1493  005110  000137  003710          JMP     DATAT           ;NOT LAST PATTERN EXIT
1494  005114  005037  001142          CLR     PATNU           ;LAST PATTERN EXIT
1495  005120  032737  000002  177570  BIT     #BIT1,SWR       ;DATA TEST ONLY?
1496  005126  001006                  BNE     2$              ;YES
1497  005130  032737  002000  001132  BIT     #BIT10,FLAG     ;DATA TEST ONLY?
1498  005136  001404                  BEQ     1$              ;NO
1499  005140  005137  001120          3$:     COM     AOB1            ;ALTERNATE PORTS
1500  005144  000137  006204          2$:     JMP     EXTPPR          ;LOOP
1501  005150  000137  005166          1$:     JMP     RANEX           ;DO NEXT TEST
1502
1503  005154  000137  004524          READCT: JMP     ESH             ;CONT. READING
1504  005160  052737  100000  001222  RANEL:  BIS     #BIT15,FLAG3    ;SET LOOP IN RANDOM TEST GOT
1505                                                                  ;HERE BY STARTING AT LOC 264
```

```
                                RANEX:                          ;RANDOM ADDRESS DATA TEST
                                ;THIS PROGRAM WRITES, WRITECHECKS AND READS 1 SECTOR OF RANDOM DATA FROM RANDOM DISK
                                ;ADDRESSES. THIS TEST WILL MAKE 1000(10) PASSES BEFORE IT IS COMPLETED

                                ;*************************************************************************
                                ;TEST 3          RANDOM ADDRESS RANDOM DATA TEST
                                ;*************************************************************************
005166  104400                  TST3:   SCOPE
                                ;XYZ***********?*********************************************************
                                ;*************************************************************************
                                ;*************************************************************************
                                ;XYZ***********?*********************************************************
                                ;*************************************************************************
                                ;*************************************************************************
                                ;XYZ***********?*********************************************************
                                ;*************************************************************************
005170  005037  001024                  CLR     TEMP2                   ;NOMORE A TEST 2
005174  052737  000400  001132  2$:     BIS     #BIT8,FLAG              ;SET TEST FLAG
005202  012737  020000  017350          MOV     #20000,OUTBUF           ;GET STARTING ADDR OF BUF
005210  013737  017350  001122          MOV     OUTBUF,VADDR            ;SAVE BUFFER ADDR
005216  005737  001216                  TST     MMAVA                   ;MEM MGMT AVAILABLE?
005222  001402                          BEQ     1$                      ;NO
005224  005037  177572                  CLR     @#SR0                   ;TURN IT OFF
005230  012737  000042  001142  1$:     MOV     #42,PATNU               ;DO RANDOM COMPARE
005236  104426                          CLRDV                           ;INIT DRIVE
005240  012737  176030  001162          MOV     #-1000.,PASSC           ;SET UP PASS COUNT
005246  012737  006024  001156          MOV     #RWRED,ERDER            ;SET UP FOR HARD ERROR
005254  004737  007160                  JSR     PC,VECTRR               ;SETUP INTERRUPT VECTOR
005260  012777  000340  173602          MOV     #340,@STATUS
005266  012737  005406  001010  WRLG1:  MOV     #WRERR,LAD              ;SETUP LOOP ADDRESS
005274  012737  000001  001226          MOV     #1,WORK                 ;SET UP RANDOM GENERATOR WORD
005302  013701  017350                  MOV     OUTBUF,R1
005306  004537  010040                  JSR     R5,RANDOM               ;GENERATE RANDOM DATA
005312  017737  012032  001140          MOV     @OUTBUF,DMA             ;SET UP DISK ADDRESS
005320  042737  170000  001140          BIC     #170000,DMA
005326  052737  000003  001132          BIS     #3,FLAG                 ;SET COUNTER
005334  012737  000200  001134          MOV     #200,WRDCT              ;RS04
005342  005737  001172                  TST     RS04DT                  ;RS04?
005346  001003                          BNE     2$                      ;YES
005350  012737  000100  001134          MOV     #100,WRDCT              ;SET UP WOPD COUNT =1SECTOR
005356  013737  001134  001226  2$:     MOV     WRDCT,WORK              ;GENERATE RANDOM BUFFER
005364  013701  017350                  MOV     OUTBUF,R1
005370  004537  010040                  JSR     R5,RANDOM
005374  013737  017350  001144          MOV     OUTBUF,BUF              ;SET UP OUTPUT BUFFER
005402  005037  001204                  CLR     LOPCNT                  ;CLR ERROR FLAG
```

```
 1551  005406  104414                    WRERR:  ERCLR
 1552  005410  012737  000161  001176            MOV     #161,CMD        ;WRITE WITH I/E
 1553  005416  104416                            DKCMD                   ;WRITE
 1554  005420  004737  011622                    JSR     PC,WATI         ;WAIT FOR INTERRUPT
 1555  005424  032737  001000  001132    2$:     BIT     #BIT9,FLAG      ;WAS THERE AN ERROR?
 1556  005432  001435                            BEQ     WRRCK1          ;NO
 1557  005434  032737  000100  177570            BIT     #BIT6,SWR       ;TYPE RETRY ?
 1558  005442  001004                            BNE     5$              ;YES
 1559  005444  005737  001204                    TST     LOPCNT          ;FIRST TIME?
 1560  005450  001013                            BNE     6$              ;NO
 1561  005452  104430                            LOGW                    ;LOG WRITE ERROR
 1562  005454  005237  001204            5$:     INC     LOPCNT          ;SET ERROR FLAG
 1563  005460  004737  014134                    JSR     PC,PRNT         ;TYPEOUT?
 1564  005464  001004                            BNE     3$              ;YES
 1565  005466  104402  000670                    TYPE    ,RANDM
 1566  005472  104402  000630                    TYPE    ,WRTERR
 1567  005476  104044                    3$:     HLT     !DS!DA
 1568  005500  104400                    6$:     SCOPE
 1569  005502  005337  001132                    DEC     FLAG
 1570  005506  032737  000003  001132            BIT     #3,FLAG
 1571  005514  001334                            BNE     WRERR           ;RETRY
 1572  005516  004737  011474                    JSR     PC,WTNO         ;TYPE CAN NOT WRITE
 1573  005522  000137  006126                    JMP     EXRAX           ;GET NEW NUMBER
```

```
 1574  005526  005737  001204          WRRCK1: TST     LOPCNT          ;ANY ERRORS?
 1575  005532  001402                          BEQ     1$              ;NO
 1576  005534  004737  011644                  JSR     PC,TYPREC       ;TYPE RECOVERED
 1577  005540  104400                  1$:     SCOPE
 1578  005542  005037  001204                  CLR     LOPCNT          ;CLEAR LOOP COUNT
 1579  005546  104414                  WRRCK:  ERCLR                   ;CLEAR RS REG IF ERRORS
 1580  005550  012737  000151  001176          MOV     #151,CMD        ;WRITE CHECK WITH I/E
 1581  005556  104416                          DKCMD                   ;WRITE CHECK
 1582  005560  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
 1583  005564  032737  001000  001132  4$:     BIT     #BIT9,FLAG      ;ERROR?
 1584  005572  001453                          BEQ     1$              ;NO
 1585  005574  032737  000100  177570          BIT     #BIT6,SWR       ;TYPE ALL RETRYS?
 1586  005602  001003                          BNE     2$              ;YES
 1587  005604  005737  001204                  TST     LOPCNT          ;FIRST ERROR?
 1588  005610  001030                          BNE     5$              ;NO
 1589  005612  104434                  2$:     LOGWC                   ;LOG WRITE CK
 1590  005614  004737  014134                  JSR     PC,PRNT         ;TYPEOUT?
 1591  005620  001052                          BNE     6$              ;NO
 1592  005622  104402  000670                  TYPE    ,RANDM
 1593  005626  104402  000642                  TYPE    ,WCKERR
 1594  005632  017737  173202  001226          MOV     @RSBA,WORK      ;GET CORRECT BA
 1595  005640  162737  000002  001226          SUB     #2,WORK
 1596  005646  104402  005652                  TYPE    ,.+2            ;.ASCIZ <15><12>"(BA)="
 1597  005662  017746  173340                  MOV     @WORK,-(6)      ;PUT @WORK ON STACK
 1598  005666  104404                          TYPEO                   ;TYPE STACK IN OCTAL
 1599  005670  104026                          HLT     !DB!DA!BA       ;BA=MEMORY LOC +2 OF ACTUAL WORD
 1600  005672  005237  001204          5$:     INC     LOPCNT          ;INC RETRY COUNT
 1601  005676  022737  000010  001204          CMP     #10,LOPCNT      ;LAST ONE YET?
 1602  005704  001320                          BNE     WRRCK           ;NO
 1603  005706  104402  006701                  TYPE    ,UNRECO
 1604  005712  005037  001204                  CLR     LOPCNT          ;CLEAR LOPCNT
 1605  005716  000137  006126                  JMP     EXRAX           ;GET NEW NUMBER
 1606  005722  005737  001204          1$:     TST     LOPCNT          ;ANY ERRORS?
 1607  005726  001407                          BEQ     6$              ;NO
 1608  005730  104402  000702                  TYPE    ,RECOV
 1609  005734  013746  001204                  MOV     LOPCNT,-(6)     ;GET NUMBER
 1610  005740  104406                          TYPES                   ;TYPE IT
 1611  005742  104402  000757                  TYPE    ,CRLFLF
 1612  005746  104400                  6$:     SCOPE
 1613  005750  052737  000003  001132          BIS     #3,FLAG         ;SET COUNTER
```

```
1614  005756  104400                    SCOPE
1615  005760  005037  001204            CLR     LOPCNT          ;CLEAR COUNTER
1616  005764  004537  011342            JSR     R5,CLEAR        ;CLEAR BUFFER
1617  005770  104414            RREAD:  ERCLR                   ;CLEAR RS REG IF ERRORS
1618  005772  012737  000171  001176    MOV     #171,CMD        ;READ WITH I/E
1619  006000  104416                    DKCMD                   ;READ
1620  006002  032737  010000  177570    BIT     #BIT12,SWR      ;COMPARE ?
1621  006010  001003                    BNE     TAG1            ;NO
1622  006012  004537  010444            JSR     R5,COMPARE      ;YES
1623  006016  000402                    BR      RWRED           ;CONT
1624  006020  004737  011622    TAG1:   JSR     PC,WATT         ;WAIT FOR INTERRUPT
1625  006024  032737  001000  001132    BIT     #BIT9,FLAG      ;IS THERE AN ERROR?
1626  006032  001435                    BEQ     EXRAX           ;NO
1627  006034  104432                    LOGR                    ;LOG READ ERR
1628  006036  032737  000100  177570  1$:       BIT     #BIT6,SWR       ;TYPE ALL ERRORS?
1629  006044  001016                    BNE     2$              ;YES
1630  006046  032737  001000  177570    BIT     #BIT9,SWR       ;LOOP ON ERROR?
1631  006054  001012                    BNE     2$              ;YES
1632  006056  005737  001204            TST     LOPCNT          ;FIRST ERROR?
1633  006062  001010                    BNE     3$              ;NO
1634  006064  004737  014134            JSR     PC,PRNT         ;TYPEOUT?
1635  006070  001004                    BNE     2$              ;NO
1636  006072  104402  000670            TYPE    ,RANDM
1637  006076  104402  000657            TYPE    ,RDERR
1638  006102  104006            2$:     HLT     !DB!DA
1639  006104  104400            3$:     SCOPE
1640  006106  005237  001204            INC     LOPCNT          ;UPDATE COUNTER
1641  006112  022737  000010  001204    CMP     #10,LOPCNT      ;LAST TRY YET?
1642  006120  001323                    BNE     RREAD           ;RETRY
1643  006122  004737  006750            JSR     PC,NOREC        ;TYPE UNRECOVERABLE
1644  006126  005737  001204    EXRAX:  TST     LOPCNT          ;ANY ERRORS?
1645  006132  001402                    BEQ     EXRXX           ;NO
1646  006134  004737  011644            JSR     PC,TYPREC       ;TYPE RECOVERED
1647  006140  104400            EXRXX:  SCOPE
1648  006142  005237  001162            INC     PASSC           ;+1 PASS COUNT
1649  006146  001402                    BEQ     1$              ;IS TEST DONE?
1650  006150  000137  005266            JMP     WRLG1           ;NO
1651  006154  005037  001142    1$:     CLR     PATNU           ;END OF TEST
1652  006160  042737  000400  001132    BIC     #BIT8,FLAG      ;CLEAR TEST FLAG
1653  006166  032737  100000  001222    BIT     #BIT15,FLAG3    ;LOOP ON THIS TEST?
1654  006174  001402                    BEQ     .+6             ;NO
1655  006176  000137  005166            JMP     RANEX           ;YES
```

```
                                        ;CHECK FOR MULTI DISK MODE
                                        ;IF IN MULTI DISK MODE REPORT "END"
                                        ;IF LAST DISK ON SYSTEM HAS BEEN EXERCISED.
                                        ;
                                        ;*********************************************************************
                                        ;TEST 4          TEST FOR MULTI DISK MODE
                                        ;*********************************************************************
006202  104400                          TST4:   SCOPE
006204  005037  001140                  EXTPPR: CLR     DMA
006210  005037  001024                          CLR     TEMP2
006214  104426                                  CLRDV                   ;INIT DRIVE
006216  032737  004000  001132                  BIT     #BIT11,FLAG     ;ARE WE IN MULTI DISK MODE
006224  001404                                  BEQ     EXTPP           ;NO REPORT "END"
006226  004737  002130                          JSR     PC,TRYNX        ;YES TEST FOR ALL DRIVES
006232  000137  003242                          JMP     EXMFLG          ;RESTART TESTING OF DRIVES
006236  004737  002204                  EXTPP:  JSR     PC,DONEE        ;GET PASS COUNT

                                        ;THIS ROUTINE CLEARS THE DRIVE
                                        ;REGISTERS IF THERE WAS AN ERROR

006242  032737  001000  001132          .ERCLR: BIT     #BIT9,FLAG      ;ANY ERRORS?
006250  001404                                  BEQ     1$              ;NO
006252  104426                                  CLRDV                   ;CLEAR ALL ERRORS
006254  042737  001000  001132                  BIC     #BIT9,FLAG      ;CLEAR ERROR FLAG
006262  000002                          1$:     RTI                     ;EXIT

                                        ;ENTER DISK HANDLER BY THE TRAP INSTRUCTION
                                        ;ARGUMENT TO TRAP INSTRUCTION IS TWO ORDER
                                        ;BYTE OF THE CONTROL REGISTER.

006264  013777  001140  172550          .DKCMD: MOV     DMA,@RSDA       ;LOAD DISK ADD
                                        ;*********************************************************************
                                        ;*********************************************************************
                                        ;*********************************************************************
                                        ;*********************************************************************
                                        ;*********************************************************************
                                        ;*********************************************************************
                                        ;*********************************************************************
006272  005737  001024                          TST     TEMP2
006276  001422                                  BEQ     5$
006300  013746  001026                          MOV     TEMP3,-(6)
006304  005077  172552                          CLR     @RSBAE
006310  005037  001030                          CLR     TEMP4
006314  062737  020000  001030  6$:     ADD     #20000,TEMP4
006322  013737  001030  001144                  MOV     TEMP4,BUF
006330  103002                                  BCC     7$
006332  005277  172524                          INC     @RSBAE
006336  005316                          7$:     DEC     (6)
006340  001365                                  BNE     6$
006342  005726                                  TST     (6)+
006344  005037  001202                  5$:     CLR     INTFLG          ;CLEAR INTERRUPT FLAG
006350  013777  001144  172462          4$:     MOV     BUF,@RSBA       ;LOAD (CMA) BUSS ADDRESS
006356  013702  001134                          MOV     WRDCT,R2        ;GET NEGATIVE
006362  005402                                  NEG     R2              ;WORD COUNT
006364  010277  172446                          MOV     R2,@RSWC        ;LOAD WC
```

E04


```
1712  006370  032737  000400  001132          BIT     #BIT8,FLAG      ;RANDOM TEST?
1713  006376  001021                          BNE     1$              ;YES A PORT ONLY WITH NO MEM MGMT
1714  006400  005737  001216                  TST     MMAVA           ;MEM MGMT AVAILIABLE?
1715  006404  001416                          BEQ     1$              ;NO
1716  006406  032737  000040  001126          BIT     #BIT5,FLAG2     ;SET A17 IN RSCS1
1717  006414  001403                          BEQ     3$              ;NO
1718  006416  052737  001000  001176          BIS     #BIT9,CMD       ;YES
```

```
1719  006424  032737  000020  001126  3$:     BIT     #BIT4,FLAG2     ;SET A16?
1720  006432  001403                          BEQ     1$              ;NO
1721  006434  052737  000400  001176          BIS     #BIT8,CMD       ;YES
1722  006442  113777  001176  172362  1$:     MOVB    CMD,@RSCS1      ;LOAD FUNCTION REG.
1723  006450  000002                          RTI                     ;RETURN FROM TRAP
1724
1725                                  ;RH11 DISK INTERRUPT HANDLER
1726                                  ;ROUTINE CONTINUES ON ERRORS
1727
1728  006452  042737  001000  001132  DKINT:  BIC     #BIT9,FLAG      ;CLEAR ERROR BIT
1729  006460  005777  172346                  TST     @RSCS1          ;TEST FOR ERROR
1730  006464  100401                          BMI     2$
1731  006466  000425                          BR      INTEXT          ;JUMP IF NO ERRORS
1732  006470  017702  172336          2$:     MOV     @RSCS1,R2       ;GET CONTENTS OF CS1
1733  006474  042702  037777                  BIC     #37777,R2       ;CLEAR ALL BUT SC AND TRE
1734  006500  022702  140000                  CMP     #140000,R2      ;IS SC AND TRE BOTH SET?
1735  006504  001413                          BEQ     TRUERR          ;YES THERE IS SOME KIND OF XFER ERROR
1736  006506  032777  100000  172330          BIT     #100000,@RSDS   ;IS THE ATA BIT SET?
1737  006514  001007                          BNE     TRUERR          ;YES
1738  006516  104140                          HLT     !AS!DS          ;WRONG UNIT INTERRUPTED
1739                                                                  ;IF YOU HAVE JUST POWERED UP A DRIVE OR
1740                                                                  ;ARE RUNNING THE POWER FAIL TEST,
1741                                                                  ;INTERRUPTS WILL OCCUR FROM DRIVES OTHER
1742                                                                  ;THAN THE UNIT UNDER TEST. IF THIS TYPEOUT
1743                                                                  ;SHOWS NO ERRORS IN THE REGISTERS OF THE DRIVE
1744                                                                  ;UNDER TEST, THAT DRIVE IS OK
1745  006520  012777  177777  172322  1$:     MOV     #-1,@RSAS       ;CLEAR ALL ATA BITS
1746  006526  013716  001156                  MOV     HRDER,(SP)      ;GET RETURN ADD.
1747  006532  000002                          RTI                     ;RETRY
1748  006534  052737  001000  001132  TRUERR: BIS     #BIT9,FLAG      ;SET ERROR BIT
1749  006542  032737  004000  177570  INTEXT: BIT     #BIT11,SWR      ;HALT ON COMPLETION FLAG
1750  006550  001401                          BEQ     .+4
1751  006552  000000                          HALT                    ;YES BIT 11 SET IN SWR HALT
1752  006554  032737  002000  001126          BIT     #BIT10,FLAG2    ;WAIT IN BACKGROUND TEST?
1753  006562  001402                          BEQ     1$              ;NO
1754  006564  012716  012306          2$:     MOV     #NPRRET,(SP)    ;MODIFY RETURN ADD.
1755  006570  010637  001202          1$:     MOV     SP,INTFLG       ;SET INT FLG
1756  006574  000002                          RTI                     ;EXIT
1757                                  ;ROUTINE TO SET UP TRACK # FROM OPTION
1758                                  ;ENTER FROM JSR R5, OPDSEL
1759
1760  006576  032737  000040  001132  OPDSEL: BIT     #BIT5,FLAG      ;OPTIONAL DMA?
1761  006604  001403                          BEQ     1$              ;NO
1762  006606  013737  001146  001140          MOV     TDMA,DMA        ;GET OPT. DMA
1763  006614  000205                  1$:     RTS     R5              ;EXIT
```

```
1764  006616  005015  052123  051101  STABUF: .ASCIZ  <15><12>"STARTING 4K BANK #"
1765  006624  044524  043516  032040
1766  006632  020113  040502  045516
1767  006640  021440     000
1768
1769  006643     015  044012  053517  BUFSIZ: .ASCIZ  <15><12>"HOW MANY 4K BANKS? (OCTAL) "
1770  006650  046440  047101  020131
1771  006656  045464  041040  047101
1772  006664  051513  020077  047450
1773  006672  052103  046101  020051
1774  006700     000
1775
1776  006701     015  052412  051116  UNRECO: .ASCIZ  <15><12>"UNRECOVERABLE"<15><12><12>
1777  006706  041505  053117  051105
1778  006714  041101  042514  005015
1779  006722  000012
1780
1781  006724  005015  047125  041101  NOWRIT: .ASCIZ  <15><12>"UNABLE TO WRITE"<15><12>
1782  006732  042514  052040  020117
1783  006740  051127  052111  006505
1784  006746  000012
1785
1786                                  .EVEN
1787
1788  006750  004737  014134          NOREC:  JSR     PC,PRNT         ;TYPEOUT?
1789  006754  001002                          BNE     1$              ;NO
1790  006756  104402  006701                  TYPE    ,UNRECO
1791  006762  005037  001204          1$:     CLR     LOPCNT          ;CLEAR LOOP COUNTER
1792  006766  000207                          RTS     PC
1793
1794  006770  052737  040000  001126  FNDTYP: BIS     #BIT14,FLAG2    ;SET CHECK DRIVE TYPE FLAG
1795  006776  004737  001762                  JSR     PC,UNTYP        ;CHECK DRIVE TYPE FLAG
1796  007002  042737  040000  001126          BIC     #BIT14,FLAG2    ;CLEAR DRIVE TYPE FLAG
1797  007010  000207                          RTS     PC
```

```
                                        ;ROUTINE TO CALCULATE VITURAL ADDR
                                        ;
007012  000302                  PHYCOV: SWAB    R2              ;CALCULATE FROM PHYSICAL ADDR
007014  004737  011610                  JSR     PC,RRR2
007020  006002                          ROR     R2
007022  042702  177770                  BIC     #177770,R2      ;GET REG #
007026  032777  000400  171776          BIT     #BIT8,@RSCS1    ;IS A16 SET?
007034  001402                          BEQ     1$              ;NO
007036  052702  000010                  BIS     #BIT3,R2        ;YES
007042  032777  001000  171762  1$:     BIT     #BIT9,@RSCS1    ;IS A17 SET?
007050  001402                          BEQ     2$              ;NO
007052  052702  000020                  BIS     #BIT4,R2        ;YES
007056  013737  001074  001230  2$:     MOV     STAMEM,WORK1    ;GET BANK # FOR -A- PORT
                                        ;*******************************************************************************
                                        ;*******************************************************************************
                                        ;*******************************************************************************
                                        ;*******************************************************************************
                                        ;*******************************************************************************
                                        ;*******************************************************************************
                                        ;*******************************************************************************
007064  005737  001024                          TST     TEMP2
007070  001403                          BEQ     3$
007072  013737  001026  001230                  MOV     TEMP3,WORK1
007100  163702  001230          3$:     SUB     WORK1,R2        ;GET STARTING BANK #
007104  062702  000001                  ADD     #1,R2           ;GET OFFSET FOR REG #
007110  000302                          SWAB    R2              ;GET BANK # INTO
007112  006102                          ROL     R2              ;UPPER BITS
007114  006102                          ROL     R2
007116  006102                          ROL     R2
007120  006102                          ROL     R2
007122  006102                          ROL     R2
007124  017737  171710  001230          MOV     @RSBA,WORK1     ;GET OFFSET FOR ADDR IF ANY
007132  162737  000002  001230          SUB     #2,WORK1        ;CORRECT IT
007140  042737  160000  001230          BIC     #160000,WORK1   ;CLEAR JUNK
007146  050237  001230                  BIS     R2,WORK1        ;GET REG NO
007152  013702  001230                  MOV     WORK1,R2
007156  000207                          RTS     PC
                                        ;
007160  012777  006452  171700  VECTRR: MOV     #DKINT,@RSVEC   ;SETUP INTERRUPT VECTORS
007166  013737  001072  177776          MOV     PRIORITY,PS     ;PRIORITY 4
007174  000207                          RTS     PC
                                        ;
                                        ;THIS ROUTINE IS USED FOR DELAYING THE START OF THIS PROGRAM
                                        ;IF POWER FAILED DURING TESTING. THIS WILL GIVE THE DRIVES TIME TO GET UP
                                        ;TO SPEED. THE DELAY WILL BE ABOUT 3-5 MINUTES DEPENDING UPON THE PROCESSOR
                                        ;
007176  012737  177777  001226  TIMUP:  MOV     #177777,WORK
007204  012737  177777  001230  1$:     MOV     #177777,WORK1
007212  000240                  2$:     NOP
007214  005337  001230                  DEC     WORK1
007220  001374                          BNE     2$
007222  005337  001226                  DEC     WORK
007226  001366                          BNE     1$
007230  000137  003226                  JMP     ADTST
                                        ;ROUTINE TO SETUP DISK BUFFERS
                                        ;ADD WORD COUNT TO STARTING DISK ADDRESSES
```

```
1854                                        ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS
1855
1856  007234  032737  000040  001132  DISBUF: BIT     #BIT5,FLAG      ;DID OPERATOR SELECT PATTERNS
1857  007242  001402                          BEQ     1$              ;NO
1858  007244  000137  007410                  JMP     BUFEXIT         ;YES
1859  007250  004737  007600          1$:     JSR     PC,BLSZ         ;DEFINE BLOCK SIZE
1860  007254  013737  001160  001230          MOV     BLOCK,WORK1
1861  007262  005237  001140          INCSEC: INC     DMA             ;+1 SECTOR COUNT
1862  007266  022737  010000  001140          CMP     #10000,DMA      ;DONE YET?
1863  007274  001445                          BEQ     BUFEXIT         ;YES
1864  007276  005337  001160                  DEC     BLOCK           ;-1 FROM BLOCK COUNT
1865  007302  001401                          BEQ     COMDAR          ;CMP DMA TO RSDA
1866  007304  000766                          BR      INCSEC          ;RECYCLE
1867  007306  032737  001000  001132  COMDAR: BIT     #BIT9,FLAG      ;ANY ERRORS?
1868  007314  001401                          BEQ     1$              ;NO ERRORS DO COMPARE ON RSDA
1869  007316  000207                          RTS     PC              ;ERRORS DO NOT COMPARE RSDA
1870  007320  023777  001140  171514  1$:     CMP     DMA,@RSDA       ;COMPARE RSDA WITH DMA
1871  007326  001425                          BEQ     CMDAE           ;SHOULD BE EQUAL
1872  007330  104432                          LOGR                    ;AFTER TRANSFER RSDA AND DMA SHOULD BE =
1873                                                                  ;IF NOT, RSDA IS NOT CORRECT. DMA CONTAINS
1874                                                                  ;WHAT RSDA SHOULD =
1875  007332  013701  001140                  MOV     DMA,GOOD        ;GET DMA FOR CORRECT ANS IN GOOD
1876  007336  017700  171500                  MOV     @RSDA,BAD       ;GET RSDA INTO BAD
1877  007342  104000                          HLT                     ;RSDA=BAD DMA=GOOD SEE COMMENTS 7 LINES ABOVE
1878  007344  004737  014134                  JSR     PC,PRNT         ;TYPEOUT?
1879  007350  001014                          BNE     CMDAE           ;NO
1880  007352  011637  001226                  MOV     (SP),WORK       ;GET TEST PC FROM WHERE IT CAME
1881  007356  104402  007362                  TYPE    ,.+2            ;.ASCIZ " TST PC="
1882  007374  013746  001226                  MOV     WORK,-(6)       ;PUT WORK ON STACK
1883  007400  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
1884  007402  105737  001132          CMDAE:  TSTB    FLAG            ;LAST DISK BUFFER?
1885  007406  100032                          BPL     BUFINX          ;NO
```

```
 1886  007410  005037  001140          BUFEXIT:CLR     DMA             ;CLEAR ADDRESS BITS LAST DISK BUFFER
 1887  007414  062716  000002                  ADD     #2,(6)          ;INC STOCK POINTER
 1888  007420  042737  000200  001132  AKH:    BIC     #200,FLAG       ;CLEAR LAST DISK BUFFER FLAG
 1889  007426  032737  000400  001132          BIT     #BIT8,FLAG      ;RANDOM TEST OR ADDR TEST?
 1890  007434  001404                          BEQ     1$              ;NO
 1891  007436  013737  001150  001134  2$:     MOV     SWRDCT,WRDCT
 1892  007444  000454                          BR      EXTDR           ;EXIT
 1893  007446  032737  000100  001132  1$:     BIT     #BIT6,FLAG      ;MULTI PORT?
 1894  007454  001770                          BEQ     2$              ;NO
 1895  007456  005737  001120                  TST     AOB1            ;A OR B PORT?
 1896  007462  001765                          BEQ     2$              ;A PORT
 1897  007464  013737  001116  001134          MOV     WDCTB,WRDCT     ;B PORT
 1898  007472  000441                          BR      EXTDR           ;GET OUT
 1899  007474  005037  001232          BUFINX: CLR     WORK2           ;CLEAR WORK2 FOR BLOCK COUNTER
 1900  007500  013702  001140                  MOV     DMA,R2          ;PUT WORKING DISK ADD INTO WORK
 1901  007504  005237  001232          XINCSEC:INC     WORK2           ;INCREMENT BLOCK COUNT
 1902  007510  022702  007777                  CMP     #7777,R2        ;CMP FOR LAST SECTOR
 1903  007514  001405                          BEQ     XINCSUR         ;+1 SURFACE LAST SECTOR BRANCH
 1904  007516  005202                          INC     R2              ;INC DMA
 1905  007520  005337  001230                  DEC     WORK1           ;DEC BLOCK COUNT
 1906  007524  001367                          BNE     XINCSEC         ;FILLED STANDARD BUFFER YET?
 1907  007526  000734                          BR      AKH             ;WILL TAKE STANDARD SIZE WORD COUNT
 1908  007530  013746  001232          XINCSUR:MOV     WORK2,-(SP)     ;SETTING UP BLOCK COUNT
 1909  007534  000241                          CLC                     ;FOR NON STANDARD BUFFER SIZE
 1910  007536  006116                          ROL     (SP)
 1911  007540  006116                          ROL     (SP)
 1912  007542  006116                          ROL     (SP)
 1913  007544  006116                          ROL     (SP)
 1914  007546  006116                          ROL     (SP)
 1915  007550  006116                          ROL     (SP)
 1916  007552  012637  001134                  MOV     (SP)+,WRDCT
 1917  007556  005737  001172                  TST     RS04DT          ;RS04?
 1918  007562  001402                          BEQ     1$              ;NO
 1919  007564  006137  001134                  ROL     WRDCT           ;YES
 1920  007570  052737  000200  001132  1$:     BIS     #200,FLAG       ;SET LAST DISK BUFFER FLAG
 1921  007576  000207                  EXTDR:  RTS     PC              ;EXIT
```

```
                                        ;THIS ROUTINE CONVERTS A WORD COUNT TO A BLOCK COUNT

007600  012737  000177  001160  BLSZ:   MOV     #177,BLOCK      ;SETUP FOR RS04
007606  005737  001172                  TST     RS04DT          ;RS04?
007612  001003                          BNE     2$              ;YES
007614  012737  000077  001160  1$:     MOV     #77,BLOCK       ;PUT SECTOR SIZE INTO BLOCK
007622  013702  001134          2$:     MOV     WRDCT,R2        ;FETCH WORD COUNT
007626  033702  001160                  BIT     BLOCK,R2        ;ARE THEY EQUAL?
007632  001406                          BEQ     RORBLK          ;YES
007634  043702  001160                  BIC     BLOCK,R2        ;SET UP BLOCK OVERFLOW
007640  005237  001160                  INC     BLOCK
007644  063702  001160                  ADD     BLOCK,R2
007650  000241                  RORBLK: CLC
007652  006002                          ROR     R2
007654  006002                          ROR     R2
007656  004737  011610                  JSR     PC,RRR2
007662  005737  001172                  TST     RS04DT          ;RS04?
007666  001401                          BEQ     1$              ;NO
007670  006002                          ROR     R2              ;YES
007672  010237  001160          1$:     MOV     R2,BLOCK        ;BLOCK COUNT
007676  000207                          RTS     PC              ;EXIT

                                        ;ROUTINE TO SELECT DATA PATTERNS FOR TEST

                                        ;ENTER FROM JSR R5,PASEL

007700  012737  010374  000004  PASEL:  MOV     #MEM,@#4        ;SETUP TRAP
007706  012737  000340  000006          MOV     #340,@#6        ;VECTOR
007714  013700  001142                  MOV     PATNU,R0        ;SET UP PATTERN NUMBER
007720  010003                          MOV     R0,R3           ;GET PATTERN #
007722  000241                          CLC                     ;MAKE IT =
007724  006003                          ROR     R3              ;TO PATTERN # IN LISTING
007726  010337  177570                  MOV     R3,@#DISPLAY    ;DISPLAY PATTERN #
007732  013737  001134  001226          MOV     WRDCT,WORK      ;SET UP WORK
007740  013701  001122                  MOV     VADDR,R1        ;LOC. OF OUTBUFFER
007744  022700  000042          1$:     CMP     #42,R0          ;TEST FOR RANDOM DATA NUMBER
007750  001433                          BEQ     RANDOM          ;GO GENERATE RANDOM DATA
007752  032737  000004  001132          BIT     #BIT2,FLAG      ;MAX TST?
007760  001404                          BEQ     2$              ;NO
007762  016037  000300  017350          MOV     PAT0(0),OUTBUF  ;GET PATTERN
007770  000205                          RTS     R5
007772  016000  000300          2$:     MOV     PAT0(0),R0
                                ;XYZ************?*******************************************
                                ;***********************************************************
                                ;**********************************************************
                                ;XYZ************?*******************************************
                                ;***********************************************************
                                ;**********************************************************
                                ;XYZ************?*******************************************
                                ;***********************************************************
007776  004737  017414                  JSR     PC,MMPSET       ;PRESET MEMORY MANAGEMENT REG
010002  005737  001024                  TST     TEMP2           ;IS IT A TEST 2
010006  001756                          BEQ     1$              ;BRANCH IF NOT TEST 2
010010  004537  017352          FILDAT: JSR     R5,MMUSE        ;DO NEXT INSTRUCTION WITH MM
010014  010021                  1$:     MOV     R0,(1)+         ;FILL BUFFER
010016  005337  001226                  DEC     WORK            ;DEC. WORK COUNT
```

```
 1978  010022  001372                          BNE     FILDAT          ;LOAD NEXT WORD
 1979  010024  012737  000006  000004  PASEX:  MOV     #6,@#4          ;RESTORE
 1980  010032  005037  000006                  CLR     @#6             ;TRAP
 1981  010036  000205                          RTS     R5              ;BUFFER FULL
```

```
                                        ;RANDOM DATA GENERATOR SUBROUTINE

010040  013737  010234  010240  RANDOM: MOV     LONUM,LOSAV
010046  013737  010236  010242          MOV     HINUM,HISAV
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
                                        ;*********************************************************************
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
                                        ;*********************************************************************
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
010054  004737  017414                          JSR     PC,MMPSET       ;PRESET MEMORY MANAGEMENT REG
010060  013700  010234          RAND1:  MOV     LONUM,R0        ;SET UP R0 WITH 5 DIGITS LOW
010064  013704  010236                  MOV     HINUM,R4        ;SET UP R1 WITH 5 DIGITS HIGH
010070  012703  000007                  MOV     #7,R3           ;SET UP SHIFT COUNT
010074  005002                          CLR     R2              ;CLEAR R2
010076  006300                  SHIFT:  ASL     R0              ;SHIFT R0 LEFT AND
010100  006104                          ROL     R4              ;ROTATE CARRY INTO LSB OF R1 INTO
010102  006102                          ROL     R2              ;ROTATE CARRY OUT OF R1 INTO R2
010104  005303                          DEC     R3              ;DECREMENT R3
010106  001373                          BNE     SHIFT           ;CONTINUE SHIFT LOOP
010110  063700  010234                  ADD     LONUM,R0        ;ADDN IN NUMBER TO MAKE X 129
010114  005504                          ADC     R4              ;PROPOGATE CARRY
010116  063704  010236                  ADD     HINUM,R4        ;ADDN IN NUMBER TO MAKE X 129
010122  005502                          ADC     R2              ;PROPOGATE CARRY
010124  062700  001057                  ADD     #1057,R0        ;ADDN LOW CONSTANT
010130  005504                          ADC     R4              ;PROPOGATE CARRIES
010132  005502                          ADC     R2              ;PROPOGATE AGAIN
010134  062704  047401                  ADD     #47401,R4       ;ADDN HIGH CONSTANT
010140  005502                          ADC     R2              ;PROPOGATE CARRY
010142  062702  000006                  ADD     #6,R2           ;ADDN HIGHEST CONSTANT
010146  062700  000002                  ADD     #2,R0           ;REPRIME R0 WITH HIGH DIGIT
010152  005504                          ADC     R4              ;PROPOGATE CARRY
010154  010037  010234                  MOV     R0,LONUM        ;PUT R0 BACK IN LONUM
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
                                        ;*********************************************************************
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
                                        ;*********************************************************************
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
010160  005737  001024                  TST     TEMP2           ;IS IT A TEST 2
010164  001402                          BEQ     1$              ;BRANCH IF NOT TEST 2
010166  004537  017352                  JSR     R5,MMUSE        ;DO NEXT INSTRUCTION WITH MM
010172  010021                  1$:     MOV     R0,(1)+         ;HOLD LONUM FOR PROGRAM
010174  005337  001226                  DEC     WORK
010200  001413                          BEQ     EXGEN
010202  010437  010236                  MOV     R4,HINUM        ;PUT R1 BACK IN HINUM
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
                                        ;*********************************************************************
                                        ;XYZ************?*******************************************************
                                        ;**********************************************************************
                                        ;*********************************************************************
```

```
                                        ;XYZ************?****************************************************
                                        ;**********************************************************************
010206  005737  001024                          TST     TEMP2           ;IS IT A TEST 2
010212  001402                                  BEQ     2$              ;BRANCH IF NOT TEST 2
010214  004537  017352                          JSR     R5,MMUSE        ;DO NEXT INSTRUCTION WITH MM
010220  010421                          2$:     MOV     R4,(1)+         ;HOLD HINUM FOR PROGRAM
010222  005337  001226                          DEC     WORK
010226  001314                                  BNE     RAND1
010230  000137  010024                  EXGEN:  JMP     PASEX           ;RETURN TO PROGRAM
010234  000000                          LONUM:  0
010236  000000                          HINUM:  0
010240  000000                          LOSAV:  0
010242  000000                          HISAV:  0

010244  013737  001220  001150          RESTOR: MOV     SAVWC,SWRDCT    ;RESTORE ORIGINAL
010252  013737  001150  001134                  MOV     SWRDCT,WRDCT    ;WORD COUNT
010260  000205                                  RTS     R5
```

```
                                        ;RANDOM DATA GENERATOR SUBROUTINE
                                        ;WHEN SWITCH = 0 WE COME HERE
010262  013700  010370          RAND:   MOV     LONUM1,R0       ;SET UP R0 WITH 5 DIGITS LOW
010266  013704  010372                  MOV     HINUM1,R4       ;SET UP R1 WITH 5 DIGITS HIGH
010272  012703  000007                  MOV     #7,R3           ;SET UP SHIFT COUNT
010276  005002                          CLR     R2              ;CLEAR R2
010300  006300                  SHIFT1: ASL     R0              ;SHIFT R0 LEFT AND
010302  006104                          ROL     R4              ;ROTATE CARRY INTO LSB OF R1 INTO
010304  006102                          ROL     R2              ;ROTATE CARRY OUT OF R1 INTO R2
010306  005303                          DEC     R3              ;DECREMENT R3
010310  001373                          BNE     SHIFT1          ;CONTINUE SHIFT LOOP
010312  063700  010370                  ADD     LONUM1,R0       ;ADDN IN NUMBER TO MAKE X 129
010316  005504                          ADC     R4              ;PROPOGATE CARRY
010320  063704  010372                  ADD     HINUM1,R4       ;ADDN IN NUMBER TO MAKE X 129
010324  005502                          ADC     R2              ;PROPOGATE CARRY
010326  062700  001057                  ADD     #1057,R0        ;ADDN LOW CONSTANT
010332  005504                          ADC     R4              ;PROPOGATE CARRIES
010334  005502                          ADC     R2              ;PROPOGATE AGAIN
010336  062704  047401                  ADD     #47401,R4       ;ADDN HIGH CONSTANT
010342  005502                          ADC     R2              ;PROPOGATE CARRY
010344  062702  000006                  ADD     #6,R2           ;ADDN HIGHEST CONSTANT
010350  062700  000002                  ADD     #2,R0           ;REPRIME R0 WITH HIGH DIGIT
010354  005504                          ADC     R4              ;PROPOGATE CARRY
010356  010037  010370                  MOV     R0,LONUM1       ;PUT R0 BACK IN LONUM
010362  010437  010372                  MOV     R4,HINUM1       ;PUT R1 BACK IN HINUM
010366  000205                  EXGEN1: RTS     R5              ;RETURN TO PROGRAM
010370  000000                  LONUM1: 0
010372  000000                  HINUM1: 0

                                        ;TRAP OUT ROUTINE WHEN CREATING DATA BUFFER

010374                          MEM:
010374  104402  010400                  TYPE    ,+2             ;.ASCIZ <15><12>"NON-X-MEM"
010414  012737  000006  000004  4$:     MOV     #6,@#4          ;RESTORE
010422  005037  000006                  CLR     @#6             ;TRAP
010426  032737  100000  177570          BIT     #BIT15,SWR      ;HALT?
010434  001401                          BEQ     2$              ;NO
010436  000000                          HALT
010440  000137  001234          2$:     JMP     @#BEGIN
```

```
                                ;THIS ROUTINE COMPARES THE DATA READ AGAINST THE DATA EXPECTED.
                                ;ALL ERRORS ARE REPORTED TO THE OPERATOR, IF BIT 4 OF THE SWITCH
                                ;REGISTER IS SET, THIS ROUTINE WILL CONTINUE COMPARING AFTER AN ERROR HAS BEEN
                                ;FOUND AND WILL REPORT UP TO 8 VERIFY ERRORS WITHIN THE SAME INPUT OPERATION.
                                
010444  012737  177770  001152  COMPAR: MOV     #-10,ERCOUNT    ;ERROR RETRY COUNTER
                                ;XYZ************?*****************************************************************
                                ;*********************************************************************************
                                ;*********************************************************************************
                                ;XYZ************?*****************************************************************
                                ;*********************************************************************************
                                ;*********************************************************************************
                                ;XYZ************?*****************************************************************
                                ;*********************************************************************************
010452  004737  017414                  JSR     PC,MMPSET       ;PRESET MEMORY MANAGEMENT REG
010456  052737  000010  001126          BIS     #BIT3,FLAG2     ;DOING COMPARE
010464  013737  001134  001232          MOV     WRDCT,WORK2     ;GET THE WORD COUNT
010472  013737  001122  001154          MOV     VADDR,SAVE      ;SET UP OUTBUFFER POINTER
010500  005037  001200                  CLR     SWITCH          ;CLEAR RANDOM PATTERN FLAG
010504  013737  010240  010370          MOV     LOSAV,LONUM1    ;GET RANDOM BASE NOS.
010512  013737  010242  010372          MOV     HISAV,HINUM1
010520  005737  001142                  TST     PATNU           ;TEST FOR PATTERN 0
010524  001017                          BNE     1$              ;NO
010526  005037  001226                  CLR     WORK            ;CLEAR COUNTER
010532  062737  000001  001226  2$:     ADD     #1,WORK         ;INC COUNTER
010540  001005                          BNE     3$              ;INTERRUPT YET?
010542  104402  000510                  TYPE    ,NOINT
010546  104054                          HLT     !DA!WC!DS
010550  000137  001234                  JMP     @#BEGIN
010554  005737  001202          3$:     TST     INTFLG          ;TEST FOR INT
010560  001764                          BEQ     2$              ;WAIT FOR INT BEFORE COMPARING
010562  000426                          BR      CMPLP1          ;CONT
010564  022737  000042  001142  1$:     CMP     #42,PATNU       ;IS THIS RANDOM PATTERN?
010572  001022                          BNE     CMPLP1          ;BRANCH IF YES
010574  005737  001202          CMPLP:  TST     INTFLG          ;INTERRUPT YET?
010600  001775                          BEQ     CMPLP           ;NO WAIT
010602  005737  001200                  TST     SWITCH
010606  001007                          BNE     2$
010610  004537  010262                  JSR     R5,RAND
010614  013701  010370                  MOV     LONUM1,GOOD     ;GET EVEN RANDOM WORD
010620  010637  001200                  MOV     SP,SWITCH       ;SET RANDOM PATTERN FLAG
010624  000411                          BR      WRDCMP
010626  005037  001200          2$:     CLR     SWITCH
010632  013701  010372                  MOV     HINUM1,GOOD
010636  000404                          BR      WRDCMP
010640  013700  001142          CMPLP1: MOV     PATNU,R0
010644  016001  000300                  MOV     PAT0(R0),GOOD
                                ;XYZ************?*****************************************************************
                                ;*********************************************************************************
                                ;*********************************************************************************
                                ;XYZ************?*****************************************************************
                                ;*********************************************************************************
                                ;*********************************************************************************
                                ;XYZ************?*****************************************************************
                                ;*********************************************************************************
010650  005737  001024          WRDCMP: TST     TEMP2
```

```
010654  001406                            BEQ     1$
010656  042737  160000  001154            BIC     #160000,SAVE      ;CLEAR PAR REG
010664  052737  060000  001154            BIS     #60000,SAVE       ;SET PAR 3
010672  160177  170256          1$:       SUB     GOOD,@SAVE        ;COMPARE DATA
010676  001037                            BNE     WDERR             ;WORD IN ERROR
010700  005337  001232          WRDINC:   DEC     WORK2             ;DECREMENT THE WORD COUNT
010704  001430                            BEQ     ADAM              ;EXIT ROUTINE IF ZERO
010706  062737  000002  001154            ADD     #2,SAVE           ;UPDATE PATTERN ADDRESS
                                ;XYZ************?*******************************************************
                                ;************************************************************************
                                ;***********************************************************************
                                ;XYZ************?*******************************************************
                                ;************************************************************************
                                ;***********************************************************************
                                ;XYZ************?*******************************************************
                                ;************************************************************************
010714  005737  001024                    TST     TEMP2
010720  001415                            BEQ     1$
010722  032737  100000  001154            BIT     #100000,SAVE      ;IS 4K DONE
010730  001411                            BEQ     1$                ;BRANCH IF 4K NOT DONE
010732  042737  100000  001154            BIC     #100000,SAVE      ;CLEAR PAR BITS
010740  052737  060000  001154            BIS     #60000,SAVE       ;SET PAR 3
010746  062737  000200  172346            ADD     #200,KIPAR3       ;UPDATE PAR 3 TO NEXT 4K
010754  022737  000042  001142  1$:       CMP     #42,PATNU         ;IS THIS RANDOM PATTERN
010762  001704                            BEQ     CMPLP             ;BRANCH IF YES
010764  000731                            BR      WRDCMP            ;COMPARE NEXT WORD
010766  042737  000010  001126  ADAM:     BIC     #BIT3,FLAG2       ;DONE WITH COMPARE
010774  000205                            RTS     R5                ;EXIT THIS ROUTINE
```

```
2179  010776  005737  001202          WDERR:  TST     INTFLG          ;DID INTERRUPT OCCUR YET?
2180  011002  001722                          BEQ     WRDCMP          ;BRANCH IF NO
2181  011004  032737  000100  177570          BIT     #BIT6,SWR       ;TRY ALL?
2182  011012  001006                          BNE     10$             ;YES
2183  011014  005737  001204                  TST     LOPCNT          ;FIRST READ ERROR?
2184  011020  001403                          BEQ     10$             ;YES
2185  011022  005777  170004                  TST     @RSCS1          ;ANY ERRORS?
2186  011026  100757                          BMI     ADAM            ;YES DO NOT COMPARE
2187  011030  060177  170120          10$:    ADD     GOOD,@SAVE
2188  011034  017700  170114                  MOV     @SAVE,BAD       ;GET GOOD DATA
2189  011040  104436                          LOGC                    ;LOG COMPARE ERROR
2190  011042  032737  001000  177570          BIT     #BIT9,SWR       ;LOOP ON ERROR?
2191  011050  001401                          BEQ     11$             ;NO
2192  011052  005726                          TST     (6)+            ;YES UPDATE SP
2193  011054  004737  014134          11$:    JSR     PC,PRNT         ;TYPEOUT?
2194  011060  001011                          BNE     3$              ;NO
2195  011062  104402  011066                  TYPE    ,.+2            ;.ASCIZ <15><12>"COMPARE ERR"
2196  011104  104000                  3$:     HLT                     ;DATA COMPARE ERROR
2197  011106  004737  014134                  JSR     PC,PRNT         ;HAD TO DO IT THIS WAY SO
2198  011112  001022                          BNE     13$             ;PROGRAM COULD LOOP ON ERROR
2199  011114  104402  011120                  TYPE    ,.+2            ;.ASCIZ " ADDR="
2200  011130  005737  001216                  TST     MMAVA           ;IS MEM MGMT ON?
2201  011134  001406                          BEQ     12$             ;NO
2202  011136  013746  177776                  MOV     PS,-(6)         ;GET PS
2203  011142  013746  001154                  MOV     SAVE,-(6)       ;GET VIRTUAL ADDR
2204  011146  104412                          TYPEA                   ;CONVERT TO PHY AND TYPE
2205  011150  000403                          BR      13$             ;CONT
2206  011152  013746  001154          12$:    MOV     SAVE,-(6)       ;GET ADDR
2207  011156  104406                          TYPES                   ;TYPE IT
2208  011160  005037  001160          13$:    CLR     BLOCK           ;CLEAR THE BLOCK COUNTER
2209  011164  013702  001134                  MOV     WRDCT,R2        ;GET THE WORD COUNT
2210  011170  005202                          INC     R2              ;CORRECT FOR DA CALCULATIONS
2211  011172  163702  001232                  SUB     WORK2,R2        ;DETERMINE DISTANCE OF FAILURE INTO BUFFER
2212  011176  005737  001172          2$:     TST     RS04DT          ;RS04?
2213  011202  001403                          BEQ     7$              ;NO
2214  011204  162702  000200                  SUB     #200,R2         ;RS03
2215  011210  000402                          BR      9$              ;CONT
2216  011212  162702  000100          7$:     SUB     #100,R2
2217  011216  100403                  9$:     BMI     8$
2218  011220  005237  001160                  INC     BLOCK           ;UPDATE BLOCK COUNT FOR EACH 400 WORDS
2219  011224  000764                          BR      2$
```

```
011226  005737  001172           8$:     TST     RS04DT          ;RS04?
011232  001403                           BEQ     4$              ;NO
011234  062702  000200                   ADD     #200,R2         ;RS04
011240  000402                           BR      6$              ;CONT
011242  062702  000100           4$:     ADD     #100,R2         ;RESTORE POSITIVE NUMBER
011246  013737  001140  001230   6$:     MOV     DMA,WORK1       ;GET HEAD AND SECTOR ADDRESS
011254  063737  001160  001230   5$:     ADD     BLOCK,WORK1
011262  004737  014134                   JSR     PC,PRNT         ;TYPEOUT?
011266  001014                           BNE     1$              ;NO
011270  104402  011274                   TYPE    ,.+2            ;.ASCIZ " DA="
011302  013746  001230                   MOV     WORK1,-(6)      ;PUT WORK1 ON STACK
011306  104406                           TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
011310  104402  011314                   TYPE    ,.+2            ;.ASCIZ <15><12>
011320  032737  000020  177570   1$:     BIT     #BIT4,SWR       ;RETRY?
011326  001405                           BEQ     CLEAR           ;NO
011330  005237  001152                   INC     ERCOUNT         ;UPDATE ERROR COUNTER
011334  001402                           BEQ     CLEAR
011336  000137  010700                   JMP     WRDINC
011342  032737  000004  001132   CLEAR:  BIT     #BIT2,FLAG      ;XFER TEST?
011350  001404                           BEQ     3$              ;NO
011352  032737  010000  001132           BIT     #BIT12,FLAG     ;READ?
011360  001421                           BEQ     2$              ;NO
                                 ;XYZ************?*********************************************
                                 ;*************************************************************
                                 ;************************************************************
                                 ;XYZ************?*********************************************
                                 ;*************************************************************
                                 ;************************************************************
                                 ;XYZ************?*********************************************
                                 ;*************************************************************
011362  013701  001122           3$:     MOV     VADDR,R1        ;GET STARTING ADD OF BUFFER
011366  013700  001134                   MOV     WRDCT,R0        ;NOW
011372  004737  017414                   JSR     PC,MMPSET       ;PRESET MM
011376  005737  001024                   TST     TEMP2           ;IS IT TEST 2
011402  001402                           BEQ     1$              ;BRANCH IF NOT TEST 2
011404  004537  017352           4$:     JSR     R5,MMUSE        ;DO NEXT INSTRUCTION WITH MM
011410  005021                   1$:     CLR     (R1)+           ;CLEAR BUFFER
011412  005300                           DEC     R0              ;COUNT LOCATIONS
011414  001373                           BNE     4$              ;WAIT TILL DONE
011416  042737  000010  001126           BIC     #BIT3,FLAG2     ;DONE WITH COMPARE
011424  000205                   2$:     RTS     R5              ;NOW GET OUT

011426  013737  001076  017350   APORT:  MOV     SAVAST,OUTBUF   ;SET STARTING ADDR FOR OUTBUF
011434  013737  001076  001122           MOV     SAVAST,VADDR    ;SAVE OUTBUF ADDR
011442  005737  001216                   TST     MMAVA           ;MEM MGMT?
011446  001411                           BEQ     EXTT            ;NO
011450  013702  001104                   MOV     SAVMGA,R2       ;SET UP MEM MGMT
011454  004737  011672           MMSET:  JSR     PC,STMM2        ;SETUP MEM MGMT
011460  010237  001122                   MOV     R2,VADDR
011464  013737  001124  017350           MOV     PHADDR,OUTBUF
011472  000207                   EXTT:   RTS     PC
```

```
2271                                    ;TYPE CAN NOT WRITE BLOCK
2272
2273  011474  004737  014134  WTNO:     JSR     PC,PRNT         ;TYPEOUT?
2274  011500  001002                    BNE     1$              ;NO
2275  011502  104402  006724            TYPE    ,NOWRIT
2276  011506  005037  001204  1$:       CLR     LOPCNT          ;CLEAR ERR COUNTER
2277  011512  000207                    RTS     PC
2278
2279                                    ;ROUTINE TO SET UP STARTING ADDRESS FOR ALL PORTS
2280                                    ;AND TO CREATE WORD COUNT MAX= 20K
2281
2282  011514  013702  001074  EXTMEM:  MOV     STAMEM,R2       ;GET BANK #
2283  011520  005702                    TST     R2              ;DID  HE TYPE 0?
2284  011522  001001                    BNE     3$              ;NO
2285  011524  005202                    INC     R2              ;YES MAKE 1
2286  011526  005737  001216  3$:       TST     MMAVA
2287  011532  001006                    BNE     1$              ;BRANCH IF MEM MGMT AVAILABLE
2288  011534  000241                    CLC
2289  011536  004737  011610            JSR     PC,RRR2
2290  011542  010237  001076            MOV     R2,SAVAST       ;SAVE A STARTIND ADDR
2291  011546  000404                    BR      2$              ;GET WC
2292  011550  000302  1$:       SWAB    R2
2293  011552  006002                    ROR     R2
2294  011554  010237  001104            MOV     R2,SAVMGA       ;SAVE ADDR FOR A PORT
2295  011560  013702  001112  2$:       MOV     SIZEAP,R2       ;GET 4K BLOCK COUNT
2296  011564  000241  8$:       CLC
2297  011566  006002                    ROR     R2              ;NO CONVERT TO WC
2298  011570  004737  011610            JSR     PC,RRR2
2299  011574  042702  000077            BIC     #77,R2          ;CLEAR BLOCK COUNT
2300  011600  010237  001150            MOV     R2,SWRDCT       ;SAVE -A- PORT WC
2301  011604  000400                    BR      7$              ;CONT
2302                                    ;4$:MOV#60000,SWRDCT;MAKE 20K
2303  011606  000207  7$:       RTS     PC
2304
2305  011610  006002  RRR2:     ROR     R2
2306  011612  006002                    ROR     R2
2307  011614  006002                    ROR     R2
2308  011616  006002                    ROR     R2
2309  011620  000207                    RTS     PC
2310
2311  011622  032737  000200  177570  WATT:     BIT     #BIT7,SWR       ;WAIT IN BACKGROUND?
2312  011630  001003                    BNE     1$              ;NO
2313  011632  004737  012176            JSR     PC,XWAIT        ;YES
2314  011636  000401                    BR      2$              ;CONT
2315  011640  000001  1$:       WAIT
2316  011642  000207  2$:       RTS     PC
2317
2318  011644  004737  014134  TYPREC:   JSR     PC,PRNT         ;TYPEOUT?
2319  011650  001007                    BNE     1$              ;NO
2320  011652  104402  000702            TYPE    ,RECOV
2321  011656  013746  001204            MOV     LOPCNT,-(6)     ;GET COUNT
2322  011662  104406                    TYPES                   ;TYPE IT
2323  011664  104402  000757            TYPE    ,CRLFLF
2324  011670  000207  1$:       RTS     PC
```

```
2325
2326  011672  005737  001216          STMM2:  TST     MMAVA           ;MEM MGMT?
2327  011676  001002                  BNE     3$              ;YES
2328  011700  000137  012164          JMP     MDON            ;GET OUT
2329  011704  005037  172340          3$:     CLR     @#KIPAR0
2330  011710  010237  001154                  MOV     R2,SAVE         ;SAVE R2
2331  011714  010237  172342                  MOV     R2,@#KIPAR1
2332  011720  006302                  ASL     R2              ;CALCULATE PHYSICAL ADDR
2333  011722  006302                  ASL     R2
2334  011724  006302                  ASL     R2
2335  011726  006302                  ASL     R2
2336  011730  006302                  ASL     R2              ;THIS BIT IS A17
2337  011732  042737  000040  001126  BIC     #BIT5,FLAG2     ;CLEAR A17?
2338  011740  103003                  BCC     1$              ;SET A17
2339  011742  052737  000040  001126  BIS     #BIT5,FLAG2     ;SET BIT 5 FOR A17
2340  011750  042737  000020  001126  1$:     BIC     #BIT4,FLAG2     ;CLEAR A16 FLAG
2341  011756  006302                  ASL     R2              ;GET A16 BIT
2342  011760  103003                  BCC     2$              ;CLEAR A16
2343  011762  052737  000020  001126  BIS     #BIT4,FLAG2     ;SET FLAG FOR A16
2344  011770  010237  001124          2$:     MOV     R2,PHADDR       ;GET PHYSICAL ADDR
2345  011774  013702  001154                  MOV     SAVE,R2         ;SET UP MEM MGMT
2346  012000  062702  000200                  ADD     #200,R2
2347  012004  010237  172344                  MOV     R2,@#KIPAR2
2348  012010  062702  000200                  ADD     #200,R2
2349  012014  010237  172346                  MOV     R2,@#KIPAR3
2350  012020  062702  000200                  ADD     #200,R2
2351  012024  010237  172350                  MOV     R2,@#KIPAR4
2352  012030  062702  000200                  ADD     #200,R2
2353  012034  010237  172352                  MOV     R2,@#KIPAR5
2354  012040  062702  000200                  ADD     #200,R2
2355  012044  010237  172354                  MOV     R2,@#KIPAR6
2356  012050  012737  077406  172300          MOV     #200*256.-400+UP+RW,@#KIPDR0    ;SET KIPDR0=RW UP 200 BLOCKS
2357  012056  012737  077406  172302          MOV     #200*256.-400+UP+RW,@#KIPDR1    ;SET KIPDR1=RW UP 200 BLOCKS
2358  012064  012737  077406  172304          MOV     #200*256.-400+UP+RW,@#KIPDR2    ;SET KIPDR2=RW UP 200 BLOCKS
2359  012072  012737  077406  172306          MOV     #200*256.-400+UP+RW,@#KIPDR3    ;SET KIPDR3=RW UP 200 BLOCKS
2360  012100  012737  077406  172310          MOV     #200*256.-400+UP+RW,@#KIPDR4    ;SET KIPDR4=RW UP 200 BLOCKS
2361  012106  012737  077406  172312          MOV     #200*256.-400+UP+RW,@#KIPDR5    ;SET KIPDR5=RW UP 200 BLOCKS
2362  012114  012737  077406  172314          MOV     #200*256.-400+UP+RW,@#KIPDR6    ;SET KIPDR6=RW UP 200 BLOCKS
2363  012122  012737  077406  172316          MOV     #200*256.-400+UP+RW,@#KIPDR7    ;SET KIPDR7=RW UP 200 BLOCKS
2364  012130  012737  177600  172356          MOV     #177600,@#KIPAR7
2365  012136  012702  020000                  MOV     #20000,R2
2366  012142  012737  012166  000250          MOV     #MMABTO,@#MMVEC
2367  012150  012737  000020  172516          MOV     #20,SR3         ;TURN ON 22 BIT MODE
2368  012156  012737  000001  177572          MOV     #1,@#SR0        ;TURN ON MEM MGMT
2369  012164  000207                  MDON:   RTS     PC
2370                                  ;MEMORY MANAGEMENT ABORT ROUTINE FOR WRITE UP
2371  012166  104402  000541          MMABTO: TYPE    ,MTRAP
2372  012172  000000                  HALT
2373  012174  000002                  RTI                     ;CAUSED THE ABORT
```

```
2374                                        ;BACKGROUND TEST FOR INTERRUPTS
2375
2376  012176  052737  002000  001126  XWAIT:  BIS     #BIT10,FLAG2    ;WAITING IN BACKGROUND TEST
2377  012204  012737  070000  012316          MOV     #70000,NPRCNT   ;SETUP TIMEOUT COUNTER
2378  012212  012701  012321                  MOV     #NPR1+1,R1      ;SETUP WAIT LOOP
2379  012216  112711  000200                  MOVB    #200,(R1)
2380  012222                              2$:
2381  012222  105421                          NEGB    (R1)+
2382  012224  105441                          NEGB    -(R1)
2383  012226  105421                          NEGB    (R1)+
2384  012230  105441                          NEGB    -(R1)
2385  012232  105421                          NEGB    (R1)+
2386  012234  105441                          NEGB    -(R1)
2387  012236  105421                          NEGB    (R1)+
2388  012240  105441                          NEGB    -(R1)
2389  012242  105421                          NEGB    (R1)+
2390  012244  105441                          NEGB    -(R1)
2391  012246  105421                          NEGB    (R1)+
2392  012250  105441                          NEGB    -(R1)
2393  012252  105421                          NEGB    (R1)+
2394  012254  105441                          NEGB    -(R1)
2395  012256  105421                          NEGB    (R1)+
2396  012260  105441                          NEGB    -(R1)
2397  012262  102401                          BVS     1$
2398  012264  000000                          HALT                    ;ARITHMETIC OPERATION FAILED RUN DIAG
2399  012266  005337  012316              1$:     DEC     NPRCNT
2400  012272  001353                          BNE     2$
2401  012274  104402  000510                  TYPE    ,NOINT
2402  012300  104054                          HLT     !DA!WC!DS
2403  012302  000137  001234                  JMP     @#BEGIN
2404  012306  042737  002000  001126  NPRRET: BIC     #BIT10,FLAG2    ;CLEAR BKGROUND FLG
2405  012314  000207                          RTS     PC
2406  012316  000000                      NPRCNT: 0
2407  012320  000000                      NPR1:   0
2408                                        ;CLEAR ERROR TABLE
2409
2410  012322  012704  000020              ERRCL:  MOV     #20,R4          ;CLEAR
2411  012326  012703  017310                      MOV     #ERTAB,R3       ;ERROR
2412  012332  005023                      1$:     CLR     (R3)+           ;TABLE
2413  012334  005304                          DEC     R4              ;DONE YET?
2414  012336  001375                          BNE     1$              ;NO
2415  012340  005037  001004                  CLR     PCNT            ;CLEAR
2416  012344  005037  001006                  CLR     PCNT+2          ;PASS COUNT
2417  012350  005037  001130                  CLR     DROP            ;CLEAR ALL DROPPED DRIVES
2418  012354  000205                          RTS     R5              ;RETURN
```

```
2419                                    ;RH11 POWER FAIL TEST #1
2420                                    ;THE STARTING ADDRESS FOR THE WRITE POWER FAIL TEST IS 270.
2421                                    ;A MESSAGE WILL BE TYPED OUT "LOAD SW WITH UNIT # AND CONT."
2422                                    ;THE OPERATOR NOW HAS TO LOAD THE UNIT # IN OCTAL INTO THE SW REGISTER
2423                                    ;IN BITS 00-01-AND 02. THEN HIT CONT. THE PROGRAM WILL
2424                                    ;WRITE THE COMPLETE DISK WITH A 125252 PATTERN. THE PROGRAM WILL THEN
2425                                    ;TELL OPERATOR TO POWER DOWN. UNTIL THE POWER FAIL, THE PROGRAM WILL
2426                                    ;CONTINUE WRITING THE SAME PATTERN ON THE DISK.
2427                                    ;WHEN POWER FAIL OCCURS THE TRANSFER IS ABORTED
2428                                    ;AND THE PROGRAM HALTS. THE OPERATOR SHOULD
2429                                    ;NOW TURN POWER BACK ON. THE PROGRAM RESTARTS AND CHECKS FOR WRITE ERRORS.
2430                                    ;ONLY ONE ERROR IS ACCEPTABLE. THAT ERROR MAY BE AN OPI (BIT13 RSER)OR A DCK
2431                                    ;(BIT 15 RSER). IF THESE ARE THE ONLY ERRORS THAT OCCUR, THE DRIVE IS OK.
2432                                    ;IF NO ERRORS OCCUR, THE PROGRAM WILL TYPE OUT "OK".
2433                                    ;THE PROGRAM WILL THEN TELL YOU WHEN TO POWER DOWN AGAIN
2434
2435                                    ;***ONLY ONE ERROR IS CONSIDERED ACCEPTABLE***
2436
2437  012356  012706  000500           PFT1:   MOV     #500,SP         ;SET UP STACK
2438  012362  005037  001024                   CLR     TEMP2
2439  012366  104402  000561                   TYPE    ,LOADSW
2440  012372  000000                           HALT
2441  012374  004737  007160                   JSR     PC,VECTRR       ;SETUP INT VECTOR
2442  012400  013737  177570  001164           MOV     @#SWR,UNNUM     ;SAVE IT
2443  012406  004737  006770                   JSR     PC,FNDTYP       ;TST FOR RS03 OR 04
2444  012412  104426                   PFWATT: CLRDV                   ;CLEAR ALL REG
2445  012414  004737  013174                   JSR     PC,POWFAL       ;WRITE 125252 ON DISK
2446  012420  005037  001140           PFWAT:  CLR     DMA
2447  012424  012737  012646  000024           MOV     #DOWN,24        ;SET UP POWER FAIL VEC.
2448  012432  012737  000340  000026           MOV     #340,26
2449  012440  012737  000161  001176   MYBYWR: MOV     #161,CMD        ;WRITE WITH I/E
2450  012446  104416                           DKCMD                   ;DO IT
2451  012450  004737  011622                   JSR     PC,WATT         ;WAIT FOR INTERRUPT
2452  012454  032737  001000  001132   3$:     BIT     #BIT9,FLAG      ;ANY ERRORS?
2453  012462  001406                           BEQ     1$              ;NO
2454  012464  104006                           HLT     !DA!DB
2455  012466  012777  177777  166354           MOV     #-1,@RSAS       ;CLEAR ALL
2456  012474  005077  166346                   CLR     @RSER           ;ERRORS
2457  012500  004737  007234           1$:     JSR     PC,DISBUF       ;SET UP NEW DISK BUFFER
2458  012504  000755                           BR      MYBYWR
2459  012506  000744                           BR      PFWAT
```

```
2460  012510  012737  012516  001156  UPCHK:  MOV     #1$,HRDER       ;RETURN HERE IF WRONG DRIVE INTERRUPTS
2461  012516  005037  001140          1$:     CLR     DMA
2462  012522  104426                          CLRDV                   ;INIT DRIVE
2463  012524  013737  001072  177776  CHKDAT: MOV     PRIORITY,PS
2464  012532  012737  000151  001176          MOV     #151,CMD        ;WRITECHECK WITH I/E
2465  012540  104416                          DKCMD                   ;DO IT
2466  012542  013737  001072  177776          MOV     PRIORITY,PS
2467  012550  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
2468  012554  032737  001000  001132  3$:     BIT     #BIT9,FLAG      ;ANY ERRORS?
2469  012562  001411                          BEQ     1$              ;NO
2470  012564  104006                          HLT     !DB!DA
2471  012566  052737  100000  001126          BIS     #BIT15,FLAG2    ;SET ERROR FLAG
2472  012574  005077  166246                  CLR     @RSER           ;CLEAR ALL
2473  012600  012777  177777  166242          MOV     #-1,@RSAS       ;ERRORS
2474  012606  004737  007234          1$:     JSR     PC,DISBUF       ;SET UP NEW DISK BUFFER
2475  012612  000744                          BR      CHKDAT
2476  012614  005737  001126                  TST     FLAG2           ;ANY ERRORS?
2477  012620  100405                          BMI     2$              ;YES
2478  012622  104402  012626                  TYPE    ,.+2            ;.ASCIZ <15><12>"OK"
2479  012634  042737  100000  001126  2$:     BIC     #BIT15,FLAG2    ;CLEAR ERROR FLAG
2480  012642  000137  012412                  JMP     PFWATT          ;GO WAIT FOR ANOTHER
2481                                                                  ;POWER FAIL
2482
2483                          ;POWER DOWN ROUTINE - ABORT DISK AND HALT
2484
2485  012646  012737  012656  000024  DOWN:   MOV     #UPP,24         ;SET POWER FAIL VECTOR
2486  012654  000000                          HALT
2487
2488  012656  012737  012646  000024  UPP:    MOV     #DOWN,24
2489  012664  012706  000500                  MOV     #500,SP
2490  012670  013777  001164  166136          MOV     UNNUM,@RSCS2    ;GET UNIT #
2491  012676  032777  000200  166140  1$:     BIT     #BIT7,@RSDS     ;WAIT FOR DRIVE READY
2492  012704  001774                          BEQ     1$
2493  012706  000137  012510                  JMP     UPCHK           ;GO CHECK DISK
```

```
                                        ;POWER FAIL TEST #2
                                        ;THIS TEST WILL TEST THE SAME DRIVE THAT WAS TESTED IN THE 1ST POWER FAIL TEST
                                        ;THE PROGRAM WILL WRITE THE COMPLETE DISK WITH A 125252 PATTERN AND WILL
                                        ;THEN TELL THE OPERATOR TO POWER DOWN THE PROCESSOR.
                                        ;THE PROGRAM WILL THEN WRITE CHECK THE DISK WHILE WAITING FOR A POWER FAIL.
                                        ;WHEN THE POWER FAIL OCCURS, THE WRITE CHECKING IS ABORTED AND
                                        ;THE PROCESSOR WILL HALT.
                                        ;THE OPERATOR SHOULD THEN TURN POWER BACK ON, THE PROGRAM WILL
                                        ;START WRITE CHECKING THE DISK AGAIN
                                        ;***NO ERRORS SHOULD OCCUR.***
                                        ;THE PROGRAM WILL TYPE OUT "OK" IF NO ERRORS OCCUR.
                                        ;THE PROGRAM WILL THEN TELL YOU TO POWER DOWN.
                                        ;DO NOT POWER OFF THE PROCESSOR AGAIN UNTIL THE PROGRAM TELLS YOU SO.

012712  012706  000500          PFT2:   MOV     #500,SP         ;SET UP STACK
012716  005037  001024                  CLR     TEMP2
012722  042737  001000  001126          BIC     #BIT9,FLAG2     ;CLEAR POWER FAIL
012730  012737  012752  001156          MOV     #PWRF1,HRDER    ;RETURN HERE IF WRONG DRIVE INT.
012736  104426                          CLRDV                   ;INIT DRIVE
012740  004737  007160                  JSR     PC,VECTRR       ;SETUP INT VECTOR
012744  004737  013174          PWRFL2: JSR     PC,POWFAL       ;WRITE 125252 ON DISK
012750  000401                          BR      PWRFL           ;WRITE CHECK
012752  104426                  PWRF1:  CLRDV                   ;INIT DRIVE
012754  005037  001140          PWRFL:  CLR     DMA
012760  012737  013124  000024          MOV     #PWRDN,24       ;SET UP POWER FAIL VEC.
012766  012737  000340  000026          MOV     #340,26
012774  013737  001072  177776  CHKDSK: MOV     PRIORITY,PS     ;ENABLE I/E
013002  012737  000151  001176          MOV     #151,CMD        ;WRITE CHECK WITH I/E
013010  104416                          DKCMD                   ;DO IT
013012  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
013016  032737  001000  001132  3$:     BIT     #BIT9,FLAG      ;ANY ERRORS?
013024  001411                          BEQ     1$              ;NO
013026  104002                          HLT     !DB             ;YES
013030  052737  100000  001126          BIS     #BIT15,FLAG2    ;SET ERROR FLAG
013036  005077  166004                  CLR     @RSER           ;CLEAR ALL
013042  012777  177777  166000          MOV     #-1,@RSAS       ;ERRORS
013050  004737  007234          1$:     JSR     PC,DISBUF       ;CHECK NEXT BUFFER
013054  000747                          BR      CHKDSK
013056  032737  001000  001126          BIT     #BIT9,FLAG2     ;DID POWER FAIL?
013064  001733                          BEQ     PWRFL           ;NO
013066  005737  001126                  TST     FLAG2           ;ANY ERRORS?
013072  100405                          BMI     2$              ;YES
013074  104402  013100                  TYPE    ,.+2            ;.ASCIZ <15><12>"OK"
013106  042737  100000  001126  2$:     BIC     #BIT15,FLAG2    ;CLEAR ERRORS
013114  042737  001000  001126          BIC     #BIT9,FLAG2     ;CLEAR POWER FAIL FLAG
013122  000710          4$:     BR      PWRFL2
```

```
                                        ;ROUTINE TO ABORT DISK DURING POWER FAIL
                                        ;
013124  012737  013134  000024  PWRDN:  MOV     #PWRUP,24       ;SET UP RESTART
013132  000000                          HALT
                                        ;
013134  012737  013124  000024  PWRUP:  MOV     #PWRDN,24       ;RESET POWER FAIL VECTOR
013142  012706  000500                  MOV     #500,SP
013146  013777  001164  165660          MOV     UNNUM,@RSCS2    ;GET UNIT #
013154  052737  001000  001126          BIS     #BIT9,FLAG2     ;SET POWER FAIL BIT
013162  032777  000200  165654  1$:     BIT     #BIT7,@RSDS     ;WAITING FOR
013170  001774                          BEQ     1$              ;DRIVE READY
013172  000667                          BR      PWRF1           ;GO CHECK DISK
                                        ;
                                        ;
                                        ;ROUTINE TO WRITE THE COMPLETE DISK
                                        ;WITH 125252 PATTERN
                                        ;WRITE CHECK AND REPORT ERRORS IF THEY  OCCUR
                                        ;REPORT "OK" AT COMPLETION
                                        ;
013174  012737  000020  001142  POWFAL: MOV     #20,PATNU       ;SET UP PATTERN
013202  042737  000004  001132          BIC     #BIT2,FLAG      ;CLEAR XFER MODE FLAG
013210  052737  010000  001126          BIS     #BIT12,FLAG2
013216  005037  001140                  CLR     DMA
013222  012737  020000  017350          MOV     #20000,OUTBUF   ;GET STARTING ADDR FOR BUF
013230  012737  020000  001122          MOV     #20000,VADDR
013236  012737  010000  001150          MOV     #10000,SWRDCT   ;SETUP WORD COUNT
013244  013737  001150  001134          MOV     SWRDCT,WRDCT
013252  005037  001120                  CLR     ADB1            ;A PORT ONLY
013256  013737  017350  001144          MOV     OUTBUF,BUF      ;SET UP CURRENT ADDRESS
013264  004537  007700                  JSR     R5,PASEL        ;GENERATE DATA BUFFER
013270  012737  000161  001176  WRDNW:  MOV     #161,CMD        ;WRITE WITH I/E
013276  104416                          DKCMD                   ;DO IT
013300  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
013304  012737  000151  001176  2$:     MOV     #151,CMD        ;WRITECHECK I/E
013312  104416                          DKCMD                   ;DO IT
013314  004737  011622                  JSR     PC,WATT         ;WAIT FOR INTERRUPT
013320  032737  001000  001132  4$:     BIT     #BIT9,FLAG      ;ANY ERRORS?
013326  001402                          BEQ     1$              ;NO
013330  104006                          HLT     !DB!DA          ;YES
013332  000000                          HALT                    ;CAN NOT WRITE WITHOUT ERROR
013334  004737  007234          1$:     JSR     PC,DISBUF       ;SET UP NEW DISK BUFFER
013340  000753                          BR      WRDNW           ;WRITE NEW BUFFER
013342  104402  013346                  TYPE    .+2             ;.ASCIZ <15><12>"POWER DOWN"
013364  000207                          RTS     PC
```

```
2584  013366  032737  000010  177570  OUT:    BIT     #BIT3,SWR       ;TYPEOUT ERROR COUNT?
2585  013374  001532                          BEQ     1$              ;NO
2586  013376  005004                          CLR     R4              ;CLEAR UNIT #
2587  013400  005003                          CLR     R3
2588  013402  053737  001130  001166          BIS     DROP,UNITSV     ;RESTORE ALL DRIVES
2589  013410  013737  001166  001226          MOV     UNITSV,WORK     ;GET UNITS ON SYSTEM
2590  013416  012705  000401                  MOV     #401,R5         ;SETUP TEST FOR UNITS
2591  013422  030537  001226          4$:     BIT     R5,WORK         ;IS THIS UNIT ON SYS
2592  013426  001006                          BNE     2$              ;YES
2593  013430  005204                  5$:     INC     R4              ;INC UNIT #
2594  013432  010403                          MOV     R4,R3           ;SAVE UNIT #
2595  013434  000241                          CLC
2596  013436  006105                          ROL     R5              ;GET NEXT DRIVE
2597  013440  103505                          BCS     3$              ;DONE
2598  013442  000767                          BR      4$              ;FIND NEXT DRIVE
2599  013444                          2$:
2600  013444  104402  013450                  TYPE    .+2             ;.ASCIZ <15><12>"UNIT "
2601  013460  010446                          MOV     R4,-(6)         ;PUT R4 ON STACK
2602  013462  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2603  013464  004737  013742                  JSR     PC,GETERR       ;GET ERROR COUNT
2604  013470  010304                          MOV     R3,R4           ;RESTORE UNIT #
2605  013472  104402  013476                  TYPE    .+2             ;.ASCIZ <15><12>
2606  013502  104402  000630                  TYPE    ,WRTERR
2607  013506  104402  013512                  TYPE    .+2             ;.ASCIZ "S "
2608  013516  013746  001206                  MOV     WRITER,-(6)     ;PUT WRITER ON STACK
2609  013522  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2610  013524  104402  013530                  TYPE    .+2             ;.ASCIZ <15><12>
2611  013534  104402  000657                  TYPE    ,RDERR
2612  013540  104402  013544                  TYPE    .+2             ;.ASCIZ "S "
2613  013550  013746  001212                  MOV     READER,-(6)     ;PUT READER ON STACK
2614  013554  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2615  013556  104402  013562                  TYPE    .+2             ;.ASCIZ <15><12>
2616  013566  104402  000642                  TYPE    ,WCKERR
2617  013572  104402  013576                  TYPE    .+2             ;.ASCIZ "S "
2618  013602  013746  001210                  MOV     WCERR,-(6)      ;PUT WCERR ON STACK
2619  013606  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2620  013610  104402  013614                  TYPE    .+2             ;.ASCIZ <15><12>"COMPARE ERRS "
2621  013634  013746  001214                  MOV     COMERR,-(6)     ;PUT COMERR ON STACK
2622  013640  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2623  013642  104402  013646                  TYPE    .+2             ;.ASCIZ <15><12>
2624  013652  000666                          BR      5$              ;GET NEXT DRIVE
2625  013654  043737  001130  001166  3$:     BIC     DROP,UNITSV     ;REDROP DRIVES
2626  013662  062706  000002          1$:     ADD     #2,SP           ;RESTORE SP DUE TO JMP EXIT FROM JSR ROUTINE
2627  013666  005137  001120                  COM     A0B1            ;SET A OR B PORT FLAG
2628  013672  032737  000040  177570          BIT     #BIT5,SWR       ;TYPEOUT PASS COUNT?
2629  013700  001035                          BNE     DONE            ;NO
2630  013702  104402  013706                  TYPE    .+2             ;.ASCIZ <15><12>"END PASS "
2631  013722  013746  001006                  MOV     PCNT+2,-(6)     ;PUT PCNT+2 ON STACK
2632  013726  104406                          TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2633  013730  104402  013734                  TYPE    .+2             ;.ASCIZ <15><12>
2634  013740  000415                          BR      DONE
```

```
2635  013742  006304                  GETERR: ASL     R4              ;GET LOC IN
2636  013744  006304                          ASL     R4              ;ERR TABLE
2637  013746  062704  017310                  ADD     #ERTAB,R4
2638  013752  112437  001206                  MOVB    (R4)+,WRITER    ;GET WRITE ERRS
2639  013756  112437  001212                  MOVB    (R4)+,READER    ;GET READ ERRS
2640  013762  112437  001210                  MOVB    (R4)+,WCERR     ;GET WRITE CK ERRS
2641  013766  112437  001214                  MOVB    (R4)+,COMERR    ;GET COMPARE ERRS
2642  013772  000207                          RTS     PC
2643
2644                                  .SBTTL          $DONE - BELL AND SCOPE ROUTINE
2645
2646  013774  104400                  DONE:   SCOPE                   ;TERMINATIONG SCOPE FOR LOOPING
2647  013776  062737  000001  001006          ADD     #1,PCNT+2       ;ADD 1 TO THE PASS COUNT
2648  014004  005537  001004                  ADC     PCNT            ;MAKE IT DOUBLE PREC.
2649  014010  013700  000042          4$:     MOV     @#42,R0         ;GET MONITOR ADDRESS
2650  014014  001405                          BEQ     $END1           ;IF NONE
2651  014016  000005                          RESET
2652  014020  004710                  $ENDAD: JSR     7,(0)           ;GO TO MONITOR
2653  014022  000240  000240  000240          240,240,240             ;SAVE ROOM FOR ACT11
2654  014030  000137  003226          $END1:  JMP     ADTST           ;RETURN
2655
2656  014034  000000                  .TBIT:  0                       ;T BIT FLAG
2657
2658  014036  012702  000001          .LOGW:  MOV     #1,R2           ;LOG WRITE ERR
2659  014042  005003                  CLIND:  CLR     R3              ;CLEAR INDEX FOR TABLE
2660  014044  000413                          BR      ADDRR
2661
2662  014046  012702  000400          .LOGR:  MOV     #400,R2         ;LOG WRITE ERR
2663  014052  000773                          BR      CLIND
2664
2665  014054  012702  000001          .LOGWC: MOV     #1,R2           ;LOG WRITC CK ERR
2666  014060  012703  000002          SETIND: MOV     #2,R3           ;SET INDEX FOR NEXT WD
2667  014064  000403                          BR      ADDRR
2668
2669  014066  012702  000400          .LOGC:  MOV     #400,R2         ;LOG COMPARE ERR
2670  014072  000772                          BR      SETIND
2671
2672  014074  005737  001204          ADDRR:  TST     LOPCNT          ;1ST TIME ERROR?
2673  014100  001014                          BNE     1$              ;NO DO NOT COUNT IT
2674  014102  013704  001164                  MOV     UNNUM,R4        ;GET UNIT #
2675  014106  006304                          ASL     R4              ;GET
2676  014110  006304                          ASL     R4              ;POSITION IN
2677  014112  060304                          ADD     R3,R4           ;ERR TABLE
2678  014114  060264  017310                  ADD     R2,ERTAB(R4)    ;TO ADD ERROR
2679  014120  004737  014134                  JSR     PC,PRNT         ;TYPEOUT?
2680  014124  001402                          BEQ     1$              ;YES
2681  014126  004737  015002                  JSR     PC,DRP          ;SHOULD I DROP DRIVE?
2682  014132  000002                  1$:     RTI
2683
2684  014134  032737  020000  177570  PRNT:   BIT     #BIT13,SWR      ;INHIBIT TYPEOUT?
2685  014142  000207                          RTS     PC
```

```
2686  014144  052737  000004  001126  RSREG:  BIS     #BIT2,FLAG2     ;SET ERROR FLAG
2687  014152  005737  016156                  TST     .HLTCT          ;SHOULD WE TYPE GOOD AND BAD
2688  014156  001017                          BNE     8$              ;NO
2689  014160  104402  014164                  TYPE    ,.+2            ;.ASCIZ "BAD="
2690  014172  010046                          MOV     (R0),-(6)       ;PUT BAD ON STACK
2691  014174  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2692  014176  104402  014202                  TYPE    ,.+2            ;.ASCIZ " GOOD="
2693  014212  010146                          MOV     R0,-(6)         ;PUT GOOD ON STACK
2694  014214  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2695  014216                          8$:
2696  014216  104402  014222                  TYPE    ,.+2            ;.ASCIZ " CS1="
2697  014230  017746  164576                  MOV     @RSCS1,-(6)     ;PUT @RSCS1 ON STACK
2698  014234  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2699  014236                          1$:
2700  014236  104402  014242                  TYPE    ,.+2            ;.ASCIZ " ER="
2701  014250  017746  164572                  MOV     @RSER,-(6)      ;PUT @RSER ON STACK
2702  014254  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2703  014256                          2$:
2704  014256  104402  014262                  TYPE    ,.+2            ;.ASCIZ " CS2="
2705  014270  017746  164540                  MOV     @RSCS2,-(6)     ;PUT @RSCS2 ON STACK
2706  014274  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2707  014276  104402  014302                  TYPE    ,.+2            ;.ASCIZ <15><12><12>""
2708  014306  104402  014312                  TYPE    ,.+2            ;.ASCIZ " CS3="
2709  014320  017746  164540                  MOV     @RSCS3,-(6)     ;PUT @RSCS3 ON STACK
2710  014324  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2711  014326  104402  014332                  TYPE    ,.+2            ;.ASCIZ " BAE="
2712  014340  017746  164516                  MOV     @RSBAE,-(6)     ;PUT @RSBAE ON STACK
2713  014344  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2714  014346  104402  014352                  TYPE    ,.+2            ;.ASCIZ <15><12><12>""
2715  014356  032737  000200  016156          BIT     #200,.HLTCT     ;PRINT SECOND SET ?
2716  014364  001112                          BNE     SEEC            ;YES
2717  014366  032737  000100  016156          BIT     #AS,.HLTCT      ;PRINT ER ?
2718  014374  001410                          BEQ     3$              ;NO
2719  014376  104402  014402                  TYPE    ,.+2            ;.ASCIZ " AS="
2720  014410  017746  164434                  MOV     @RSAS,-(6)      ;PUT @RSAS ON STACK
2721  014414  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2722  014416  032737  000020  016156  3$:     BIT     #BA,.HLTCT      ;PRINT BUS ASSRESS
2723  014424  001410                          BEQ     4$              ;NO
2724  014426  104402  014432                  TYPE    ,.+2            ;.ASCIZ " BA="
2725  014440  017746  164374                  MOV     @RSBA,-(6)      ;PUT @RSBA ON STACK
2726  014444  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2727  014446  032737  000004  016156  4$:     BIT     #DA,.HLTCT      ;PRINT DA ?
2728  014454  001410                          BEQ     5$              ;NO
2729  014456  104402  014462                  TYPE    ,.+2            ;.ASCIZ " DA="
2730  014470  017746  164346                  MOV     @RSDA,-(6)      ;PUT @RSDA ON STACK
2731  014474  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2732  014476  032737  000010  016156  5$:     BIT     #WC,.HLTCT      ;PRINT WC?
2733  014504  001410                          BEQ     6$              ;NO
2734  014506  104402  014512                  TYPE    ,.+2            ;.ASCIZ " WC="
2735  014520  017746  164312                  MOV     @RSWC,-(6)      ;PUT @RSWC ON STACK
2736  014524  104404                          TYPEO                   ;TYPE STACK IN OCTAL
2737  014526  032737  000040  016156  6$:     BIT     #DS,.HLTCT      ;DRIVE STATUS
2738  014534  001410                          BEQ     9$              ;NO
2739  014536  104402  014542                  TYPE    ,.+2            ;.ASCIZ " DS="
2740  014550  017746  164270                  MOV     @RSDS,-(6)      ;PUT @RSDS ON STACK
2741  014554  104404                          TYPEO                   ;TYPE STACK IN OCTAL
```

```
 2742  014556  032737  000002  016156  9$:     BIT     #DB,.HLTCT      ;PRINT DATA BUFFER
```

E06


```
2743  014564  001461                        BEQ     PTDONE          ;NO
2744  014566  104402  014572                TYPE    .+2             ;.ASCIZ " DB="
2745  014600  017746  164250                MOV     @RSDB,-(6)      ;PUT @RSDB ON STACK
2746  014604  104404                        TYPEO                   ;TYPE STACK IN OCTAL
2747  014606  000137  014730                JMP     PTDONE          ;GET OUT
2748  014612  042737  000200  016156  SEEC: BIC     #200,.HLTCT     ;CLEAR COMMON BIT
2749  014620  032737  000240  016156        BIT     #DT,.HLTCT      ;PRINT DRIVE TYPE?
2750  014626  001410                        BEQ     10$             ;NO
2751  014630  104402  014634                TYPE    .+2             ;.ASCIZ " DT="
2752  014642  017746  164212                MOV     @RSDT,-(6)      ;PUT @RSDT ON STACK
2753  014646  104404                        TYPEO                   ;TYPE STACK IN OCTAL
2754  014650  032737  000220  016156  10$:  BIT     #MR,.HLTCT      ;PRINT MN?
2755  014656  001410                        BEQ     11$             ;NO
2756  014660  104402  014664                TYPE    .+2             ;.ASCIZ " MR="
2757  014672  017746  164160                MOV     @RSMR,-(6)      ;PUT @RSMR ON STACK
2758  014676  104404                        TYPEO                   ;TYPE STACK IN OCTAL
2759  014700  032737  000204  016156  11$:  BIT     #LA,.HLTCT      ;PRINT LA?
2760  014706  001410                        BEQ     PTDONE          ;NO
2761  014710  104402  014714                TYPE    .+2             ;.ASCIZ " LA="
2762  014722  017746  164124                MOV     @RSLA,-(6)      ;PUT @RSLA ON STACK
2763  014726  104404                        TYPEO                   ;TYPE STACK IN OCTAL
2764  014730  032737  010000  001126  PTDONE: BIT    #BIT12,FLAG2    ;POWER FAIL TEST?
2765  014736  001111                        BNE     RETT            ;YES
2766  014740  104402  014744                TYPE    .+2             ;.ASCIZ <15><12>"PASS "
2767  014754  013746  001006                MOV     PCNT+2,-(6)     ;PUT PCNT+2 ON STACK
2768  014760  104406                        TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2769  014762  032737  001000  177570        BIT     #BIT9,SWR       ;LOOPING ON ERROR?
2770  014770  001404                        BEQ     DRP             ;NO
2771  014772  104402  014776                TYPE    .+2             ;.ASCIZ <15><12>
2772  015002  032737  000001  177570  DRP:  BIT     #BIT0,SWR       ;DROP DRIVE?
2773  015010  001464                        BEQ     RETT            ;NO
2774  015012  013704  001164                MOV     UNNUM,R4        ;GET UNIT #
2775  015016  004737  013742                JSR     PC,GETERR       ;GET ERRORS
2776  015022  063737  001206  001212        ADD     WRITER,READER   ;ADD THE ERRORS
2777  015030  063737  001212  001210        ADD     READER,WCERR
2778  015036  063737  001210  001214        ADD     WCERR,COMERR
2779  015044  022737  000023  001214        CMP     #23,COMERR      ;DROP DRIVE?
2780  015052  103043                        BHIS    RETT            ;NO
2781  015054  053737  001170  001130        BIS     UNCMP,DROP      ;DROP DRIVE
2782  015062  104402  015066                TYPE    .+2             ;.ASCIZ <15><12>"DROPPED UNIT "
2783  015106  013746  001164                MOV     UNNUM,-(6)      ;PUT UNNUM ON STACK
2784  015112  104406                        TYPES                   ;TYPE STACK IN OCTAL - SUPRESS
2785  015114  104402  000757                TYPE    ,CRLFLF
2786  015120  113703  001130                MOVB    DROP,R3         ;GET DROPPED UNITS
2787  015124  113704  001166                MOVB    UNITSV,R4       ;GET ALL DRIVES
2788  015130  020304                        CMP     R3,R4           ;ALL DRIVES DROPPED?
2789  015132  001003                        BNE     2$              ;NO
2790  015134  000000                        HALT                    ;NO MORE DRIVES
2791  015136  000137  001234                JMP     @#BEGIN         ;RESTART TEST
2792  015142  032737  100000  001132  2$:   BIT     #BIT15,FLAG     ;DID OPERATOR SELECT PATTERN
2793  015150  001002                        BNE     3$              ;YES
2794  015152  005037  001142                CLR     PATNU           ;NO CLEAR IT
2795  015156  000137  006204          3$:   JMP     @#EXTPPR        ;GET NEXT DRIVE
2796  015162  000207                RETT:   RTS     PC
```

```
2797                                    ;ROUTINE TO RESTORE LOADER
2798  015164  013705  015210    RLDR:   MOV     LDR1,R5         ;GET FIRST ADDRESS OF WHERE LOADER IS
2799                                                            ;TO BE RESTORED
2800  015170  012704  017500            MOV     #17500,R4       ;ADDRESS WHERE LOADER IS STORED
2801  015174  012702  000155            MOV     #155,R2         ;WORD COUNT
2802  015200  012425            1$:     MOV     (R4)+,(R5)+     ;RESTORE
2803  015202  005302                    DEC     R2
2804  015204  001375                    BNE     1$
2805  015206  000000                    HALT                    ;DONE
2806  015210  017500            LDR1:   .WORD   17500           ;FIRST ADDRESS WHERE LOADERS ARE SAVED
2807
2808          172100            PARCSR=172100
2809          000114            PARVEC=114
2810  015212  012737  015304  000114    .MAMK:  MOV     #.PARSRV,@#PARVEC
2811  015220  012737  000340  000116            MOV     #340,@#PARVEC+2 ;SET PRI LEVEL TO 7
2812  015226  013746  000004            MOV     @#4,-(SP)       ;SAVE CURRENT ERROR VECTOR
2813  015232  013746  000006            MOV     @#6,-(SP)       ;SAVE PRIOITY LEVEL
2814  015236  012737  000006  000004    MOV     #6,@#4
2815  015244  012737  000002  000006    MOV     #RTI,@#6
2816  015252  012700  172100            MOV     #PARCSR,R0      ;GET FIRST CSR ADDR
2817  015256  012702  000001            MOV     #1,R2
2818  015262  012720  000001    1$:     MOV     #1,(R0)+        ;SET ACTION ENABLE IF AVAILABLE
2819  015266  006302                    ASL     R2              ;SHIFT AVAILABILITY INDICATOR
2820  015270  103374                    BCC     1$
2821  015272  012637  000006            MOV     (SP)+,@#6       ;RESTORE ERROR VECTOR PRIORITY
2822  015276  012637  000004            MOV     (SP)+,@#4       ;AND INTERRUPT VECTOR
2823  015302  000207                    RTS     PC
2824                                    ;PARITY MEMORY TRAP
2825
2826  015304                            .PARSRV:
2827  015304  104402  015310                    TYPE    ,.+2            ;.ASCIZ <15><12>"PARITY ERR"
2828  015326  052737  004000  001126            BIS     #BIT11,FLAG2    ;SET ERROR FLAG
2829  015334  104402  000757                    TYPE    ,CRLFLF
2830  015340  104402  015344                    TYPE    ,.+2            ;.ASCIZ "HIER= "
2831  015354  013746  177742                    MOV     HERADD,-(SP)
2832  015360  104404                            TYPEO
2833  015362  104402  015366                    TYPE    ,.+2            ;.ASCIZ " LOER="
2834  015376  013746  177740                    MOV     LERADD,-(SP)
2835  015402  104404                            TYPEO
2836  015404  104402  015410                    TYPE    ,.+2            ;.ASCIZ " ME REG="
2837  015422  013746  177744                    MOV     MEMERR,-(SP)
2838  015426  104404                            TYPEO
2839  015430  032737  000010  001126            BIT     #BIT3,FLAG2     ;WERE WE COMPARING DURING ERROR?
2840  015436  001422                            BEQ     13$             ;NO
2841  015440  104402  015444                    TYPE    ,.+2            ;.ASCIZ " ADDR="
2842  015454  005737  001216                    TST     MMAVA           ;IS MEM MGMT ON?
2843  015460  001406                            BEQ     12$             ;NO
2844  015462  013746  177776                    MOV     PS,-(6)         ;GET PS
2845  015466  013746  001154                    MOV     SAVE,-(6)       ;GET VIRTUAL ADDR
2846  015472  104412                            TYPEA                   ;CONVERT TO PHY AND TYPE
2847  015474  000403                            BR      13$             ;CONT
2848  015476  013746  001154            12$:    MOV     SAVE,-(6)       ;GET ADDR
2849  015502  104406                            TYPES                   ;TYPE IT
2850  015504  032737  100000  177570    13$:    BIT     #BIT15,SWR      ;HALT ON ERROR?
2851  015512  001401                            BEQ     1$              ;NO
2852  015514  000000                            HALT                    ;YES
```

```
 2853  015516  012706  000500          1$:     MOV     #500,SP         ;RESET STACK
 2854  015522  000137  003242                  JMP     EXMFLG          ;RESTART TEST
```

```
                                .SBTTL          $TYPE - TTY TYPEOUT ROUTINE

                                ;THIS ROUTINE IS USE TO TYPE ASCII MESSAGES ON THE TTY. THE
                                ;CALL CAN BE IN ONE OF 3 FORMS: 1) "TYPE ,ADR" - TYPES THE
                                ;MESSAGE STARTING IN LOCATION "ADR:", 2) "TYPE ,CHAR" - TYPES
                                ;THE ASCII "CHAR", AND 3) "PRINT <<15><12>"MESSAGE"> - TYPES
                                ;THE MESSAGE WHICH IS INLINE ASCII. THE FILLER CHARACTER WHICH IS
                                ;TYPED AFTER A LINE FEED IS IN FILCHR AND THE NUMBER OF FILLERS
                                ;IS IN FILCHR+1.

015526  010446                  .TYPE:  MOV     R4,-(6)         ;SAVE R4
015530  010546                          MOV     R5,-(6)         ;SAVE R5
015532  017605  000004                  MOV     @4(6),R5        ;GET ADDRESS TO BE TYPED
015536  032705  177400                  BIT     #177400,R5      ;IS IT A TYPEM?
015542  001002                          BNE     1$              ;NO
015544  016605  000004                  MOV     4(6),R5         ;GET ADDRESS OF CHARACTER
015550  105715                  1$:     TSTB    (R5)            ;TERMINATOR?
015552  001423                          BEQ     2$              ;GET OUT IF SO
015554  122715  000012                  CMPB    #12,(R5)        ;IS THE CHAR A LINE FEED
015560  001012                          BNE     4$              ;NO - GET OUT
015562  113704  001015                  MOVB    FILCHR+1,R4     ;GET THE FILL COUNT
015566  113777  001014  163224  5$:     MOVB    FILCHR,@TPB     ;TYPE A FILLER
015574  105777  163216                  TSTB    @TPS            ;DONE YET?
015600  100375                          BPL     .-4             ;NO - WAIT
015602  005304                          DEC     R4              ;DEC COUNT
015604  001370                          BNE     5$              ;LOOP UNTIL 0
015606  112577  163206          4$:     MOVB    (R5)+,@TPB      ;LOAD AND TYPE THE CHARACTER
015612  105777  163200                  TSTB    @TPS            ;IS THE PRINTER READY
015616  100375                          BPL     .-4             ;WAIT UNTIL IT IS
015620  000753                          BR      1$              ;GET THE NEXT CHARACTER
015622  017646  000004          2$:     MOV     @4(6),-(6)      ;GET ADDRESS TO BE TYPED
015626  062766  000002  000006          ADD     #2,6(6)         ;ADD 2 TO THE ADDRESS
015634  022666  000004                  CMP     (6)+,4(6)       ;IS IT .+2?
015640  001006                          BNE     3$              ;NO
015642  062705  000002                  ADD     #2,R5           ;ADD 2 TO THE ADDRESS
015646  042705  000001                  BIC     #1,R5           ;BACK UP TO AN EVEN BYTE
015652  010566  000004                  MOV     R5,4(6)         ;RESTORE ADDRESS
015656  012605                  3$:     MOV     (6)+,R5         ;RESTORE R5
015660  012604                          MOV     (6)+,R4         ;RESTORE R4
015662  000002                          RTI                     ;RETURN
```

```
                                        .SBTTL          $SCOPE - SCOPE LOOP HANDLER

                                        ;THIS ROUTINE HANDLES THE ITERATIONS, LOOPING, ERROR
                                        ;LOOPING, AND THE DISPLAYING OF THE TEST NUMBER.
                                        ;"SCOPE" IS PLACED BETWEEN EACH SUBTEST IN THE TEST AND
                                        ;RECORDS THE STARTING ADDRESS OF THE SUBTEST IN "LAD:"

015664  032737  040000  177570  .SCOPE: BIT     #SW14,@#SWR     ;LOOP ON TEST?
015672  001045                  .KIT    BNE     .KIT            ;LOOP ON TEST IS SET
015674  000416                  3$      BR      3$              ;SKIP - NOP FOR XOR TESTER
015676  013746  000004                  MOV     @#4,-(6)        ;PUSH @#4 ON STACK
015702  012737  015722  000004          MOV     #4$,@#4         ;SET FOR TIMEOUT
015710  005737  177060                  TST     @#177060        ;ERROR ON XOR?
015714  012637  000004                  MOV     (6)+,@#4        ;POP STACK INTO @#4
015720  000422                  .SVLAD  BR      .SVLAD          ;NO ERROR - GO TO NEXT TEST
015722  022626                  4$:     CMP     (6)+,(6)+       ;CLEAR STACK
015724  012637  000004                  MOV     (6)+,@#4        ;POP STACK INTO @#4
015730  000426                  .KIT    BR      .KIT            ;ERROR - LOOP ON TEST
015732  032737  004000  177570  3$:     BIT     #SW11,@#SWR     ;KILL ITERATIONS
015740  001012                  .SVLAD  BNE     .SVLAD          ;YES - KILL ITERATIONS
015742  105737  001001                  TSTB    ICNT+1          ;FIRST ONE?
015746  001404                  2$      BEQ     2$              ;BRANCH IF FIRST
015750  123737  016034  001001          CMPB    TIMES,ICNT+1    ;DONE?
015756  003013                  .KIT    BGT     .KIT            ;BRANCH IF NOT
015760  112737  000001  001001  2$:     MOVB    #1,ICNT+1       ;FIRST ITERATION
015766  105237  001000          .SVLAD: INCB    ICNT            ;COUNT TEST NUMBERS
015772  011637  001010                  MOV     (6),LAD         ;SAVE LOOP ADDRESS
015776  013737  001000  177570          MOV     ICNT,@#DISPLAY  ;DISPLAY TEST NO. AND ITERATION COUNT
016004  000002                  RTI     RTI                     ;RETURN

016006  105237  001001          .KIT:   INCB    ICNT+1          ;INC THE ITERATION COUNT
016012  013737  001000  177570  .OVER:  MOV     ICNT,@#DISPLAY  ;SET UP DISPLAY
016020  005737  001010                  TST     LAD             ;FIRST ONE?
016024  001760                  BEQ     .SVLAD                  ;YES
016026  013716  001010          MOV     LAD,(6)                 ;FUDGE RETURN ADDRESS
016032  000002                  RTI     RTI                     ;FIXES PS

016034  000001          TIMES:  1                               ;RUN 1 TIMES
```

```
                                        .SBTTL          $HLT - HLT ROUTINE (ERROR TYPEOUT)

                                        ;THIS ROUTINE PRINTS OUT ERROR MESSAGES STARTING WITH THE
                                        ;ADDRESS OF THE "HLT". IT ALSO COUNTS THE NUMBER OF ERRORS
                                        ;AND HAS THE CAPABILITY OF LOOPING ON ERROR, BELL ON ERROR,
                                        ;"HALT" ON ERROR, AND INHIBIT TYPEOUTS. AN OPTIONAL ARGUMENT
                                        ;(HLT+3) WILL BE PLACED IN ".HLTCT:" FOR ADITIONAL TYPEOUTS.

016036  005237  001002          .HLT:   INC     ERRORS          ;INC THE ERROR COUNT
016042  032737  020000  177570          BIT     #SW13,@#SWR     ;SKIP TYPEOUT IF SET
016050  001025                          BNE     2$              ;SKIP TYPEOUTS
016052  104402  016056                  TYPE    .+2             ;.ASCIZ <15><12>
016062  011637  001012                  MOV     (6),HLTADR      ;PUT ADDRESS OF INSTRUCTION ON STACK
016066  162737  000002  001012          SUB     #2,HLTADR       ;FUDGE ADDRESS
016074  117737  162712  016156          MOVB    @HLTADR,.HLTCT  ;GET HLT ARGUEMENT
016102  013746  001012                  MOV     HLTADR,-(6)     ;PUT HLTADR ON STACK
016106  104404                          TYPEO                   ;TYPE STACK IN OCTAL
016110  104402  016114                  TYPE    .+2             ;.ASCIZ " "
016120  004737  014144                  JSR     PC,RSREG        ;GO TO USER ERROR ROUTINE
016124  005737  177570          2$:     TST     @#SWR           ;HALT ON ERROR
016130  100001                          BPL     .+4             ;SKIP IF CONTINUE
016132  000000                          HALT                    ;HALT ON ERROR!
016134  032737  001000  177570          BIT     #SW9,@#SWR      ;CHECK FOR INHIBIT LOOP ON ERROR
016142  001003                          BNE     3$              ;SKIP IF LOOP ON ERROR
016144  105037  001001                  CLRB    ICNT+1          ;CLEAR ITERATION COUNT
016150  000002                          RTI                     ;RETURN
016152  000137  016006          3$:     JMP     .KIT            ;LOOP ON TEST UNTIL NO ERRORS

016156  000000          .HLTCT: 0                               ;HLT ARGUMENT
```

```
                                        .SBTTL          $OCTAL - OCTAL TYPEOUT ROUTINE
                                        ;THIS ROUTINE IS USED TO TYPE AN OCTAL NUMBER ON THE TTY. IT WILL TYPE
                                        ;ALL 6 CHARACTERS, SUPPRESS LEADING ZEROES, OR TYPE THE
                                        ;16 BITS. IT IS CALLED VIA THE TYPOCT, TYPBIT, OR TYPOCS MACRO'S.
016160  012737  170101  016346  .TYPEB: MOV     #170101,.PR     ;SET BIT FLAG AND 16. CHARACTER COUNT
016166  000411                  BR      .PTIT           ;NOW TYPE IT IN BIT FORM
016170  112737  000001  016346  .TYPEO: MOVB    #1,.PR          ;SET ZERO FILL SWITCH
016176  000402                  BR      .+6             ;SKIP
016200  005037  016346  .TYPES: CLR     .PR             ;SUPRESS LEADING ZERO'S
016204  112737  177772  016347          MOVB    #-6,.PR+1       ;SET COUNT
016212                  .PTIT:
016212  010446                  MOV     R4,-(6)         ;PUSH R4 ON STACK
016214  010546                  MOV     R5,-(6)         ;PUSH R5 ON STACK
016216  016605  000010          MOV     10(6),R5        ;GET THE DATA
016222  012704  016350          MOV     #.PR+2,R4       ;SET POINTER TO FIRST ASCII CHAR.
016226  105014                  CLRB    (4)             ;CLEAR FIRST BYTE
016230  000411                  BR      .PRF            ;ROTATE FIRST BIT
016232  105014          .PRL:   CLRB    (4)             ;CLEAR BYTE OF CHARACTER
016234  032737  000100  016346          BIT     #100,.PR        ;BIT TYPING MODE?
016242  001004                  BNE     .PRF            ;YES - SKIP 2 ROTATES
016244  006105                  ROL     R5              ;ROTATE BIT INTO C
016246  106114                  ROLB    (4)             ;PACK IT
016250  006105                  ROL     R5              ;ROTATE BIT INTO C
016252  106114                  ROLB    (4)             ;PACK IT
016254  006105          .PRF:   ROL     R5              ;ROTATE BIT INTO C
016256  106114                  ROLB    (4)             ;PACK IT
016260  105714                  TSTB    (4)             ;IS IT ZERO?
016262  001402                  BEQ     .+6             ;SKIP INC
016264  105237  016346          INCB    .PR             ;SET FILL SWITCH
016270  105737  016346          TSTB    .PR             ;CHECK FILL SWITCH
016274  001402                  BEQ     .+6             ;SKIP BITSET
016276  152724  000060          BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
016302  105237  016347          INCB    .PR+1           ;INC COUNT
016306  001351                  BNE     .PRL            ;REPEAT
016310  022704  016350          CMP     #.PR+2,R4       ;EMPTY BUFFER?
016314  001002                  BNE     .+6             ;SKIP IF NOT
016316  112724  000060          MOVB    #'0,(4)+        ;LOAD 1 ZERO
016322  105014                  CLRB    (4)             ;NULL TERMINATOR
016324  104402  016350          TYPE    .PR+2           ;TYPE IT
016330  012605                  MOV     (6)+,R5         ;POP STACK INTO R5
016332  012604                  MOV     (6)+,R4         ;POP STACK INTO R4
016334  016666  000002  000004  MOV     2(6),4(6)       ;GET RID OF
016342  012616                  MOV     (6)+,(6)        ;DATA WORD
016344  000002                  RTI                     ;RETURN

016346  000012          .PR:    .BLKW   12              ;COUNT, SWITCH, AND OUTPUT BUFFER
```

```
                                        .SBTTL          $POWER - POWER DOWN AND UP ROUTINES

                                        ;THIS IS THE POWER FAIL ROUTINE WHICH WILL SAVE ALL
                                        ;THE GENERAL REGISTERS AND USER DEFINED REGISTERS THEN
                                        ;WAIT FOR POWER TO GO DOWN AND BE RESTORED.
                                        ;IF THERE ISN'T ENOUGH TIME FOR SAVING ALL THE REGISTERS,
                                        ;THE PROGRAM WILL HALT AT '.ILLUP'.

016372  012777  016520  000126  .POWER: MOV     #.ILLUP,@.PUVEC ;SET FOR FAST UP
016400  012777  000340  000122          MOV     #340,@.PUVEC$+2 ;PRIO:7
016406  010046                        MOV     R0,-(6)         ;PUSH R0 ON STACK
016410  010146                        MOV     R1,-(6)         ;PUSH R1 ON STACK
016412  010246                        MOV     R2,-(6)         ;PUSH R2 ON STACK
016414  010346                        MOV     R3,-(6)         ;PUSH R3 ON STACK
016416  010446                        MOV     R4,-(6)         ;PUSH R4 ON STACK
016420  010546                        MOV     R5,-(6)         ;PUSH R5 ON STACK
016422  010637  016524                MOV     SP,.SAVR6       ;SAVE SP
016426  012777  016436  000072        MOV     #.POWUP,@.PUVEC ;SET UP VECTOR
016434  000000                        HALT                    ;WAIT FOR PF

016436  013706  016524  .POWUP: MOV     .SAVR6,SP       ;GET SP
016442  005001                  CLR     R1              ;WAIT LOOP FOR THE TTY
016444  005201          1$:     INC     R1              ;WAIT FOR THE INC
016446  001376                  BNE     1$              ;OF  WORD
016450  012605                  MOV     (6)+,R5         ;POP STACK INTO R5
016452  012604                  MOV     (6)+,R4         ;POP STACK INTO R4
016454  012603                  MOV     (6)+,R3         ;POP STACK INTO R3
016456  012602                  MOV     (6)+,R2         ;POP STACK INTO R2
016460  012601                  MOV     (6)+,R1         ;POP STACK INTO R1
016462  012600                  MOV     (6)+,R0         ;POP STACK INTO R0
016464  012737  016372  000024        MOV     #.POWER,@#24    ;SET UP THE POWER DOWN VECTOR
016472  012737  000340  000026        MOV     #340,@#26       ;PRIO:7
016500  104402  016504                TYPE    .+2             ;.ASCIZ <15><12>"POWER"
016514  000137  007176                JMP     †IMUP           ;JMP TO USER ADDRESS

016520  000000  .ILLUP: HALT                    ;THE POWER UP SEQUENCE WAS STARTED
016522  000776          BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE

016524  000000  .SAVR6: 0                       ;PUT THE SP HERE
016526  000024  000026  .PUVEC: 24,26           ;POWER UP VECTOR
```

```
                                .SBTTL          $TYPEA - 18 BIT ADDRESS TYPER

                                ;THIS ROUTINE TAKES 2 ARGUMENTS OFF THE STACK (OLD
                                ;SP AND ADDRESS) AND, USING THE MEMORY MANAGEMENT REGISTERS, TYPES
                                ;THE ADDRESS SUPPLIED IN 18 BIT FORM. THIS ROUTINE IS LINKED
                                ;VIA THE 'TYPADR' MACRO.

016532                          .TYPEA:
016532  010446                          MOV     R4,-(6)         ;PUSH R4 ON STACK
016534  010546                          MOV     R5,-(6)         ;PUSH R5 ON STACK
016536  016605  000012                  MOV     12(6),R5        ;R5 - OLD PS WITH PREVIOUS MODE
016542  016604  000010                  MOV     10(6),R4        ;R4 - ADDRESS TO BE DECODED AND TYPED
016546  016666  000006  000010          MOV     6(6),10(6)      ;MOVE
016554  016666  000004  000006          MOV     4(6),6(6)       ;DOWN
016562  016666  000002  000004          MOV     2(6),4(6)       ;FOUR
016570  012616                          MOV     (6)+,(6)        ;WORDS
016572  010346                          MOV     R3,-(6)         ;PUSH R3 ON STACK
016574  000305                          SWAB    R5              ;GET THE
016576  006005                          ROR     R5              ;2 PREVIOUS
016600  006005                          ROR     R5              ;MODE BITS
016602  006005                          ROR     R5              ;INTO POSITION
016604  042705  177771                  BIC     #177771,R5      ;TO USE AS AN OFFSET
016610  016505  016764                  MOV     .SATAB($),R5    ;R5 - SPACE ADDRESS FOR MM
016614  010403                          MOV     R4,R3           ;R3 - REGISTER OFFSET
016616  042704  160000                  BIC     #160000,R4      ;CLEAR THE MM REG SELECT BITS
016622  000303                          SWAB    R3              ;NOW MAKE
016624  006003                          ROR     R3              ;MM REG
016626  006003                          ROR     R3              ;SELECT BITS
016630  006003                          ROR     R3              ;INTO AN
016632  006003                          ROR     R3              ;OFFSET
016634  042703  177761                  BIC     #177761,R3      ;CLEAR THE JUNK BITS
016640  060305                          ADD     R3,R5           ;ADD THE OFFSET TO THE TABLE
016642  011505                          MOV     (5),R5          ;GET THE ISAR DATA
016644  005003                          CLR R3
016646  006305                          ASL     R5              ;THIS IS
016650  006103                          ROL     R3
016652  006305                          ASL     R5              ;TO SHIFT
016654  006103                          ROL     R3
016656  006305                          ASL     R5              ;THE SEGMENT
016660  006103                          ROL     R3
016662  006305                          ASL     R5              ;ADDRESS
016664  006103                          ROL     R3
016666  006305                          ASL     R5              ;AN 18 BIT
016670  006103                          ROL     R3              ;ADDRESS
016672  006305                          ASL     R5              ;POSITION
016674  006103                          ROL     R3              ;WITH R3 CONTAINING
016676  060405                          ADD     R4,R5           ;THE UPPER 2 BITS
016700  005503                          ADC     R3              ;AND R5 CONTAINING
016702  006305                          ASL     R5              ;THE 16 BIT ADDRESS
016704  006103                          ROL     R3              ;THEN SHIFT FOR TYPING
016706  010346                          MOV     R3,-(SP)
016710  000241                          CLC
016712  006016                          ROR     (SP)
016714  000241                          CLC
016716  006016                          ROR     (SP)
016720  000241                          CLC
```

```
3106  016722  006016                          ROR     (SP)
3107  016724  104406                          TYPES
3108  016726  042703  177770                  BIC     #177770,R3
3109  016732  110337  016350                  MOVB    R3,.PR+2        ;GET THE FIRST NUMBER FROM R3
3110  016736  062737  000060  016350          ADD     #'0,.PR+2       ;MAKE IT INTO A NUMBER
3111  016744  012704  016351                  MOV     #.PR+3,R4       ;FUDGE IN THE POINTER
3112  016750  012737  175401  016346          MOV     #175401,.PR     ;AND THE FLAGS (FILL & 5 BYTES)
3113  016756  012603                          MOV     (6)+,R3         ;POP STACK INTO R3
3114  016760  000137  016232                  JMP     .PRL            ;DECODE AND TYPE THE REST
3115
3116  016764  172340                .SATAB:   172340                  ;KISARO
```

```
                                .SBTTL          $TRAP - TRAP HANDLER

                                ;THIS ROUTINE DECODES A TRAP CALL AND JUMPS TO THE APROPRATE
                                ;SUBROUTINE. THE CALL IS A "TRAP+N" WHERE N IS A MULTIPLE OF 2.
                                ;THE "SET" MACRO WILL CREATE THE TABLE NEEDED. IT HAS TO
                                ;FOLLOW THIS MACRO.

016766  011646          .TRAP:  MOV     (6),-(6)        ;GET ADDRESS OF TRAP +2
016770  162716  000002          SUB     #2,(6)          ;MAKE IT ADDRESS OF TRAP
016774  017616  000000          MOV     @(6),(6)        ;GET TRAP INSTRUCTION
017000  062716  112406          ADD     #.TRP+2-TRAP,(6);GET DATA AND MAKE IT AN OFFSET
017004  013607          .TRP:   MOV     @(6)+,PC        ;GO TO PROPER SUBROUTINE

017006  015664                  .SCOPE                  ;SCOPE  =  TRAP+0       (104400)
017010  015526                  .TYPE                   ;TYPE   =  TRAP+2       (104402)
017012  016170                  .TYPEO                  ;TYPEO  =  TRAP+4       (104404)
017014  016200                  .TYPES                  ;TYPES  =  TRAP+6       (104406)
017016  020556                  .TYPED                  ;TYPED  =  TRAP+10      (104410)
017020  016532                  .TYPEA                  ;TYPEA  =  TRAP+12      (104412)
017022  006242                  .ERCLR                  ;ERCLR  =  TRAP+14      (104414)
017024  006264                  .DKCMD                  ;DKCMD  =  TRAP+16      (104416)
017026  017046                  .RDOCT                  ;RDOCT  =  TRAP+20      (104420)
017030  017164                  .RDLIN                  ;RDLIN  =  TRAP+22      (104422)
017032  020524                  .UPDAT                  ;UPDAT  =  TRAP+24      (104424)
017034  000342                  .CLRDV                  ;CLRDV  =  TRAP+26      (104426)
017036  014036                  .LOGW                   ;LOGW   =  TRAP+30      (104430)
017040  014046                  .LOGR                   ;LOGR   =  TRAP+32      (104432)
017042  014054                  .LOGWC                  ;LOGWC  =  TRAP+34      (104434)
017044  014066                  .LOGC                   ;LOGC   =  TRAP+36      (104436)
```

```
                                        .SBTTL          $RDOCT - OCTAL INPUT ROUTINE

                                        ;THIS ROUTINE CALLS RDLIN, INPUTS A LINE FROM THE TTY AND CONVERTS
                                        ;IT INTO AN OCTAL NUMBER WHICH IS THE FIRST WORD ON THE STACK.

017046  011646                  .RDOCT: MOV     (6),-(6)        ;MOVE THE PC
017050  016666  000004  000002          MOV     4(6),2(6)       ;MOVE THE PS
017056  010146                          MOV     R1,-(6)         ;PUSH R1 ON STACK
017060  010246                          MOV     R2,-(6)         ;PUSH R2 ON STACK
017062  010346                          MOV     R3,-(6)         ;PUSH R3 ON STACK
017064  104422                  4$:     RDLIN                   ;READ A LINE INTO INPUT
017066  005001                          CLR     R1              ;INIT DATA WORD
017070  012703  017270                  MOV     #INPUT,R3       ;INIT POINTER
017074  112302                  1$:     MOVB    (3)+,R2         ;GET A BYTE
017076  001417                          BEQ     2$              ;GET OUT IF ZERO
017100  122702  000060                  CMPB    #'0,R2          ;CHECK FOR 0 OR GREATER
017104  003022                          BGT     3$              ;ERROR - LESS THAN 0
017106  122702  000067                  CMPB    #'7,R2          ;CHECK FOR 7 OR LESS
017112  002417                          BLT     3$              ;ERROR - GREATER THAN 7
017114  006002                          ROR     R2              ;GET
017116  006002                          ROR     R2              ;INTO
017120  006002                          ROR     R2              ;POSITION
017122  006101                          ROL     R1              ;FIRST BIT
017124  006102                          ROL     R2              ;GET
017126  006101                          ROL     R1              ;SECOND BIT
017130  006102                          ROL     R2              ;GET
017132  006101                          ROL     R1              ;THIRD BIT
017134  000757                          BR      1$              ;LOOP
017136  010166  000012          2$:     MOV     R1,12(6)        ;SAVE THE RESULT
017142  012603                          MOV     (6)+,R3         ;POP STACK INTO R3
017144  012602                          MOV     (6)+,R2         ;POP STACK INTO R2
017146  012601                          MOV     (6)+,R1         ;POP STACK INTO R1
017150  000002                          RTI                     ;RETURN

017152                          3$:
017152  104402  017156                  TYPE    ,.+2            ;.ASCIZ "?"<15><12>
017162  000740                          BR      4$              ;TRY AGAIN
```

```
                                        .SBTTL          $RDLIN - TTY INPUT ROUTINE

                                        ;THIS ROUTINE INPUTS A LINE TERMINATED BY A RETURN INTO ADDRESS
                                        ;INPUT AND RETURNS A LINE FEED. THE BUFFER HAS A NULL TERMINATOR
                                        ;INSTEAD OF THE RETURN. RUBOUTS ARE HANDLED BY RETYPING
                                        ;THE LINE. BUFFER OVERFLOW ERRORS LIKE A RUBOUT.

017164  010546                  .RDLIN: MOV     R5,-(6)         ;SAVE R5
017166  012705  017270          1$:     MOV     #INPUT,R5       ;GET ADDRESS
017172  022705  017310          2$:     CMP     #INPUT+16.,R5   ;BUFFER FULL?
017176  001412                          BEQ     4$              ;YES - TYPE "?"
017200  105737  177560                  TSTB    @#177560        ;WAIT FOR
017204  100375                          BPL     .-4             ;A CHARACTER
017206  113715  177562                  MOVB    @#177562,(5)    ;GET CHARACTER
017212  142715  000200                  BICB    #200,(5)        ;GET RID OF JUNK
017216  122715  000177                  CMPB    #177,(5)        ;IS IT A RUBOUT
017222  001005                          BNE     3$              ;SKIP IF NOT
017224                          4$:
017224  104402  017230                  TYPE    .+2             ;.ASCIZ "?"<15><12>
017234  000754                          BR      1$              ;ZAP THE BUFFER AND LOOP
017236  111527  000000          3$:     MOVB    (5),#0          ;SET UP FOR TYPING
017242  104402  017240                  TYPE    ,3$+2           ;ECHO IT
017246  122725  000015                  CMPB    #15,(5)+        ;CHECK FOR RETURN
017252  001347                          BNE     2$              ;LOOP IF NOT RETURN
017254  105065  177777                  CLRB    -1(5)           ;ZAP RETURN (THE 15)
017260  104402  000012                  TYPE    ,12             ;TYPE A LINE FEED
017264  012605                          MOV     (6)+,R5         ;RESTORE R5
017266  000002                          RTI                     ;RETURN

017270  000020                  INPUT:  .BLKB   16.             ;TTY INPUT AREA
017310  000020                  ERTAB:  .BLKW   16.
017350  000000                  OUTBUF: 0
```

```
3216                                    ;THIS SUBROUTINE HAS THE CALL
3217                                    ;       JSR     PC,MMUSE
3218                                    ;       XXX
3219                                    ;
3220                                    ;WHERE XXX IS AN EXECUTABLE ONE WORD INSTRUCTION
3221                                    ;MEM MANAGEMENT IS USED ON THE DESTINATION
3222                                    ;THE DESTINATION FIELD MUST BE (R1)+
3223                                    ;NO OTHER FORM IS ALLOWED
3224
3225
3226
3227  017352  005737  001024           MMUSE:  TST     TEMP2
3228  017356  001415                           BEQ     2$
3229  017360  012537  017374                   MOV     (R5)+,1$
3230  017364  042701  160000                   BIC     #160000,R1
3231  017370  052701  060000                   BIS     #60000,R1
3232  017374  000000                   1$:     .WORD   0               ;CONTAINS INSTRUCTION JUST AFTER
3233                                                                   ;THE JSR R5, MMUSE
3234  017376  032701  100000                   BIT     #100000,R1
3235  017402  001403                           BEQ     2$
3236  017404  062737  000200  172346           ADD     #200,KIPAR3
3237  017412  000205                   2$:     RTS R5
3238
3239
3240
3241
3242                                    ;THIS SETSUP MEM MANAGEMENT FOR A FOLLOWING INSTRUCTION
3243                                    ;CALL    JSR PC,MMPSET
3244
3245
3246  017414  005737  001024           MMPSET: TST     TEMP2
3247  017420  001412                           BEQ     2$
3248  017422  013746  001026                   MOV     TEMP3,-(6)
3249  017426  005037  172346                   CLR     KIPAR3
3250  017432  062737  000200  172346   1$:     ADD     #200,KIPAR3
3251  017440  005316                           DEC     (6)
3252  017442  001373                           BNE     1$
3253  017444  005726                           TST     (6)+
3254  017446  000207                   2$:     RTS     PC
3255
3256
3257  017450  104402  000757           TIEOUT: TYPE    ,CRLFLF
3258  017454  104402  017460                   TYPE    ,.+2            ;.ASCIZ "TIMEOUT PC="
3259  017474  162746  000002                   SUB     #2,-(SP)
3260  017500  104404                           TYPEO
3261  017502  000000                           HALT
3262
3263
3264
3265                                    ;NOTE FOR PROGRAMMER******** PROGRAM AT THIS POINT CAN NOT EXCEED A PC OF 17500*****
```

```
                020000                          .=      20000
                                                ;NOTE    ALL THIS CODE GETS DESTROYED WHEN PATTERN IS WRITTEN

                                                ;ROUTINE TO SAVE ABS LOADER
020000  012700  017776                  LDR:    MOV     #17776,R0
020004  012737  020024  000004                  MOV     #2$,4                   ;SET TIME OUT TRAP VECTOR
020012  012737  000340  000006                  MOV     #340,6
020020  005720                                  TST     (R0)+
020022  000776                                  BR      .-2
020024  022626                          2$:     CMP     (SP)+,(SP)+
020026  012737  000006  000004                  MOV     #6,4
020034  005037  000006                          CLR     6
020040  162700  000334                          SUB     #334,R0                 ;POINT R0 BACK TO LOADER
020044  010037  015210                          MOV     R0,LDR1                 ;SAVE FOR RESTORE ROUTINE
020050  012702  000155                          MOV     #155,R2                 ;WORD COUNT
020054  012703  017500                          MOV     #17500,R3               ;WHERE LOADER IS TO BE STORED
020060  012023                          1$:     MOV     (R0)+,(R3)+             ;STORE LOADER
020062  005302                                  DEC     R2
020064  001375                                  BNE     1$
020066  000207                                  RTS     PC                      ;RETURN

                                                ; -A- PORT SIZE

020070  052737  020000  001126  SIZZAP: BIS     #BIT13,FLAG2            ;SET MAPPING BIT
020076  004737  001620                  JSR     PC,DRVENO               ;FIND DRIVE
020102  012737  000002  001230          MOV     #2,WORK1                ;START WITH ONE 4K BUFFER
020110  012737  000001  001074          MOV     #1,STAMEM               ;FIRST 4K BANK
020116  012737  057476  001144          MOV     #57476,BUF              ;GET STARTING ADDR. 5K
020124  012737  000001  001134          MOV     #1,WRDCT                ;LOAD WC
020132  005037  001140                  CLR     DMA                     ;LOAD DA
020136  012777  000040  160670          MOV     #40,@RSCS2              ;CLEAR ALL RS REG
020144  013777  001164  160662          MOV     UNNUM,@RSCS2            ;GET DRIVE #
                                        ;XYZ*************?*****************************************************
                                        ;*****************************************************************
                                        ;*****************************************************************
                                        ;XYZ*************?*****************************************************
                                        ;*****************************************************************
                                        ;*****************************************************************
                                        ;XYZ*************?*****************************************************
                                        ;*****************************************************************
020152  005037  001026                          CLR     TEMP3
020156  012737  000061  001176                  MOV     #61,CMD                 ;DO A ERITE
020164  104416                          4$:     DKCMD                           ;NOW
020166  105777  160640                  1$:     TSTB    @RSCS1                  ;DONE YET?
020172  100375                                  BPL     1$                      ;NO
020174  032777  004000  160632                  BIT     #4000,@RSCS2            ;DID NEM SET?
020202  001012                                  BNE     SIZ1                    ;YES
020204  005777  160622                          TST     @RSCS1                  ;ANY ERRORS?
020210  100005                                  BPL     3$                      ;NO
020212  012737  000006  001112                  MOV     #6,SIZEAP               ;GET SIZE OF BUFFER
020220  000137  020326                          JMP     @#SIZERR                ;FOR USER IF HE WISHES IT
020224  104424                          3$:     UPDAT                           ;GET NEXT 4K BANK
020226  000756                                  BR      4$                      ;TEST BANK
020230  005337  001230                  SIZ1:   DEC     WORK1                   ;DEC SIZE OF BUFFER
020234  013737  001230  001112                  MOV     WORK1,SIZEAP            ;LOAD SIZE OF A BUFFER
```

```
                                        ;XYZ************?*******************************************************
                                        ;*************************************************************************
                                        ;************************************************************************
                                        ;XYZ************?*******************************************************
                                        ;*************************************************************************
                                        ;************************************************************************
                                        ;XYZ************?*******************************************************
                                        ;*************************************************************************
020242  013737  001230  001022                  MOV     WORK1,TEMP1
020250  104402  020254                          TYPE    ,.+2            ;.ASCIZ <15><12> "PORT -A- DATA BUFFER     4K TO "
020316  004737  020464                          JSR     PC,SIZPR
```

```
3333  020322  000137  020444          SIZZBP: JMP     NOB             ;GET OUT NO -B- PORT
3334  020326                          SIZERR:
3335  020326  104402  020332                  TYPE    .+2             ;.ASCIZ <15><12>"WILL NOT CONTINUE TO SIZE MEMORY BECAUS
3336  020416  012737  000006  001114          MOV     #6,SIZEBP       ;GIVE PROGRAM A BUFFER
3337  020424  104060                          HLT     !BA!DS          ;YOU CAN ENTER CONVERSATION MODE
3338  020426  052737  000001  001126          BIS     #BIT0,FLAG2     ;BEEN HERE BEFORE FLAG
3339  020434  042737  020000  001126          BIC     #BIT13,FLAG2    ;CLEAR MAPPING FLAG
3340  020442  000000                          HALT                    ;OR GO TO DERSA
3341  020444  042737  020000  001126  NOB:    BIC     #BIT13,FLAG2    ;CLEAR MAPPING FLAG
3342  020452  052737  000002  001126          BIS     #BIT1,FLAG2     ;SET BEEN HERE FLAG
3343  020460  000137  001462                  JMP     CALM            ;CAL BUFFER AND WC
3344
3345  020464  005001                  SIZPR:  CLR     R1              ;INIT SETUP
3346  020466  012702  000004                  MOV     #4,R2
3347  020472  062701  000001          SIZP:   ADD     #1,R1           ;SETUP FOR BANK NO
3348  020476  062702  000004                  ADD     #4,R2           ;SETUP FOR SIZE FO MEMORY
3349  020502  020137  001230                  CMP     R1,WORK1        ;IS THIS THE RIGHT SIZE?
3350  020506  001371                          BNE     SIZP            ;NO
3351  020510  010246                          MOV     R2,-(6)         ;PUT R2 ON STACK
3352  020512  104410                          TYPED                   ;TYPE STACK IN DECIMAL
3353  020514  104402  020520                  TYPE    .+2             ;.ASCIZ "K"
3354  020522  000207                          RTS     PC              ;RETURN
3355
3356                                  ;ADD 4K TO TEST ADDR
3357
3358                                  ;XYZ************?*****************************************************************
3359                                  ;*********************************************************************************
3360                                  ;*********************************************************************************
3361                                  ;XYZ************?*****************************************************************
3362                                  ;*********************************************************************************
3363                                  ;*********************************************************************************
3364                                  ;XYZ************?*****************************************************************
3365                                  ;*********************************************************************************
3366  020524  005237  001230          .UPDAT: INC     WORK1           ;INC BANK #
3367  020530  062737  020000  001144          ADD     #20000,BUF      ;UPDATE BY 4K
3368  020536  103005                          BCC     1$              ;BRANCH IF NO OVERFLOW
3369  020540  005237  001026                  INC     TEMP3           ;INCREMENT FOR RSBAE
3370  020544  013777  001026  160310          MOV     TEMP3,@RSBAE
3371  020552  000002                  1$:     RTI
3372
3373  020554  020556                          .TYPED                  ;TYPED  =  TRAP+40      (104440)
3374                                  .SBTTL          $TYPED - CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
3375
3376  020556  012737  100040  021004  .TYPED: MOV     #100040,.DSIGN  ;SET BLANK SWITCH AND SIGN
3377  020564  010046                          MOV     R0,-(6)         ;PUSH R0 ON STACK
3378  020566  010146                          MOV     R1,-(6)         ;PUSH R1 ON STACK
3379  020570  010246                          MOV     R2,-(6)         ;PUSH R2 ON STACK
3380  020572  010346                          MOV     R3,-(6)         ;PUSH R3 ON STACK
3381  020574  010546                          MOV     R5,-(6)         ;PUSH R5 ON STACK
3382  020576  012737  100040  021004          MOV     #100040,.DSIGN  ;SET BLANK SWITCH AND SIGN
3383  020604  016605  000016                  MOV     16(6),R5        ;GET DATA TO BE TYPED
3384  020610  100004                          BPL     1$              ;BR IF INPUT IS POS.
3385  020612  005405                          NEG     R5              ;MAKE THE BINARY NUMBER POS.
3386  020614  112737  000055  021004          MOVB    #'-,.DSIGN      ;MAKE THE ASCII NUMBER NEG.
3387  020622  005000                  1$:     CLR     R0              ;ZERO THE CONSTANTS INDEX
3388  020624  012703  020774                  MOV     #.DBLK,R3       ;SETUP THE OUTPUT POINTER
```

```
3389  020630  112723  000040            MOVB    #' ,(R3)+       ;SET THE FIRST CHARACTER TO A BLANK
3390  020634  005002            2$:     CLR     R2              ;CLEAR THE BCD NUMBER
3391  020636  016001  020764            MOV     .DTBL(R0),R1    ;GET THE CONSTANT
3392  020642  160105            3$:     SUB     R1,R5           ;FORM THIS BCD DIGIT
3393  020644  002402                    BLT     4$              ;BR IF DONE
3394  020646  005202                    INC     R2              ;INCREASE THE BCD DIGIT BY 1
3395  020650  000774                    BR      3$
3396  020652  060105            4$:     ADD     R1,R5           ;ADD BACK THE CONSTANT
3397  020654  005702                    TST     R2              ;CHECK IF BCD DIGIT=0
3398  020656  001003                    BNE     5$              ;FALL THROUGH IF 0
3399  020660  105737  021005            TSTB    .DSIGN+1        ;STILL DOING LEADING 0'S?
3400  020664  100410                    BMI     7$              ;BR IF YES
3401  020666  106337  021005    5$:     ASLB    .DSIGN+1        ;MSD?
3402  020672  103003                    BCC     6$              ;BR IF NO
3403  020674  113763  021004  177777    MOVB    .DSIGN,-1(R3)   ;YES--SET THE SIGN
3404  020702  052702  000060    6$:     BIS     #'0,R2          ;MAKE THE BCD DIGIT ASCII
3405  020706  052702  000040    7$:     BIS     #' ,R2          ;MAKE IT A SPACE IF NOT ALREADY A DIGIT
3406  020712  110223                    MOVB    R2,(R3)+        ;PUT THIS CHARACTER IN THE OUTPUT BUFFER
3407  020714  005720                    TST     (R0)+           ;JUST INCREMENTING
3408  020716  020027  000010            CMP     R0,#10          ;CHECK THE TABLE INDEX
3409  020722  002744                    BLT     2$              ;GO DO THE NEXT DIGIT
3410  020724  003002                    BGT     8$              ;GO TO EXIT
3411  020726  010502                    MOV     R5,R2           ;GET THE LSD
3412  020730  000764                    BR      6$              ;GO CHANGE TO ASCII
3413  020732  105013            8$:     CLRB    (R3)            ;SET THE TERMINATOR
3414  020734  012605                    MOV     (6)+,R5         ;POP STACK INTO R5
3415  020736  012603                    MOV     (6)+,R3         ;POP STACK INTO R3
3416  020740  012602                    MOV     (6)+,R2         ;POP STACK INTO R2
3417  020742  012601                    MOV     (6)+,R1         ;POP STACK INTO R1
3418  020744  012600                    MOV     (6)+,R0         ;POP STACK INTO R0
3419  020746  016666  000002  000004    MOV     2(6),4(6)       ;FUDGE DATA
3420  020754  012616                    MOV     (6)+,(6)        ;OFF STACK
3421  020756  104402  020774            TYPE    ,.DBLK          ;NOW TYPE THE NUMBER
3422  020762  000002                    RTI                     ;RETURN
3423
3424  020764  023420  001750  000144  .DTBL:  10000.,1000.,100.,10.
3425  020772  000012
3426  020774  000004            .DBLK:  .BLKW   4
3427  021004  000000            .DSIGN: 0
3428
3429          000001                    .END
```

```
ADAM    010766          2157    2177#   2186
ADDRR   014074          2660    2667    2672#
ADERR   003624          1273    1278#
ADHGT   003562          1261    1266#
ADRD    004732          1433    1450#
ADRI    004746          1449    1452    1454#
ADTL    003302           639    1206#
ADTST   003226           629     999    1191    1194#   1851    2654
ADT1    003310          1199    1216#
ADT1A   003312          1221#   1295
AKH     007420          1888#   1907
APORT   011426          1314    2262#
AS    = 000100           845#   1738    2717
ASKWC   002536          1109    1128#
AOB1    001120           865#    967*   1499*   1895    2567*   2627*
A1      002346           633    1102#
BA    = 000020           843#   1250    1398    1599    2722    3337
BEGIN   001234           625     948#   2094    2123    2403    2791
BELL  = 000007           723#
BIT0  = 000001           732#    960     978     983     986    2772    3338
BIT1  = 000002           733#    990    1005    1054    1066    1126    1495    3342
BIT10 = 002000           742#    992     993    1102    1198    1497    1752    2376    2404
BIT11 = 004000           743#   1108    1194    1667    1749    2828
BIT12 = 010000           744#   1186    1414    1620    2240    2561    2764
BIT13 = 020000           745#   1192    1356    2684    3290    3339    3341
BIT14 = 040000           622     746#   1033    1180    1324    1794    1796
BIT15 = 100000           747#   1171    1206    1293    1504    1653    2091    2471    2479    2527    2537    2792    2850
BIT2  = 000004           734#    968    1019    1040    1047    1197    1427    1959    2238    2560    2686
BIT3  = 000010           735#   1806    2110    2177    2259    2584    2839
BIT4  = 000020           736#   1719    1809    2233    2340    2343
BIT5  = 000040           737#   1016    1038    1151    1716    1760    1856    2337    2339    2628
BIT6  = 000100           738#   1099    1368    1434    1557    1585    1628    1893    2181
BIT7  = 000200           739#    851    1036    2311    2491    2549
BIT8  = 000400           740#   1224    1292    1381    1523    1652    1712    1721    1804    1889
BIT9  = 001000           741#   1248    1262    1330    1363    1370    1432    1555    1583    1625    1630    1676    1679
                        1718    1728    1748    1807    1867    2190    2452    2468    2510    2524    2532    2538    2548
                        2576    2769
BLOCK   001160           919#   1860    1864*   1924*   1927*   1929    1931    1932*   1933    1941*   2208*   2218*   2226
BLSZ    007600          1859    1924#
BUF     001144           913#   1234*   1318*   1359*   1549*   1701*   1708    2568*   3294*   3367*
BUFEXI  007410          1858    1863    1886#
BUFINX  007474          1885    1899#
BUFSIZ  006643          1074    1094    1769#
CALM    001462           979     981#   3343
CALM1   001466           982#
CHCKDV  002144          1050    1054#
CHKADT  003650          1277    1283    1288#
CHKDAT  012524          2463#   2475
CHKDSK  012774          2520#   2531
CLEAR   011342          1412    1616    2234    2236    2238#
CLIND   014042          2659#   2663
CLRDV = 104426          1227    1313    1530    1666    1678    2444    2462    2512    2516    3141#
CMD     001176           926#   1241*   1256*   1326*   1360*   1423*   1552*   1580*   1618*   1718*   1721*   1722    2449*
                        2464*   2521*   2570*   2573*   3308*
CMDAE   007402          1871    1879    1884#
CMPLP   010574          2129#   2130    2175
```

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CMPLP1  010640          2126    2128    2140#
CMPY    003264          1106    1130    1149    1178    1184    1190    1202#
COMDAR  007306          1865    1867#
COMERR  001214           933#   2621    2641*   2778*   2779
COMPAR  010444          1429    1622    2100#
CONM    002220          1000    1071#
CRLFLF  000757           794#   1042    1284    1611    2323    2785    2829    3257
DA    = 000004           841#   1250    1264    1340    1398    1443    1567    1599    1638    2122    2402    2454    2470
                        2578    2727
DATA    000620           769#   1338    1376    1440
DATAT   003710          1200    1296#   1493
DATTES  002426          1107    1110#   1115
DB    = 000002           840#   1398    1599    1638    2454    2470    2526    2578    2742
DISBUF  007234          1252    1289    1351    1410    1454    1856#   2457    2474    2530    2580
DISPLA= 177570           722#   1954*   2922*   2926*
DKCMD = 104416          1242    1257    1327    1361    1424    1553    1581    1619    2450    2465    2522    2571    2574
                        3137#   3309
DKINT   006452          1728#   1836
DMA     001140           911#    987*   1226*   1238    1272    1278    1312*   1539*   1540*   1664*   1686    1762*   1861*
                        1862    1870    1875    1886*   1900    2225    2446*   2461*   2517*   2562*   3296*
DONE    013774          2629    2634    2646#
DONEE   002204          1055    1065#   1671
DOWN    012646          2447    2485#   2488
DROP    001130           869#   1013    2417*   2588    2625    2781*   2786
DRP     015002          2681    2770    2772#
DRVENO  001620          1004#   1196    3291
DS    = 000040           844#   1340    1443    1567    1738    2122    2402    2737    3337
DSKRD   004570          1420    1422#   1447
DT    = 000240           848#   2749
DVNUM   001660          1009    1012#
ELH     004634          1430    1432#
ERCLR = 104414          1235    1255    1322    1354    1422    1551    1579    1617    3136#
ERCOUN  001152           916#   2100*   2235*
ERRCL   012322           965    1103    2410#
ERRORS  001002           804#   2941*   2961
ERRVEC= 000004           944#    997*    998*
ERTAB   017310          2411    2637    2678*   3213#
ESH     004524          1413#   1503
ESH1    004520          1358    1412#
EXGEN   010230          2030    2046#
EXGEN1  010366          2081#
EXMFLG  003242          1195    1197#   1670    2854
EXRAX   006126          1573    1605    1626    1644#
EXRXX   006140          1645    1647#
EXTDR   007576          1892    1898    1921#
EXTMEM  011514           981    1100    2282#
EXTPP   006236          1668    1671#
EXTPPR  006204          1500    1664#   2795
EXTT    011472          2265    2270#
FILCHR  001014           808#   2875    2876
FILDAT  010010          1975#   1978
FLAG    001132           908#    957*    992*    995*   1099*   1102*   1104*   1108*   1151*   1171*   1180*   1186*   1192*
                        1194    1197*   1198    1224*   1248*   1262*   1292*   1319*   1324    1330    1341*   1342    1350*
                        1356    1363    1414    1418*   1427    1432    1456    1497    1523*   1541*   1555    1569*   1570
                        1583    1613*   1625    1652*   1667    1676    1679*   1712    1728*   1748*   1760    1856    1867
                        1884    1888*   1889    1893    1920*   1959    2238    2240    2452    2468    2524    2560*   2576
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                    2792
FLAG2   001126       868#   958*   960    978    983    986*  1005*  1019*  1033  1040  1047*  1054  1066*
                    1126*  1716   1719   1752   1794*  1796*  2110*  2177*  2259* 2337* 2339*  2340* 2343*
                    2376*  2404*  2471*  2476   2479*  2510*  2527*  2532   2534  2537* 2538*  2548* 2561*
                    2686*  2764   2828*  2839   3290*  3338*  3339*  3341*  3342*
FLAG3   001222       936#   959*  1206*  1293   1504*  1653
FNDTYP  006770      1117   1794#  2443
GETERR  013742      2603   2635#  2775
HERADD= 177742       946#  2831
HINUM   010236      1985   1996   2006   2031*  2048#
HINUM1  010372      2059   2069   2080*  2083#  2115*  2138
HISAV   010242      1985*  2050#  2115
HLT     = 104000     718#  1250   1264   1280   1340   1398   1443   1567   1599  1638  1738   1877  2122
                    2196   2402   2454   2470   2526   2578   3337
HLTADR  001012       807#  2945*  2946*  2947   2948   2962
HRDER   001156       918#  1317*  1532*  1746   2460*  2511*
ICNT    001000       803#   955*  2915   2917   2919*  2920*  2922   2925*  2926  2932  2957*
INCSEC  007262      1861#  1866
INPUT   017270      1204   3158   3191   3192   3212#
INTEXT  006542      1731   1749#
INTFLG  001202       928#  1707*  1755*  2124   2129   2179
KDPAR0= 172360       708#
KDPAR1= 172362       709#
KDPAR2= 172364       710#
KDPAR3= 172366       711#
KDPAR4= 172370       712#
KDPAR5= 172372       713#
KDPAR6= 172374       714#
KDPAR7= 172376       715#
KDPDR0= 172320       690#
KDPDR1= 172322       691#
KDPDR2= 172324       692#
KDPDR3= 172326       693#
KDPDR4= 172330       694#
KDPDR5= 172332       695#
KDPDR6= 172334       696#
KDPDR7= 172336       697#
KIPAR0= 172340       699#  2329#
KIPAR1= 172342       700#  2331#
KIPAR2= 172344       701#  2347#
KIPAR3= 172346       702#  2173#  2349*  3236*  3249*  3250*
KIPAR4= 172350       703#  2351#
KIPAR5= 172352       704#  2353#
KIPAR6= 172354       705#  2355#
KIPAR7= 172356       706#  2364#
KIPDR0= 172300       681#  2356#
KIPDR1= 172302       682#  2357#
KIPDR2= 172304       683#  2358#
KIPDR3= 172306       684#  2359#
KIPDR4= 172310       685#  2360#
KIPDR5= 172312       686#  2361#
KIPDR6= 172314       687#  2362#
KIPDR7= 172316       688#  2363#
LA      = 000204     846#  2759
LAD     001010       806#   956*  1247*  1329*  1409*  1535*  2921*  2927   2929  2932
LDAT    004012      1317   1322#  1329   1343
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LDAT1   004006          1321#   1352
LDAT2   003734          1312#
LDAT3   003726          1311#   1487
LDR     020000           962    3270#
LDR1    015210          2798    2806#   3279*
LERADD= 177740           945#   2834
LOADSW  000561           762#   2439
LOGC    = 104436        1281    2189    3145#
LOGR    = 104432        1263    1442    1627    1872    3143#
LOGW    = 104430        1249    1332    1561    3142#
LOGWC   = 104434        1367    1589    3144#
LONUM   010234          1984    1995    2004    2016*   2047#
LONUM1  010370          2058    2067    2079*   2082#   2114*   2134
LOPCNT  001204           929#   1321*   1333*   1334    1345    1348*   1365    1372    1400*   1401    1404    1407*   1419*
                        1436    1445*   1446    1451    1550*   1559    1562*   1574    1578*   1587    1600*   1601    1604*
                        1606    1609    1615*   1632    1640*   1641    1644    1791*   2183    2276*   2321    2672
LOSAV   010240          1984*   2049#   2114
MDON    012164          2328    2369#
MEM     010374          1948    2087#
MEMERR= 177744           947#   2837
MMABTO  012166          2366    2371#
MMAVA   001216           934#    966*    973*   1386    1526    1714    2200    2264    2286    2326    2842
MMPSET  017414          1972    1994    2109    2252    3246#
MMSET   011454          2267#
MMUSE   017352          1975    2027    2042    2255    3227#
MMVEC   = 000250         854#   2366*
MR      = 000220         847#   2754
MSTR    004754          1416    1456#
MTRAP   000541           758#   2371
MYBYWR  012440          2449#   2458
N       = 000005         717#   1217    1221#   1297    1301#   1510    1514#   1660    1664#
NOB     020444          3333    3341#
NOFND   000730           790#   1060
NOINT   000510           752#   2121    2401
NOPORT  002334          1089    1100#
NOREC   006750          1403    1448    1643    1788#
NOWGO   002210          1048    1064    1066#
NOWRIT  006724          1781#   2275
NPRCNT  012316          2377*   2399*   2406#
NPRRET  012306          1754    2404#
NPR1    012320          2378    2407#
NUMS    001174           925#   1113*   1114    1116    1121    1123*   1137*   1138    1142    1144    1154*   1157    1159
                        1161    1165*   1166    1169    1172
OPDAR   002662          1133    1147#   1160
OPDSEL  006576          1323    1355    1413    1760#
OPPAT   003010          1150    1162#   1167
OPRD    003142          1179    1182#
OPWCK   003172          1185    1188#
OPWRT   003112          1170    1176#
OUT     013366          1065    2584#
OUTBUF  017350          1223*   1234    1236    1266    1318    1359    1379    1481*   1483*   1524*   1525    1537    1539
                        1547    1549    1961*   2262*   2269*   2563*   2568    3214#
PARCSR= 172100          2808#   2816
PARVEC= 000114          2809#   2810*   2811*
PASEL   007700          1320    1948#   2569
PASEX   010024          1979#   2046
```

```
PASSC   001162          920#   1531*  1648*
PATNU   001142          912#    988*  1168*  1172*  1174*  1490*  1491   1494*  1529*  1651*  1950   2116   2127
                       2140   2174   2559*  2794*
PAT0    000300          651#   1961   1963   2141
PAT1    000302          652#
PAT10   000320          659#
PAT11   000322          660#
PAT12   000324          661#
PAT13   000326          662#
PAT14   000330          663#
PAT15   000332          664#
PAT16   000334          665#
PAT17   000336          666#
PAT2    000304          653#
PAT20   000340          667#
PAT3    000306          654#
PAT4    000310          655#
PAT5    000312          656#
PAT6    000314          657#
PAT7    000316          658#
PCNT    001004          805#   2415*  2416*  2631   2647*  2648*  2656   2767
PFT1    012356          646    2437#
PFT2    012712          648    2508#
PFWAT   012420         2446#   2459
PFWATT  012412         2444#   2480
PHADDR  001124          867#   2269   2344*
PHYCOV  007012         1388    1800#
POWFAL  013174         2445    2514   2559#
PRIORI  001072          851#   1837   2463   2466   2520
PRNT    014134         1282    1336   1374   1384   1438   1563   1590   1634   1788   1878   2193   2197   2227
                       2273    2318   2679   2684#
PS    = 177776          719#    720    964*  1221*  1837*  2202   2463*  2466*  2520*  2844
PSW   = 177776          720#
PTDONE  014730         2743    2747   2760   2764#
PWRDN   013124         2518    2542#  2545
PWRFL   012754         2515    2517#  2533
PWRFL2  012744         2514#   2539
PWRF1   012752         2511    2516#  2551
PWRUP   013134         2542    2545#
QQ    = 000001         1217#   1297#  1510#  1660#
RAND    010262         2058#   2133
RANDM   000670          782#   1565   1592   1636
RANDOM  010040         1538    1548   1958   1984#
RAND1   010060         1995#   2045
RANEL   005160          643    1504#
RANEX   005166         1501    1506#  1655
RDERR   000657          779#   1441   1637   2611
RDLIN = 104422         1203    3139#  3156
RDOCT = 104420         1072    1075   1092   1095   1112   1136   1153   1164   3138#
RDSECT  003520         1255#
READCT  005154         1455    1503#
READER  001212          932#   2613   2639*  2776*  2777
RECOV   000702          785#   1608   2320
RESTOR  010244          996    1132   2052#
RETT    015162         2765    2773   2780   2796#
RLDR    015164          636    2798#
```

```
RORBLK  007650          1930    1934#
RRDSEC  003516          1254#   1290
RREAD   005770          1617#   1642
RRR2    011610          1801    1937    2289    2298    2305#
RSAS    001050           829#   1012    1745*   2455*   2473*   2529*   2720
RSBA    001040           825#   1378    1594    1708*   1829    2725
RSBAE   001062           834#   1698*   1703*   2712    3370*
RSCS1   001032           822#   1243    1245    1258    1260    1722*   1729    1732    1804    1807    2185    2697    3310
                        3314
RSCS2   001034           671*    672*    823#   1006*   1010*   1022*   2490*   2547*   2705    3297*   3298*   3312
RSCS3   001064           835#   2709
RSDA    001042           826#   1686*   1870    1876    2730
RSDB    001054           831#   2745
RSDS    001044           827#   1036    1736    2491    2549    2740
RSDT    001060           833#   1024    1026    1028    1030    2752
RSER    001046           828#   1007*   2456*   2472*   2528*   2701
RSLA    001052           830#   2762
RSMR    001056           832#   2757
RSREG   014144          2686#   2951
RSVEC   001066           836#   1836*
RSWC    001036           824#   1396    1711*   2735
RSO4DT  001172           924#   1023*   1032*   1155    1230    1267    1543    1917    1925    1938    2212    2220
RW    = 000006           852#   2356    2357    2358    2359    2360    2361    2362    2363
RWRED   006024          1532    1623    1625#
SANHT   003606          1270    1272#   1276
SAVAST  001076           856#   2262    2263    2290*
SAVCPU  001102           858#
SAVE    001154           917#   1225*   1291    2112*   2152*   2153*   2154*   2158*   2169    2171*   2172*   2187*   2188
                        2203    2206    2330*   2345    2845    2848
SAVMGA  001104           859#   2266    2294*
SAVMGB  001106           860#
SAVMGC  001110           861#
SAVWC   001220           935#    985*   1140    2052
SAVWCB  001224           937#
SCOPE = 104400          1220    1251    1254    1265    1288    1300    1349    1353    1408    1417    1444    1450    1513
                        1568    1577    1612    1614    1639    1647    1663    2646    3130#
SEABUF  003420          1235#   1247    1253
SEEC    014612          2716    2748#
SETIND  014060          2666#   2670
SHIFT   010076          1999#   2003
SHIFT1  010300          2062#   2066
SIZEAP  001112           862#   1076*   2295    3316*   3321*
SIZEBP  001114           863#   1096*   1097    3336*
SIZERR  020326          3317    3334#
SIZP    020472          3347#   3350
SIZPR   020464          3332    3345#
SIZZAP  020070           980    3290#
SIZZBP  020322          3333#
SIZ1    020230          3313    3320#
SLH     004174          1325    1353#
SLH2    004176          1354#   1402    1409    1421
SLH2A   004564          1411    1421#
SR0   = 177572           676#    972*   1528*   2368*
SR1   = 177574           677#
SR2   = 177576           678#
SR3   = 172516           679#   2367*
```

```
STABUF  006616          1071    1090    1764#
STAMEM  001074           855#   1073*   1086    1310    1810    2282    3293*
STATUS  001070           850#   1316*   1534*
STBCOM  001100           857#   1093*
STMM2   011672          2267    2326#
STTEST  001752          1017    1020#   1052
SWITCH  001200           927#   2113*   2131    2135*   2137*
SWR   = 177570           721#    722     968     990     993    1016    1038    1368    1370    1381    1425    1434    1495
                        1557    1585    1620    1628    1630    1749    2091    2181    2190    2233    2311    2442    2584
                        2628    2684    2769    2772    2850    2902    2913    2942    2952    2955
SWRDCT  001150           915#    985     989    1101    1144*   1145    1225    1229*   1233*   1291*   1311    1891    2052*
                        2053    2300*   2565*   2566
SW0   = 000001           617#
SW1   = 000002           616#
SW10  = 002000           607#   2649    2941
SW11  = 004000           606#   2913
SW12  = 010000           605#   2649
SW13  = 020000           604#   2942
SW14  = 040000           603#   2902
SW15  = 100000           602#
SW2   = 000004           615#
SW3   = 000010           614#
SW4   = 000020           613#
SW5   = 000040           612#
SW6   = 000100           611#
SW7   = 000200           610#
SW8   = 000400           609#   2902
SW9   = 001000           608#   2955
TAG     004630          1426    1428    1431#
TAG1    006020          1621    1624#
TDMA    001146           914#   1161*   1762
TEMP1   001022           812#   1087    1475    1478    3330*
TEMP2   001024           813#   1222*   1309*   1522*   1665*   1695    1818    1973    2025    2040    2150    2167    2253
                        2438*   2509*   3227    3246
TEMP3   001026           814#   1310*   1474*   1475    1477*   1478    1480*   1482    1697    1820    3248    3307*   3369*
                        3370
TEMP4   001030           815#   1699*   1700*   1701
TIEOUT  017450           997    3257#
TIMES   016034          2917    2932#
TIMUP   007176          1844#   3043
TPB     001020           810#   2876*   2881*
TPS     001016           809#   2877    2882
TRACK   001136           910#
TRUERR  006534          1735    1737    1748#
TRY     001640          1007#   1011
TRYNX   002130          1021    1031    1037    1049#   1669
TST1    003310          1220#
TST2    003710          1300#
TST3    005166          1513#
TST4    006202          1663#
TYPE  = 104402          1018    1042    1046    1060    1071    1074    1090    1091    1094    1105    1111    1129    1135
                        1148    1152    1163    1177    1183    1189    1202    1284    1338    1339    1376    1377    1391
                        1395    1440    1441    1565    1566    1592    1593    1596    1603    1608    1611    1636    1637
                        1790    1881    2088    2121    2195    2199    2229    2232    2275    2320    2323    2371    2401
                        2439    2478    2536    2582    2600    2605    2606    2607    2610    2611    2612    2615    2616
                        2617    2620    2623    2630    2633    2689    2692    2696    2700    2704    2707    2708    2711
```

```
                    2714    2719    2724    2729    2734    2739    2744    2751    2756    2761    2766    2771    2782
                    2785    2827    2829    2830    2833    2836    2841    2944    2950    3002    3042    3131#   3181
                    3201    3204    3208    3257    3258    3331    3335    3353    3421
TYPEA = 104412      2204    2846    3135#
TYPED = 104440      3134#   3352    3373#
TYPEO = 104404      1394    1397    1598    2691    2694    2698    2702    2706    2710    2713    2721    2726    2731
                    2736    2741    2746    2753    2758    2763    2832    2835    2838    2949    3132#   3260
TYPES = 104406      1045    1059    1610    1883    2207    2231    2322    2602    2609    2614    2619    2622    2632
                    2768    2784    2849    3107    3133#
TYPREC  011644      1347    1406    1453    1576    1646    2318#
UNCMP   001170       923#  1014*   1020    1049*   1056*   2781
UNITSV  001166       922#  1012*   1013*   1020    1125*   2588*   2589    2625*   2787
UNNUM   001164       672     921#  1015*   1022    1044    1051*   1057*   1058    1116*   2442*   2490    2547    2674
                    2774    2783    3298
UNRECO  006701      1603    1776#   1790
UNTYP   001762      1022#   1795
UP      = 000000     853#   2356    2357    2358    2359    2360    2361    2362    2363
UPCHK   012510      2460#   2493
UPDAT = 104424      3140#   3318
UPP     012656      2485    2488#
VADDR   001122       866#  1525*   1956    2112    2250    2263*   2268*   2564*
VECTRR  007160      1315    1533    1836#   2441    2513
WATT    011622      1328    1362    1431    1554    1582    1624    2311#   2451    2467    2523    2572    2575
WC      = 000010     842#   1250    1264    2122    2402    2732
WCCON   002600      1131    1134#   1139    1143
WCERR   001210       931#   2618    2640*   2777*   2778
WCKERR  000642       775#   1377    1593    2616
WDCTB   001116       864#   1897
WDERR   010776      2155    2179#
WORK    001226       941#   1389*   1393    1536*   1546*   1594*   1595*   1597    1844*   1849*   1880*   1882    1955*
                    1977*   2029*   2044*   2118*   2119*   2589*   2591
WORK1   001230       942#   1810*   1820*   1821    1829*   1830*   1831*   1832*   1833    1845*   1847*   1860*   1905*
                    2225*   2226*   2230    3292*   3320*   3321    3330    3349    3366*
WORK2   001232       943#   1899*   1901*   1908    2111*   2156*   2211
WRDCMP  010650      2136    2139    2150#   2176    2180
WRDCT   001134       909#    989*   1101*   1145*   1228*   1232*   1237    1311*   1467    1542*   1545*   1546    1709
                    1891*   1897*   1916*   1919*   1928    1955    2053*   2111    2209    2251    2566*   3295*
WRDINC  010700      2156#   2237
WRDNW   013270      2570#   2581
WRERR   005406      1535    1551#   1571
WRITER  001206       930#   2608    2638*   2776
WRLG1   005266      1535#   1650
WRNEXB  003506      1246    1251#
WRRCK   005546      1579#   1602
WRRCK1  005526      1556    1574#
WRTERR  000630       772#   1339    1566    2606
WRXBL   004140      1331    1345#
WRX1    004152      1346    1348#
WTNO    011474      1344    1572    2273#
XESH    004242      1363#
XINCSE  007504      1901#   1906
XINCSU  007530      1903    1908#
XSEABU  003432      1238#   1240
XWAIT   012176      2313    2376#
YORN    000763       796#   1202
$ENDAD  014020       620    2652#
```

```
$END1   014030          2650    2654#
.       = 021006         618#    619#    621#    624#    627#    631#    635#    638#    642#    645#    647#    750#    799#
                         801#   1018    1091    1092#   1105    1111    1112#   1129    1130#   1135    1136#   1148    1152
                        1163    1177    1183    1184#   1189    1190#   1244    1259    1294    1391    1395    1396#   1492
                        1596    1654    1750    1881    1882#   2088    2195    2199    2200#   2229    2230#   2232    2233#
                        2478    2479#   2536    2537#   2582    2583#   2600    2605    2606#   2607    2608#   2610    2611#
                        2612    2613#   2615    2616#   2617    2618#   2620    2623    2624#   2630    2633    2634#   2656
                        2689    2690#   2692    2693#   2696    2700    2701#   2704    2707    2708#   2711    2714    2715#
                        2719    2720#   2724    2725#   2729    2730#   2734    2735#   2739    2740#   2744    2745#   2751
                        2752#   2756    2757#   2761    2762#   2766    2771    2772#   2782    2827    2828#   2830    2831#
                        2833    2834#   2836    2837#   2841    2842#   2878    2883    2932    2944    2945#   2950    2951#
                        2953    2961    2962    2971    2991    2994    2999    3009#   3042    3046    3181    3195    3201
                        3212#   3213#   3258    3266#   3274    3331    3335    3353    3426#
.CLRDV  000342           671#   3141
.DBLK   020774          3388    3421    3426#
.DKCMD  006264          1686#   3137
.DSIGN  021004          3376*   3382*   3386*   3399    3401*   3403    3427#
.DTBL   020764          3391    3424#
.ERCLR  006242          1676#   3136
.HLT    016036           951    2941#
.HLTCT  016156          2687    2715    2717    2722    2727    2732    2737    2742    2748*   2749    2754    2759    2947*
                        2961#
.ILLUP  016520          3018    3045#
.KIT    016006          2903    2912    2918    2925#   2959
.LOGC   014066          2669#   3145
.LOGR   014046          2662#   3143
.LOGW   014036          2658#   3142
.LOGWC  014054          2665#   3144
.MAMK   015212           982    2810#
.OVER   016012          2926#
.PARSR  015304          2810    2826#
.POWER  016372           949    3018#   3040
.POWUP  016436          3027    3030#
.PR     016346          2968*   2970*   2972*   2973*   2978    2982    2992*   2993    2996*   2998    3002    3009#   3109*
                        3110*   3111    3112*
.PRF    016254          2980    2983    2988#
.PRL    016232          2981#   2997    3114
.PTIT   016212          2969    2974#
.PUVEC  016526          3018*   3019*   3027*   3049#
.QQ.    = 000042        3117#   3130    3131#   3132#   3133#   3134#   3135#   3136#   3137#   3138#   3139#   3140#   3141#
                        3142#   3143#   3144#   3145#   3146#   3373    3374#
.RDLIN  017164          3139    3190#
.RDOCT  017046          3138    3151#
.SATAB  016764          3072    3116#
.SAVR6  016524          3026*   3030    3048#
.SCOPE  015664          2902#   3130
.SVLAD  015766          2909    2914    2920#   2928
.SWOPT= 121000           596#    602     603     604     605     606     607     608     609    2649    2902    2941    2942
                        2955
.TBIT   014034          2656#
.TRAP   016766           953    3124#
.TRP    017004          3127    3128#
.TYPE   015526          2865#   3131
.TYPEA  016532          3057#   3135
.TYPEB  016160          2968#
.TYPED  020556          3134    3373    3376#
```

F08


```
.TYPEO  016170          2970#   3132
.TYPES  016200          2972#   3133
.UPDAT  020524          3140    3366#
```

```
END          1#    596#
LDPDR     2325#   2356    2357    2358    2359    2360    2361    2362    2363
NEWTST       1#    596#   1217    1297    1510    1660
ODT11        1#
ODT11X       1#
POP          1#    748#   2908    2911    3003    3034    3113    3175    3414
PRINT        1#    748#   1018    1091    1105    1111    1129    1135    1148    1152    1163    1177    1183    1189    1391
          1395    1596    1881    2088    2195    2199    2229    2232    2478    2536    2582    2600    2605    2607    2610
          2612    2615    2617    2620    2623    2630    2633    2689    2692    2696    2700    2704    2707    2708    2711
          2714    2719    2724    2729    2734    2739    2744    2751    2756    2761    2766    2771    2782    2827    2830
          2833    2836    2841    2944    2950    3042    3180    3200    3258    3331    3335    3353
PUSH         1#    748#   2905    2974    3020    3057    3066    3153    3377
SCOPE.       1#   1217#   1297#   1510#   1660#
SET       3117#   3130    3131    3132    3133    3134    3135    3136    3137    3138    3139    3140    3141    3142    3143
          3144    3145    3373
TYPADR       1#
TYPBIT       1#    748#
TYPCHR       1#    748#
TYPDEC       1#    748#   3351
TYPLIN       1#    748#
TYPOCS       1#    748#   1043    1058    1882    2230    2601    2608    2613    2618    2621    2631    2767    2783
TYPOCT       1#    748#   1392    1396    1597    2690    2693    2697    2701    2705    2709    2712    2720    2725    2730
          2735    2740    2745    2752    2757    2762    2948
TYPTXT       1#    748#   1018    1091    1105    1110    1128    1134    1147    1152    1162    1176    1182    1188    1390
          1395    1596    1881    2087    2195    2199    2229    2232    2478    2536    2582    2599    2605    2607    2610
          2612    2615    2617    2620    2623    2630    2633    2689    2692    2695    2699    2703    2707    2708    2711
          2714    2719    2724    2729    2734    2739    2744    2751    2756    2761    2766    2771    2782    2826    2830
          2833    2836    2841    3258    3331    3334    3353
$CATCH       1#    596#    618
$CMTAG       1#    596#    801
$DONE        1#    596#   2644
$EQUAT       1#    596#    717
$HLT         1#    596#   2933
$KMMR        1#    596#    674
$OCTAL       1#    596#   2962
$POWER       1#    596#   3010
$RAND2       1#
$RAND4       1#
$RDDEC       1#
$RDLIN       1#    596#   3183
$RDOCT       1#    596#   3146
$SCOPE       1#    596#   2895
$SET      3117#   3130    3131    3132    3133    3134    3135    3136    3137    3138    3139    3140    3141    3142    3143
          3144    3145    3373
$SETUP       1#    596#    948
$SMMR        1#
$SWDOC       1#    596#    599
$TRAP        1#    596#   3117
$TYPE        1#    596#   2855
$TYPEA       1#    596#   3050
$TYPED       1#    596#   3374
$UMMR        1#

. ABS.  021006    000
```

```
ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

.NOW.SEQ/SCL/CRF/NL:TOC=DERSBB.SML,DERSBB.P11
RUN-TIME:  26 40 3 SECONDS
RUN-TIME RATIO:  3586/71=50.3
CORE USED:  22K  (43 PAGES)
```

I08

```
Spooler runtime 12 Seconds, 54 KCS, 350 disk reads, 3 disk writes, 98 pages
[redacted] Date [illegible]-Nov-76 13:57:53 Monitor IPC-0 [illegible] [illegible] [illegible]
000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000111111111111111111111111111111111110
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