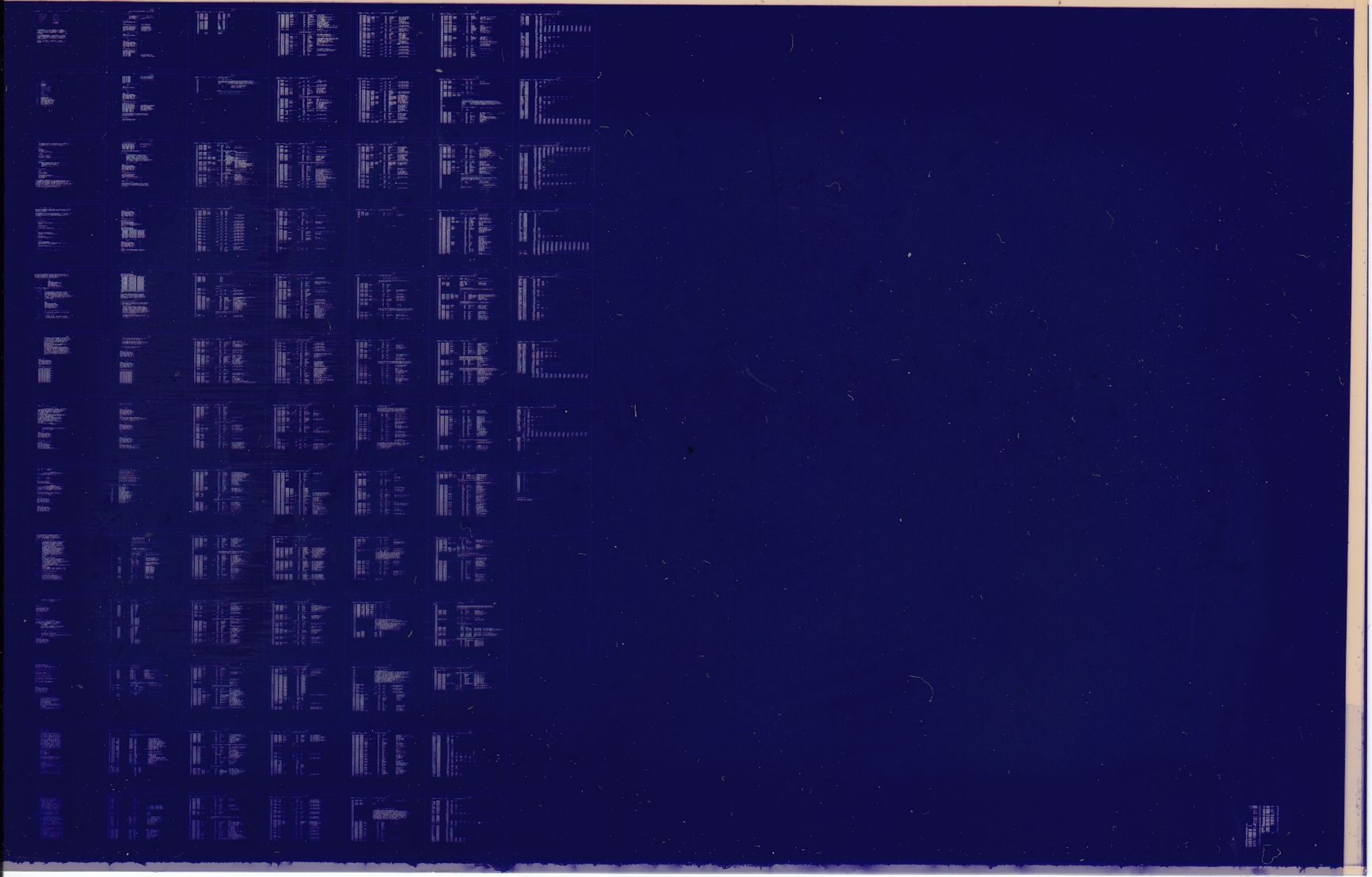
RK11/RK05

RK11 UTILITY PACKAGE
CZRKIF0

AH-9238F-MC

FICHE 1 OF 1

JUN 1978
digital
MADE IN USA



PRODUCT CODE: AC-9236F-MC

PRODUCT NAME: CZRKIFD RK11 UTILITY PACKAGE

DATE CREATED: MARCH, 1978

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: BOB COLLINS

REVISED BY: JIM KAPADIA
TOM SAWYER
CHUCK HESS

TABLE OF CONTENTS

1. ABSTRACT

1.1 THIS PACKAGE CONTAINS 4 INDIVIDUAL UTILITY PROGRAMS FOR THE RKXX PLUS A MINI-MONITOR WHICH ALLOWS TEST SELECTION AND PARAMETER INPUT VIA THE CONSOLE DEVICE. ALL UTILITY PACKAGES ARE EXPLAINED IN DETAIL IN PARAGRAPH 9.

2. REQUIREMENTS

2.1 EQUIPMENT
PDP-11 PROCESSOR
8K MEMORY
RK11 OR RKV11 CONTROLLER
1-8 RK05 OR RK05F DISK DRIVES (DRIVE TYPES MAY BE MIXED)

2.2 STORAGE
THIS PROGRAM REQUIRES 8K

2.3 PRELIMINARY PROGRAMS
THIS IS NOT A DIAGNOSTIC, PACKAGE IT IS ASSUMED THAT ALL EQUIPMENT IS FUNCTIONAL

3. LOADING PROCEDURE

3.1 METHOD
PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED
A. ABSOLUTE LOADER MUST BE IN MEMORY.
B. PLACE BINARY TAPE IN READER.
C. LOAD ADDRESS, #7500 (*DETERMINED BY LOCATION OF LOADER).
D. PRESS "START" PROGRAM WILL LOAD.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS
NONE

4.2 STARTING ADDRESS
200 MINI MONITOR

4.3 PROGRAM AND/OR OPERATOR ACTION
LOAD PROGRAM INTO MEMORY
SET SWITCH REGISTER TO STARTING ADDRESS (200)
LOAD ADDRESS
PRESS START

IF THE PROGRAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E. AN 11/34) THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH REGISTER IS NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH REGISTER. THE 'SOFTWARE' SWITCH REGISTER IS LOCATED AT LOCATION 176 (8). THE SETTINGS OF THE 'SOFTWARE' SWITCHES ARE CONTROLLED THROUGH A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING A 'CONTROL G'. THE PROGRAM WILL RECOGNIZE THE 'CONTROL G' whenever the program enters the scope routine or begins a new test. the 'SOFTWARE' SWITCH VALUES ARE ENTERED AS AN OCTAL NUMBER IN RESPONSE TO THE PROMPT FROM THE SWITCH ENTRY ROUTINE:

'SWR = NNNNNN NEW ='

EACH TIME SWITCH SETTING ARE ENTERED, THE ENTIRE SWITCH REGISTER IMAGE MUST BE ENTERED. LEADING ZEROS ARE NOT REQUIRED. 'RUBOUT' AND 'CONTROL L' FUNCTIONS MAY BE USED TO CORRECT TYPING ERRORS DURING SWITCH ENTRY.

ON PROCESSORS WITH HARDWARE SWITCH REGISTERS, THE 'SOFTWARE' SWITCH REGISTER MAY BE USED. IF THE PROGRAM FINDS ALL 16 SWITCHES IN THE 'UP' POSITION, ALL SWITCH REGISTER REFERENCES WILL BE TO THE 'SOFTWARE' REGISTER AND THE PROCEDURES DESCRIBED ABOVE MUST BE FOLLOWED.

PROGRAM WILL TYPE MINI MONITOR ROUTINE

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS
SEE SEC. 9.0 FOR SWITCHES APPLICABLE TO INDIVIDUAL ROUTINES.

5.2 SUBROUTINE ABSTRACTS
NOT APPLICABLE

5.3 PROGRAM AND/OR OPERATOR ACTOR
SEE INDIVIDUAL PACKAGE DESCRIPTION (PARAGRAPH 9)

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION
IF HALTED A MAJOR PROBLEM EXIST CHECK CODE AT HALT PC TO DETERMINE WHAT OCCURRED.

6.2 ERROR RECOVERY
EXPLAINED IN DETAIL IN INDIVIDUAL PACKAGE DESCRIPTION (PARAGRAPH 9)

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS
IT IS NOT RECOMMENDED THAT YOU START AT AN ADDRESS OTHER THAN 200, (REASON EXPLAINED IN PARAGRAPH 9.1) UNLESS DIRECTED TO BY THE PROGRAM.

7.2 OPERATIONAL RESTRICTIONS
EXPLAINED IN DETAIL IN INDIVIDUAL PACKAGE DESCRIPTIONS (PARAGRAPH. 9)

8. EXECUTION TIME

VARIES WITH SELECTED ROUTINE, NUMBER OF DRIVES, ETC.

9. PROGRAM DESCRIPTION

THE RK11 UTILITY PACKAGE IS DIVIDED INTO EIGHT SECTIONS
WHICH ALLOW COMPATABILITY TEST'NG, OSCILLATING SEEKS FOR SERVO
ADJUSTMENT AND SEEK LOGIC WAVEFORM ANALYSIS, PACK FORMATTING
AND SURFACE VERIFICATION, AND FRONT PANEL TESTING (INDICATOR LAMPS,
SWITCHES, INTERLOCKS, ETC) AND VERIFICATION.
THE PACKAGE IS DIVIDED INTO FIVE SECTIONS

SECTION	NAME
0	INDEX
1	COMPATIBILITY TEST
2	OSCILLATING SEEK PACKAGE
3	FORMATTER SURFACE VERIFIER
4	FRONT PANEL TEST
5	RK05 CONTROL PANEL TEST #2
6	HEAD ALIGNMENT ROUTINE
7	POWER FAILURE (DURING WRITE) TEST

NOTE: NORMAL LINKAGE TO ANY OF THESE PACKAGES IS THRU
SECTION 0 (SEE PARAGRAPH 9.1)

9.1 SECTION 0 INDEX

PURPOSE: TO ALLOW THE USER TO SELECT AND RUN TESTS VIA
THE CONSOLE DEVICE IN AN EFFORT TO FREE HIM
FROM REMEMBERING VARIOUS SWITCH SETTINGS.

DESCRIPTION: LOAD START ADDRESS 200, A TABLE IS PRODUCED
WHICH TELLS THE USER THE NAME AND TYPE OF THE
TEST. (TYPE IS AN OCTAL CODE BY WHICH THE USER SELECTS
THE TEST). AFTER THE TABLE IS TYPED, THE QUESTION "TYPE ="
IS ASKED, THE USER THEM TYPES THE NUMERAL 0-4
TO SELECT A TEST.

USE: THIS IS EXAMPLE OF THE ACTUAL OUTPUT:

```
RK11 UTILITY PACKAGE

NAME                              TYPE
INDEX                              0
COMPATIBILITY PACKAGE              1
OSCILLATING SEEK PACKAGE           2
FORMATTER-SURFACE VERIFIER         3
RK05 CONTROL PANEL TEST            4
RK05 CONTROL PANEL TEST #2         5
HEAD ALIGNMENT ROUTINE             6
POWER FAILURE (WRITE) TEST         7
```

TYPE=X
WERE "X" IS THE RESPONSE (0-7) BY THE USER

ERROR INFO: ANY ILLEGAL INPUT IS HANDLED, A QUESTION MARK
IS TYPED AND THE QUESTION "TYPE =" IS RE-ASKED.

9.2 SECTION 1 COMPATIBILITY PACKAGE

PURPOSE: TO CONFIRM THE FACT THAT A GROUP OF DRIVES
(A MAXIMUM OF EIGHT) ARE TRULY COMPATIBLE.
THIS PACKAGE DOES NOT APPLY TO RK-05F DRIVES.

DESCRIPTION: THIS PACKAGE ALLOWS A USER TO AUTOMATICALLY TEST

COMPATIBILITY OF UP TO EIGHT (8) DRIVES SIMPLY
BY STATING THE DRIVE NUMBERS TO BE TESTED. THE
TEST DOES THE REST, INSTRUCTING THE USER WHERE
TO PLACE THE PACK. THE LIMITATIONS OF TESTING ARE
IF THERE ARE (2) TWO PROCESSORS, FROM ONE (1) TO
SEVEN (7) DRIVES MAY BE ON SYSTEM ONE, AND
ONLY ONE (1) DRIVE (ANY DRIVE NUMER) MAY
BE ON SYSTEM TWO.
COMPATIBILITY-A DEFINITION, COMPATIBILITY INFERS
MORE THAN THE FACT THAT INFORMATION WHICH
WAS WRITTEN ON ONE DRIVE CAN BE
READ ON ANOTHER.
FOR DRIVES TO BE CONSIDERED TRULY COMPATIBLE
ANY DRIVE SHOULD BE ABLE TO READ WHAT WAS
WRITTEN BY ANY OTHER DRIVE AND ALSO MUST BE ABLE
TO OVERWRITE A PORTION OF INFORMATION WRITTEN
BY ANOTHER DRIVE, WITH NEW INFORMATION, AND
READ IT BACK. THIS IS A VERY BROAD DEFINITION
BUT IS THE BASIC PREMISE OF TRUE COMPATIBILITY.

USE: THE BELOW IS AN EXAMPLE OF ACTUAL OUTPUT, THE USER
WANTS TO RUN SINGLE PROCESSOR MODE AND TEST
COMPATIBILITY ON THREE (3) DRIVES WHOSE UNIT NUMBERS
ARE 0,1,3.....

****

EXAMPLE 1

```
          NAME                        TYPE
    INDEX                              0
    COMPATIBILITY PACKAGE              1
    OSCILLATING SEEK PACKAGE           2
    FORMATTER-SURFACE VERIFIER         3
    RK05 CONTROL PANEL TEST            4
    RK05 CONTROL PANEL TEST #2         5
    HEAD ALIGNMENT ROUTINE             6
    POWER FAILURE (WRITE) TEST         7

TYPE=1
DRIVE NUMBERS ON SYSTEM 1=0,1,3.

IS THERE A SECOND SYSTEM?N
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #1
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #3
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #1
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #3
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
DONE!
```

```
          RK11 UTILITY PACKAGE

          NAME                          TYPE
INDEX                                    0
COMPATIBILITY PACKAGE                    1
                          **********

          ...THE USER SELECTED TYPE ONE (1) AND RECEIVED
THE MESSAGE RKXX COMPATIBILITY PACKAGE AND WAS THEN
ASKED FOR SYSTEM 1 DRIVES HE TYPES EACH SELECTED
DRIVE NUMBER SEPARATED BY COMMAS HE TERMINATES THE
STRING WITH A PERIOD THEN A CARRIAGE RETURN
HE IS ASKED IF THERE IS A SECOND SYSTEM,
HE TYPES N FOR NO.
HE NOW RECEIVES A STRING OF MOVE DIRECTIVES TELLING
HIM EXACTLY WHERE TO MOVE THE TEST PACK AND WHAT TO
DO.  FINALLY THE USER RECEIVES THE MESSAGE "DONE!"
INDICATING A SUCCESSFUL PASS.
AT THIS POINT ANY DRIVE WHICH HAS NOT BEEN
DECLARED DOWN AND DID NOT RECEIVE AN ERROR*
MESSAGE IS COMPATIBLE WITH ANY OTHER SELECTED
DRIVE MEETING THE SAME CONDITIONS.
FINALLY THE INDEX ROUTINE IS AUTOMATICALLY
RE-ENTERED AND USER IS READY TO MAKE ANOTHER
SELECTION.
*SEE ERROR INFO TO DETERMINE THE TYPE OF ERROR
WHICH CONSTITUTES INCOMPATABILITY.
                          **********
```

EXAMPLE 2

```
          THE USER NOW DESIRES TO TEST COMPATIBILITY ON
          TWO SYSTEMS HE HAS UNITS 0,1 ON SYSTEM ONE
          AND UNIT 0 ON SYSTEM 2, IT GOES LIKE THIS....
          RK11 UTILITY PACKAGE

          NAME                          TYPE
INDEX                                    0
COMPATIBILITY PACKAGE                    1
OSCILLATING SEEK PACKAGE                 2
FORMATTER-SURFACE VERIFIER               3
RK05 CONTROL PANEL TEST                  4
RK05 CONTROL PANEL TEST #2               5
HEAD ALIGNMENT ROUTINE                   6
POWER FAILURE (WRITE) TEST               7


TYPE=1
DRIVE NUMBERS ON SYSTEM 1=1,0

IS THERE A SECOND SYSTEM?Y
DRIVE # =0
MOUNT PACK ON DRIVE #1
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
LOAD AND START ADDRESS 210 ON SYSTEM #2
AND TYPE THE BELOW WHEN ASKED ON SYSTEM #2
```

```
AND TYPE THE BELOW WHEN ASKED FOR IT.
WORD              1=000002
WORD              2=000200

                          **********
          ....THE ONLY DIFFERENCE BETWEEN THIS AND SINGLE
SYSTEM IS THE NEW DIRECTIVE TO LOAD START 210
ETC.  THE USER NOW LOADS AND STARTS SYSTEM TWO
AND THE BELOW IS TYPED...
                          **********

COMPATIBILITY-SYSTEM#2
WORD              1=000002

WORD              2=000200

MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
DONE SYSTEM 2 RESTART SYSTEM 1, TYPE WORD 000077

                          **********
          ....THE USER RESPONSE TO THE QUESTION WORD 1 =
BY TYPING WORD 1 FROM PROCESSOR ONE AND
WORD 2 =, BY TYPING WORD TWO FROM PROCESSOR 1
HE RECEIVES THE MOUNT COMMAND MOVES THE TEST PACK
TO SYSTEM TWO, DRIVE NUMBER (0), AND PRESSES
CONTINUE.  NOW THE MESSAGE TO RETURN TO SYSTEM
ONE*

*SYSTEM ONE HAS BEEN IN A HALT STATE AND
SHOULD BE LEFT THAT WAY UNTIL THE RETURN FROM
SYSTEM TWO SO THAT TABLES, ETC. BUILT FOR THE
TEST WILL NOT BE DISTURBED.
                          **********

WORD=000077

MOUNT PACK ON DRIVE #1
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
DONE!
        RK11 UTILITY PACKAGE

        NAME                          TYPE
INDEX                                  0
COMPATIBILITY PACKAGE                  1
OSCILLATING SEEK PACKAGE               2
FORMATTER-SURFACE VERIFIER             3
RK05 CONTROL PANEL TEST                4
RK05 CONTROL PANEL TEST #2             5
HEAD ALIGNMENT ROUTINE                 6
POWER FAILURE (WRITE) TEST             7

TYPE=

                          **********
```

THE USER NOW PRESSES CONTINUE ON PROCESSOR ONE
AND IN RESPONSE TO THE QUESTION, WORD =, TYPES
THE WORD GIVEN TO HIM FROM PROCESSOR TWO
THEN EVERYTHING BECOMES THE SAME AS A SINGLE
SYSTEM. THE USER MEARLY FOLLOWS DIRECTIONS.
ERROR INFO: SEE PARAGRAPH 9.6 SPECIAL SECTION

9.3 SECTION 2 OSCILLATING SEEK PACKAGE

PURPOSE: TO ALLOW THE USER TO MAKE SERVO ADJUSTMENTS
AND/OR SEEK LOGIC CHECKOUT BY PERFORMING
SEEKS BETWEEN USER SPECIFIED ADDRESS
DESCRIPTION: SELECT TYPE 2, THE USER THEN INSERTS
THE DRIVES TO BE TESTED IN SW0 TO SW7
OF THE SWITCH REGISTER. A SWITCH IS SET
FOR EACH DRIVE (E.G. SW2 TO TEST DRIVE 2.
THE USER THEN INSERTS THE
ADDRESS TO SEEK IN THE SWR. IF BOTH ADDRESS
ARE LEGAL, 50 CYCLES (100 SEEKS) WILL BE
MADE BETWEEN THE SPECIFIED ADDRESS THEN
THE PROGRAM WILL LOOK AT THE SWR FOR
POSSIBLE CHANGES THIS SHOULD ALLOW FOR GOOD
STABLE TRACES ON AN OSCILLISCOPE.
IT SHOULD BE NOTED THAT THE OSCILLATING
SEEKS BETWEEN THE SPECIFIED CYLINDERS
ARE DONE ON ALL AVAILABLE DRIVES.
THE ONLY WAY TO EXIT is HALT!, LOAD ADDRESS 200,
HIT START.
USE: SELECT TYPE 2, RESPOND TO QUESTION WITH UNIT NUMBER..
TYPE=2
OSCILLATING SEEK PACKAGE
SET SW0 TO SW7 TO SELECT THE DRIVES TO TEST
AND CONTINUE. IF ALL SWITCHES ARE RESET,
ALL AVAILABLE DRIVES WILL BE TESTED.
TOGGLE THE "FIRST CYLINDER ADDRESS" (OUTER LIMIT)
INTO THE LOW BYTE (BIT0-7) OF THE SWITCH REGISTER AND THE "LAST
CYLINDER ADDRESS" (INNER LIMIT) INTO THE HIGH
BYTE (BIT8-15), THEN PRESS CONTINUE
...FOLLOW INSTRUCTIONS TYPED
ERROR INFO: IF AN ILLEGAL ADDRESS IS SELECTED A MESSAGE IS TYPED
AND USER MEARLY SELECTS LEGAL ADDRESS AND DEPRESSES
CONTINUE
EXAMPLE TYPEOUT
INVALID ADDRESS IN SWITCH REGISTER TRY AGAIN
INVALID ADDRESS IN SWITCH REGISTER TRY AGAIN
INVALID ADDRESS IN SWITCH REGISTER TRY AGAIN

NOTE: BOTH DRIVES OF AN RK-05F SHOULD NOT BE SELECTED
FOR TESTING AT THE SAME TIME.

9.4 SECTION 3 FORMATTER-SURFACE VERIFIER

PURPOSE: TO FORMAT VIRGIN PACKS OR REFORMAT AN OLDER
PACK AND VERIFY ITS SURFACE
DESCRIPTION: SELECT TYPE 3, RESPOND TO THE QUESTION
BY SETTING SWITCHES CORRESPONDING TO
DRIVE NUMBERS TO BE FORMATTED. THUS IF
DRIVES 0,1,2 ARE TO BE FORMATTED SET
SWITCHES 0,1,2. THE DRIVES ARE FORMATTED
ONE AFTER ANOTHER AT COMPLETION PACK GOOD

MESSAGE IS TYPED AND PACK IS FORMATTED.
USE: SELECT TYPE 3, RESPOND TO QUESTION WITH SETTING OF SWITCH REGISTER.

****

RK11 UTILITY PACKAGE

NAME	TYPE
INDEX	0
COMPATIBILITY PACKAGE	1
OSCILLATING SEEK PACKAGE	2
FORMATTER-SURFACE VERIFIER	3
RK05 CONTROL PANEL TEST	4
RK05 CONTROL PANEL TEST #2	5
HEAD ALIGNMENT ROUTINE	6
POWER FAILURE (WRITE) TEST	7

TYPE=3
FORMATTER-SURFACE VERIFIER, SET SW REG WITH DRIVE #'S

PACK GOOD.

RK11 UTILITY PACKAGE

NAME	TYPE
INDEX	0
COMPATIBILITY PACKAGE	1

****

AFTER THE PACK IS FORMATTED A GOOD MESSAGE IS GIVEN AND A CHECK IS MADE TO SEE IF THERE ARE ANY MORE PACKS TO BE FORMATTED. IF THERE ARE NONE CONTROL IS TRANSFERRED TO THE MINI-MONITOR

ERROR INFO: DRIVE PROBLEM, IF THE MESSAGE....
SYSTEM ERROR
....IS TYPED IT INDICATES A FAULTY DRIVE OR CONTROLLER, RUN DIAGNOSTICS, THE PROCESSOR WILL HALT
PRESS CONTINUE TO RETURN TO MINI MONITOR.
BAD SPOT, OR SURFACE PROBLEM, ETC.

PACK FAILED AT (IN OCTAL) CYLINDER SECTOR SURFACE

9.5 SECTION 4 RK05 CONTROL PANEL TEST

PURPOSE: TO INSURE ALL SWITCHES INDICATOR LAMPS, AND INTERLOCKS ARE FUNCTIONAL IN THE RK05
DESCRIPTION: SELECT TYPE 4, RESPOND TO QUESTION WITH UNIT NUMBER, FOLLOW DIRECTIONS GIVEN. AT COMPLETION MESSAGE "DONE!" IS GIVEN
USE SELECT TYPE 4, RESPOND TO QUESTION WITH THE UNIT NUMBER....

****

NAME	TYPE
INDEX	0
COMPATABILITY PACKAGE	1
OSCILLATING SEEK PACKAGE	2
FORMATTER-SURFACE VERIFIER	3
RK05 CONTROL PANEL TEST	4
RK05 CONTROL PANEL TEST #2	5
HEAD ALIGNMENT ROUTINE	6
POWER FAILURE (WRITE) TEST	7

TYPE=4

```
RK05 CONTROL PANEL TEST, WHICH DRIVE?0
MOUNT PACK ON DRIVE#0
PLACE DRIVE IN RUN ;SHOULD SEE THE RUN,
POWER, AND ON CYLINDER LAMPS LIGHT.
MAKE DRIVE WRITE ENABLE PRESS CONTINUE

WRITE PROTECT THE DRIVE THEN PRESS CONTINUE

CLEAR WRITE PROTECT THEN PRES  TINUE

CAUTION! TRY TO OPEN THE DOOR  NOT FORCE:
DOOR SHOULD NOT OPEN!
PRESS CONTINUE WHEN FINISHED

PUT DRIVE IN LOAD, WAIT FOR LOAD LIGHT
PRESS CONTINUE WHEN FINISHED

OPEN THE DOOR, PUT DRIVE IN RUN
CAUTION! IF RUN LIGHT ON ERROR! DEPRESS
LOAD IMMEDIATELY, CONTINUE WHEN FINISHED

REMOVE THE PACK, CLOSE THE DOOR
PUT DRIVE IN RUN, DRIVE SHOULD NOT
RUN...INTERLOCKS HAVE BEEN CHECKED
DONE!

        RK11 UTILITY PACKAGE

          NAME                      TYPE
INDEX                                0
COMPATABILITY PACKAGE                1
OSCILLATING SEEK PACKAGE             2
FORMATTER-SURFACE VERIFIER           3
RK05 CONTROL PANEL TEST              4
RK05 CONTROL PANEL TEST #2           5
HEAD ALIGNMENT ROUTINE               6
POWER FAILURE (WRITE  TEST           7

TYPE=
                          **********
```

9.6 SECTION 5 'RK05 CONTROL PANEL TEST #2

PURPOSE: TO GIVE A CONTINUOUS MONITORING AND CHECKING CAPABILITY FOR THE FOLLOWING CONDITIONS ON THE VARIOUS DRIVES:
OFF LINE (RDY CLR)/ON LINE (RDY SET)
WRITE PRCTECTED/WRITE ENABLED
POWER LOW/POWER UP
SEEK INCOMPLETE/SEEK OK

DESCRIPTION: SELECT TYPE 5, PUT ALL THE DRIVES THAT ARE TO BE MONITORED AND CHECKED ON 'RUN'. NOTE THAT THIS IS IMPORTANT BECAUSE THE PROGRAM HAS TO KNOW WHICH DRIVES ARE TO BE CHECKED.

USE: AFTER HAVING SELECTED TYPE 5 AND PUTTING THE DRIVES THAT ARE TO BE MONITORED ON 'RUN', THE PROGRAM PRINTS OUT ALL THE DRIVES THAT ARE 'ON LINE'.

DRIVE 0 ON LINE
DRIVE 1 ON LINE
DRIVE 2 ON LINE

THE PROGRAM, THEN STARTS SCANNING ALL DRIVES, ONE AFTER THE OTHER. CHECKS IF THE DRIVE IS ON LINE OR OFF LINE (DRY SET OR CLEAR), THEN IT CHECKS IF THE DRIVE IS WRITE ENABLED OR WRITE PROTECTED. THEN A SEEK (TO CYLINDER 1) IS DONE AND 'DPL' BIT IS CHECKED TO SEE IF DRIVE POWER IS LOW OR OK. IF THE DRIVE IS POWERED, IT IS CHECKED IF THE SEEK IS DONE OR SEEK INCOMPLETE OCCURS. WHEN EVER ANY CHANGE IN THE STATUS IS FOUND, IT IS REPORTED. IF THE DRIVEIS PUT ON 'LOAD' AND BACK TO 'RUN', THE PROGRAM CHECKS IF THE DRIVE COMES ON LINE IN THE WRITE ENABLED MODE. IF NOT, AN ERROR MESSAGE (ERROR, NOT WRITE ENABLED) IS REPORTED. THEN THE DRIVE IS WRITE PROTECTED.
EX: IN A SYSTEM UNDER TEST, IF A DRIVE IS PUT ON 'LOAD' BY THE USER IT GETS REPORTED, IF THE USER SET 'WRITE PROT' IT GETS REPORTED. THE MESSAGES APPEAR AS FOLLOWING:

DRIVE 0 OFF LINE
DRIVE 1 WRITE PROTECTED
DRIVE 2 SIN
DRIVE 1 WRITE ENABLED
DRIVE 0 POWER LO
DRIVE 2 SEEK OK
DRIVE 0 POWER OK

NOTE THAT ONLY CHANGES IN STATUS ARE REPORTED. THESE CHANGES HAVE TO BE AFFECTED BY THE USER. IF ANY CHANGE IN STATUS IS NOT DETECTED AND REPORTED BY THE PROGRAM IT MIGHT IMPLY AN ERROR CONDITION.

SECTION 6 HEAD ALIGNMENT ROUTINE

PURPOSE: TO PROVIDE A FACILITY FOR HEAD ALIGNMENT, WITH DYNAMIC SELECTION OF THE UPPER OR LOWER HEAD.

DESCRIPTION: WHEN THE ROUTINE IS SELECTED THE FOLLOWING MESSAGE APPEARS:
SET SW0=0 FOR SURFACE 0, SW0=1 FOR SURFACE 1,
SET SW1=1 TO TEST CYL 64, SET SW1=0 TO TEST CYLINDER 105.
SW2-15=0
PUT ANY SW FROM 2-15 HI TO SELECT NEW DRIVE

THEN THE FOLLOWING QUESTION IS ASKED:
DRIVE? THE USER SHOULD TYPE IN THE DRIVE NUMBER THAT HE WANTS TO SELECT. THE DRIVE NUMBER IS SUFFIXED WITH AN 'F' TO TEST RK-05F TYPE DRIVES.

TYPE=6
DRIVE=0<CR>

THE UPPER OR THE LOWER HEAD CAN BE
SELECTED BY SWITCH 0. IF SURFACE 0 IS
TO BE SELECTED, PUT SW 0 TO 0. IF
SURFACE 1 IS TO BE SELECTED PUT SW 0 ON 1.
THE HEADS MAY BE POSITIONED AT CYLINDER 64
OR CYLINDER 105. SET SW1=0 FOR CYLINDER 105,
SW1=1 FOR CYLINDER 64.
THE PROGRAM POSITIONS THE HEADS ON THE SELECTED
CYLINDER AND CONTINUOUSLY READS FROM
THE SURFACE SELECTED. IF THE USER WISHES
TO SELECT THE OTHER HEAD OR CYLINDER IT CAN BE
DYNAMICALLY DONE BY FLIPPING SW 0 OR SW 1.
IF SOME OTHER DRIVE IS TO BE SELECTED,
ANY SWITCH BETWEEN SW 2 AND SW 15 SHOULD
BE PUT UP. THE QUESTION - DRIVE? IS
ASKED AGAIN. THIS IS A CONTINUOUS ROUTINE,
HENCE TO EXIT A HALT HAS TO BE DONE.

NOTE ALIGNMENT IS DONE WITH AN RK-05J CARTRIDGE
SO IF AN F TYPE DRIVE IS SELECTED, CYLINDER
64 OF THE RK-05J IS CYLINDER 130 OF THE F DRIVE
(EVEN DRIVE). CYLINDER 105 BECOMES CYLINDER 5
OF THE ODD DRIVE ON THE RK-05F.

2.2 SECTION 7 (DISK) POWER FAILURE (DURING WRITE) TEST
PURPOSE THIS TEST CHECKS THAT DATA WRITTEN ON THE DISK
IS NOT DESTROYED WHEN THE DISK SENSES A LOSE OF
POWER (POWER FAILS) WHILE DOING A WRITE.
DESCRIPTION: UPON SELECTING THIS TEST, THE PROGRAM FINDS OUT
THE FIRST AVAILABLE DRIVE AND INDICATES IT TO
THE USER BY TYPING A MESSAGE:
DRIVE X X=DRIVE NUMBER 0,1,..7
THEN IT PROCEEDS TO TO WRITE UNIQUE PATTERNS
ON CYLINDERS 0 TO 15 (DECIMAL) OF THAT DRIVE.
THE HEADS ARE THEN POSITIONED ON CYLINDER 10
AND THE USER IS ASKED TO DROP POWER ON THAT
DRIVE:
DROP POWER
MEANWHILE WRITE IS BEING DONE ON CYLINDER 10.
ON GETTING THE ABOVE MESSAGE THE USER SHOULD
DROP THE POWER ON THAT DRIVE. ON SENSING A LOSS
OF POWER, THE PROGRAM WILL ASK THE USER TO PUT
THE POWER ON AGAIN:
POWER ON
ON RECEIVING THE ABOVE MESSAGE THE USER SHOULD
PUT THE POWER ON. ON DETECTING POWER UP THE
PROGRAM PROCEEDS TO CHECK THAT THE DATA WRITTEN
ON CYLINDERS 0 TO 15 WAS INTACT. IF A WRITE
CHECKS ERROR OCCURS (POSSIBLY MEANING THAT
SOME OF THE DATA WAS DESTROYED DURING THE
LOSS OF POWER) IT IS REPORTED AS FOLLOWING:
ERROR, ON POWER-UP, RKDA=XXXX
XXXX IS THE CONTENTS OF RKDA AT THE TIME OF
ERROR

THE PROGRAM DOES THE ABOVE POWER FAIL TEST

ON ALL DRIVES THAT ARE PRESENT, ONE AFTER THE
OTHER IN A ROUND BOBBIN FASHION. EXIT IS THROUGH
HALT.

SEQ 0014

9.9 SECTION SPECIAL

FOR THE BELOW EXAMPLES THE FOLLOWING FORMAT
WILL BE USED.
THE ACTUAL TYPEOUT ;COMMENTS ON WHAT
AND RESPONSE ;OCCURRED OR WHAT TO DO
#NOTES IF NECESSARY FOR CLARITY

ERROR EXAMPLE 1

```
FORMATTER-SURFACE VERIFIER      3
RKDS CONTPOL PANEL TEST         4

TYPE=1                          ;TYPE 1 SELECTION
DRIVE NUMBERS ON SYTEM 1=0.     ;DRIVE #0 SELECTED

IS THERE A SECOND SYSTEM?N      ;NO SECOND SYSTEM
MOUNT PACK ON DRIVE #0          ;CONTINUE PRESSED BUT
MAKE PACK WRITE ENABLE          ;WRITE PROTECT ON
PRESS CONTINUE WHEN DRIVE RDY   ;CLEAR WRITE PROTECT SWITCH
DRIVE WRITE PROTECTED.          ;NOW RUNS TO FINISH
DRIVE WRITE PROTECTED           ;THIS DOES NOT EFFECT
DONE!                           ;OUTCOME OF TEST
        RK11 UTILITY PACKAGE

        NAME              TYPE
INDEX                      0
COMPATIBILITY PACKAGE      1
OSCILLATING SEEK PACKAGE   2
```

ERROR EXAMPLE 2

```
        RK11 UTILITY PACKAGE

        NAME                        TYPE
INDEX                                0
COMFATIBILITY PACKAGE                1
OSCILLATING SEEK PACKAGE             2
FORMATTER-SURFACE VERIFIER           3
RKDS CONTROL PANEL TEST              4
RKDS CONTROL PANEL TEST #2           5
HEAD ALIGNMENT ROUTINE               6
POWER FAILURE (WRITE) TEST           7

TYPE=1
DRIVE NUMBERS ON SYTEM 1=0.

IS THERE A SECOND SYSTEM?N
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE
DRIVE NOT READY
DRIVE NOT READY                      ;CONTINUE PRESSED BUT
DRIVE NOT READY                      ;DRIVE NOT READY. IF UP
DRIVE NOT READY                      ;TO SPEED ETC. AND MESSAGE
DRIVE NOT READY                      ;OCCURRING - STATIC SHOULD BE
```

```
    DRIVE NOT READY                 ;RUN IF NOT LOADED OR NOT
    DRIVE NOT READY                 ;READY MAKING DRIVE READY
    DRIVE NOT READY                 ;WILL STOP THE MESSAGE
    DRIVE NOT READY                 ;IT DOES NOT EFFECT THE
    DRIVE NOT READY
    DRIVE NOT READY                 ;THE OUTCOME OF COMPATABILITY
    DRIVE NOT READY
    DRIVE NOT READY
    DRIVE NOT READY
    DONE!
            RK11 UTILITY PACKAGE

            NAME                    TYPE
    INDEX                            0
    COMPATIBILITY PACKAGE            1
    OSCILLATING SEEK PACKAGE         2

ERROR EXAMPLE 3

            RK11 UTILITY PACKAGE

            NAME                    TYPE
    INDEX                            0
    COMPATIBILITY PACKAGE            1
    OSCILLATING SEEK PACKAGE         2
    FORMATTER-SURFACE VERIFIER       3
    RK05 CONTROL PANEL TEST          4
    RK05 CONTROL PANEL TEST #2       5
    HEAD ALIGNMENT ROUTINE           6
    POWER FAILURE (WRITE) TEST       7

    TYPE=1                          ;DRIVE RESET TIMED OUT
    DRIVE NUMBERS ON SYTEM 1=0,1,4,7.

    IS THERE A SECOND SYSTEM?Y
    DRIVE # =2
    MOUNT PACK ON DRIVE #0
    MAKE PACK WRITE ENABLE          ;THIS MESSAGE IF CONTINUOUS
    PRESS CONTINUE WHEN DRIVE RDY   ;INDICATED A DRIVE PROBLEM
    MOUNT PACK ON DRIVE #1          ;THERE IS NO RECOVERY
    MAKE PACK WRITE ENABLE          ;AND IF CONTINUOUS, A
    PRESS CONTINUE WHEN DRIVE RDY   ;LOAD START ADDRESS 200
    DRIVE RESET TIMED OUT           ;IS NECESSARY, DIAGNOSTIC
    DRIVE RESET TIMED OUT           ;SHOULD BE RUN AGAINST THE
    DRIVE RESET TIMED OUT           ;FAILING DRIVE.
    DRIVE RESET TIMED OUT
    DRIVE RESET TIMED OUT

    *NOTE A SLOW DRIVE OR FAST PROCESSOR AND MEMORY
    MAY CAUSE THE MESSAGE TO APPEAR A FEW TIMES AND
    THEN CONTINUE THIS IS OK AND WILL NOT EFFECT THE
    OUTCOME OF THE TEST.

ERROR EXAMPLE 4

    OSCILLATING SEEK PACKAGE         2
    FORMATTER-SURFACE VERIFIER       3
    RK05 CONTROL PANEL TEST          4

    TYPE=1
```

```
    DRIVE NUMBERS ON SYTEM 1=0.

    IS THERE A SECOND SYSTEM?N        ;SAME AS ABOVE BUT FUNCTION
    MOUNT PACK ON DRIVE #0            ;WAS A CONTROL RESET
    MAKE PACK WRITE ENABLE
    PRESS CONTINUE WHEN DRIVE RDY     ;ALL COMMENTS ARE THE SAME
    CONTROL RESET TIMED OUT           ;AS EXAMPLE 3
    CONTROL RESET TIMED OUT
    CONTROL RESET TIMED OUT
    CONTROL RESET TIMED OUT

    *A SINGULAR OCCURANCE AS ABOVE IS NOT A PROBLEM
    AND WILL NOT EFFECT COMPATABILITY

ERROR EXAMPLE 5

            THE BELOW ERRORS DO, ALWAYS, EFFECT COMPATABILITY.
            IN THE FIRST TYPE THE DRIVE IS DOWN
            INDICATING THAT (5) FIVE HARD OR SOFT
            ERRORS OCCURRED.  THE TEST WILL CONTINUE
            AGAINST THE OTHER DRIVES BUT THERE IS A
            PROBLEM IN THIS DRIVE AND IT SHOULD BE
            CONSIDERED NON EXISTENT AS FAR AS COMPATABILITY
            GOES.  THAT IS TO SAY IT IS NOT TESTED, THEREFORE
            NOT NECESSARILY COMPATABLE OR INCOMPATABLE.

            RK11 UTILITY PACKAGE

            NAME                      TYPE
    INDEX                              0
    COMPATIBILITY PACKAGE              1
    OSCILLATING SEEK PACKAGE           2
    FORMATTER-SURFACE VERIFIER         3
    RKOS CONTROL PANEL TEST            4
    RKOS CONTROL PANEL TEST #2         5
    HEAD ALIGNMENT ROUTINE             6
    POWER FAILURE (WRITE) TEST         7

    TYPE=1
    DRIVE NUMBERS ON SYTEM 1=0.

    IS THERE A SECOND SYSTEM?N
    MOUNT PACK ON DRIVE #0
    MAKE PACK WRITE ENABLE
    PRESS CONTINUE WHEN DRIVE RDY
    5 ERRORS OCCURRED DRIVE DECLARED DOWN!! NOT TESTED !
    DONE!
            RK11 UTILITY PACKAGE

            NAME                      TYPE
    INDEX                              0
    COMPATIBILITY PACKAGE              1

    *IN THE ABOVE CASE THE MESSAGE "3 SEEK INCOMPLETE
    ERRORS OCCURRED DRIVE DECLARED DOWN!! NOT TESTED!"
    MAY OCCUR IT IS THE SAME ERROR AS DESCRIBED ABOVE
    EXCEPT THAT IT IS CAUSED BY 3 SEEK ERRORS OCCURRING
    ON ONE DRIVE.

ERROR EXAMPLE 6
```

```
        RK11 UTILITY PACKAGE

          NAME                        TYPE
INDEX                                  0
COMPATABILITY PACKAGE                  1
OSCILLATING SEEK PACKAGE               2
FORMATTER-SURFACE VERIFIER             3
RKOS CONTROL PANEL TEST                4
RKOS CONTROL PANEL TEST ROUTINE        5
HEAD ALIGNMENT ROUTINE                 6
POWER FAILURE (WRITE) TEST             7

TYPE=1
DRIVE NUMBERS ON SYSTEM 1=0.

IS THERE A SECOND SYSTEM?Y
DRIVE # =1
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
LOAD AND START ADDRESS 210 ON SYSTEM #2
AND TYPE THE BELOW WHEN ASKED FOR IT.
WORD              1=101000
WORD=000177

MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=002764  EXPCTD=077400  RECVD=177000
  ADDR=002764  EXPCTD=077400  RECVD=077600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=007624  EXPCTD=077400  RECVD=177000
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=007633  EXPCTD=077400  RECVD=177000
  ADDR=007633  EXPCTD=077400  RECVD=177000
DONE!
        RK11 UTILITY PACKAGE

          NAME                        TYPE
INDEX                                  0
COMPATABILITY PACKAGE                  1
OSCILLATING SEEK PACKAGE               2
FORMATTER-SURFACE VERIFIER             3
RKOS CONTROL PANEL TEST                4
RKOS CONTROL PANEL TEST #2             5
HEAD ALIGNMENT ROUTINE                 6
POWER FAILURE (WRITE) TEST             7

TYPE=
THE ABOVE ERROR MESSAGE SHOWS A COMPATABILITY
PROBLEM.  ALL ERRORS OCCURRED ON HEAD ONE OF
DRIVE 0 TRYING TO READ INFORMATION WRITTEN BY
DRIVE 1.
```

ERROR EXAMPLE 7

```
MOUNT PACK ON DRIVE #0
MAKKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=000367  EXPCTD=077400  RECVD=077600
  ADDR=000367  EXPCTD=077400  RECVD=037600
  ADDR=000367  EXPCTD=077400  RECVD=037600
  ADDR=000367  EXPCTD=077400  RECVD=037600
  ADDR=000367  EXPCTD=077400  RECVD=037600
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=002764  EXPCTD=077400  RECVD=077600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=002764  EXPCTD=077400  RECVD=077600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
  ADDR=002764  EXPCTD=077400  RECVD=037600
ERROR! DATA WRITTEN BY DRIVE 1 CANNOT BE READ.
  ADDR=002767  EXPCTD=077400  RECVD=177000
5 ERRORS OCCURRED DRIVE DECLARED DOWN!! NOT TESTED!
DONE!
```

IN THE ABOVE EXAMPLE THE PROBLEM IS EXTREME. THE DRIVE WAS DECLARED DOWN DO TO CHECKSUM ERRORS. (TO SEE HOW THIS WAS DETERMINED SEE PARAGRAPH 9.7). NOTICE ALSO THE PROBLEM DID NOT START APPEARING UNTIL CYLINDER 7, AND WAS NOT FATAL UNTIL CYLINDER 57, AGAIN HEAD #1 WAS A COMMON FACTOR.

****

9.10 COMPATIBILITY ERROR RECOVERY

ALTHOUGH A UTILITY PACKAGE IS NOT A TRUE DIAGNOSTIC IT IS OF BENEFIT TO THE USER TO AT TIMES, BE ABLE TO MODIFY THE PROGRAM TO RECIEVE MORE INFORMATION OR CONTROL PARAMETERS

1. THERE ARE TWO STRATEGICALY PLACED NO-OPS, WHICH IF CHANGED TO HALTS, MAY BE OF HELP TO THE USER. ONE IS IN THE 'EXECUTE' ROUTINE WHICH ALLOWS THE USER TO EXAMINE THE DISK ADDRESS, BUS ADDRESS, WORD COUNT AND CONTROL REGISTERS IN TEMPORARY LOCATIONS JUST PRIOR TO LOADING AND EXECUTION. THE SECOND IS IN THE 'ERRCHK' ROUTINE WHICH ALLOW THE USER TO EXAMINE THE RKER REGISTER BEFORE THE PROGRAM CORRECTS ANY ERRORS WHICH WHICH MAY HAVE OCCURRED.

2. IF PLAGED BY CHECKSUM ERRORS AND THE USEP WISHES MORE ERROR MAPING THEN HE MAY MODIFY THE MASK WORD AT LOCATION 'ERRCHK+2' TO ONLY RECOGNIZE HARD ERRORS.

3. TO INCREASE OR DECREASE THE NUMBER OF RETRYS ALLOWED

BEFORE A DRIVE IS DECLARED DOWN, GO TO THE
'MOUNT' ROUTINE, MODIFY THE SETUP OF LOCATIONS
'ECNT' AND 'CNTSIN' AND YOU HAVE IT!

4. IF THE USER DECIDES, SAY BECAUSE OF A
LARGE NUMBER OF FAILURES, TO ALTER THE NUMBER
OF PRINTOUTS PER SECTOR ON FAILURES (THE TYPE IN
ERROR EXAMPLE 6 AND 7) HE MAY MODIFY THE SETUP
OF 'CHKCNT' IN THE 'RDCHK' ROUTINE.

A FINAL LOOK; THE FOLLOWING SECTION SHOWS ALL PACKAGES
CALLED IN SEQUENCE, NONE WITH ERRORS.

RK11 UTILITY PACKAGE

NAME	TYPE
INDEX	0
COMPATABILITY PACKAGE	1
OSCILLATING SEEK PACKAGE	2
FORMATTER-SURFACE VERIFIER	3
RK05 CONTROL PANEL TEST	4
RK05 CONTROL PANEL TEST #2	5
HEAD ALIGNMENT ROUTINE	6
POWER FAILURE (WRITE) TEST	7

TYPE=0

RK11 UTILITY PACKAGE

NAME	TYPE
INDEX	0
COMPATABILITY PACKAGE	1
OSCILLATING SEEK PACKAGE	2
FORMATTER-SURFACE VERIFIER	3
RK05 CONTROL PANEL TEST	4
RK05 CONTROL PANEL TEST #2	5
HEAD ALIGNMENT ROUTINE	6
POWER FAILURE (WRITE) TEST	7

TYPE=1
DRIVE NUMBERS ON SYSTEM 1=0,1,3.

IS THERE A SECOND SYSTEM?N
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #1
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #3
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #0
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #1
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
MOUNT PACK ON DRIVE #3

```
MAKE PACK WRITE ENABLE
PRESS CONTINUE WHEN DRIVE RDY
DONE!

        RK11 UTILITY PACKAGE

          NAME                      TYPE
INDEX                                0
COMPATABILITY PACKAGE                1
OSCILLATING SEEK PACKAGE             2
FORMATTER-SURFACE VERIFIER           3
RK05 CONTROL PANEL TEST              4
RK05 CONTROL PANEL TEST #2           5
HEAD ALIGNMENT ROUTINE               6
POWER FAILURE (WRITE) TEST           7

TYPE=2
OSCILLATING SEEK PACKAGE, WHICH DRIVE?0
TOGGLE THE "FIRST CYLINDER ADDRESS" (OUTER LIMIT)
INTO THE LOW BYTE (BIT0-7) OF THE SWITCH REGISTER AND THE "LAST
CYLINDER ADDRESS" (INNER LIMIT) INTO THE HIGH
BYTE (BIT8-15), THEN PRESS CONTINUE.

        RK11 UTILITY PACKAGE

          NAME                      TYPE
INDEX                                0
COMPATABILITY PACKAGE                1
OSCILLATING SEEK PACKAGE             2
FORMATTER-SURFACE VERIFIER           3
RK05 CONTROL PANEL TEST              4
RK05 CONTROL PANEL TEST #2           5
HEAD ALIGNMENT ROUTINE               6
POWER FAILURE (WRITE) TEST           7

TYPE=3
FORMATTER-SURFACE VERIFIER, WHICH DRIVE?0

PACK GOOD.

        RK11 UTILITY PACKAGE

          NAME                      TYPE
INDEX                                0
COMPATABILITY PACKAGE                1
OSCILLATING SEEK PACKAGE             2
FORMATTER-SURFACE VERIFIER           3
RK05 CONTROL PANEL TEST              4
RK05 CONTROL PANEL TEST #2           5
HEAD ALIGNMENT ROUTINE               6
POWER FAILURE (WRITE) TEST           7

TYPE=4
RK05 CONTROL PANEL TEST, WHICH DRIVE?0
MOUNT PACK ON DRIVE #0
PLACE DRIVE IN RUN ;SHOULD SEE THE RUN,
POWER, AND ON CYLINDER LAMPS LIGHT.
MAKE DRIVE WRITE ENABLE PRESS CONTINUE

WRITE PROTECT THE DRIVE THEN PRESS CONTINUE
```

```
                CLEAR WRITE PROTECT THEN PRESS CONTINUE                                 SEQ 0021

                CAUTION! TRY TO OPEN THE DOOR, DO NOT FORCE:
                DOOR SHOULD NOT OPEN!
                PRESS CONTINUE WHEN FINISHED

                PUT DRIVE IN LOAD, WAIT FOR LOAD LIGHT
                PRESS CONTINUE WHEN FINISHED

                OPEN THE DOOR, PUT DRIVE IN RUN
                CAUTION! IF RUN LIGHT ON ERROR! DEPRESS
                LOAD IMMEDIATELY, CONTINUE WHEN FINISHED

                REMOVE THE PACK, CLOSE THE DOOR
                PUT DRIVE IN RUN, DRIVE SHOULD NOT
                RUN...INTERLOCKS HAVE BEEN CHECKED
                DONE!

                        RK11 UTILITY PACKAGE
MAINDEC-11-DZRKI-E      MACY11 30A(1052)  24-MAR-78  09:23
DZRKIF.P11    24-MAR-78 09:20           TABLE OF CONTENTS                               SEQ 0001

     22         BASIC DEFINITIONS
    132         TRAP CATCHER
    141         STARTING ADDRESS(ES)
    146         ACT11 HOOKS
    156         COMMON TAGS
    296         ERROR POINTER TABLE
    324         INITIALIZE THE COMMON TAGS
    353         TYPE PROGRAM NAME
    358         GET VALUE FOR SOFTWARE SWITCH REGISTER
    440         COMPATIBILITY TEST
   1155         OSCILLATING SEEK ROUTINE
   1307         FORMATTER-SURFACE VERIFIER
   1571         RKOS CONTROL PANEL TEST
   1841         CONTROL PANEL TEST # 2
   2165         HEAD ALIGNMENT ROUTINE
   2288         DISK POWER FAILURE TEST
   2412         TYPE ROUTINE
   2482         BINARY TO OCTAL (ASCII) AND TYPE
   2553         TTY INPUT ROUTINE
   2799         READ AN OCTAL NUMBER FROM THE TTY
   2837         TRAP DECODER
   2860         TRAP TABLE
```

```
                        .TITLE  MAINDEC-11-DZRKI-E
                        ;*COPYRIGHT (C) 1974,1977
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY BOB COLLINS
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*
000001                  $TN=1
160000                  $SWR=160000     ;;HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYPOUT


                        ;*REVISED BY JIM KAPADIA
                        ;*REVISED BY TOM SAWYER FEB 27, 1976
                        ;*REVISED BY CHUCK HESS AUGUST, 1976

                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  $STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  TOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
000007                  PC=     %7              ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
```

```
                        
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7
                        
                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0
                        
                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                     15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
```

```
                                .EQUIV  BIT01,BIT1
                                .EQUIV  BIT00,BIT0

                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
            000004              ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
            000010              RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
            000014              TBITVEC=14              ;;"T" BIT
            000014              TRTVEC= 14              ;;TRACE TRAP
            000014              BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
            000020              IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
            000024              PWRVEC= 24              ;;POWER FAIL
            000030              EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
            000034              TRAPVEC=34              ;;"TRAP" TRAP
            000060              TKVEC=  60              ;;TTY KEYBOARD VECTOR
            000064              TPVEC=  64              ;;TTY PRINTER VECTOR
            000240              PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
                                .SBTTL  TRAP CATCHER

            000000                      .=0
                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
            000174                      .=174
000174  000000             DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000             SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  001434              JMP     @#STARTR        ;;JUMP TO STARTING ADDRESS OF PROGRAM
            000210                      .=210
000210  112737  000377  001312      MOVB    #377,@#MODE
000216  000137  001440              JMP     @#START
                                .SBTTL  ACT11 HOOKS

                                ;;**********************************************************************
                                ;HOOKS REQUIRED BY ACT11
            000222              $SVPC=.                 ;SAVE PC
            000046                      .=46
000046  001400                      $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
            000052                      .=52
000052  000000                      .WORD   0               ;;2)SET LOC.52 TO ZERO
```

```
                        001100
001100                          $CMTAG:
001100  000000                  $PASS:  .WORD   0                ;;CONTAINS PASS COUNT
001102     000                  $TSTNM: .BYTE   0                ;;CONTAINS THE TEST NUMBER
001103     000                  $ERFLG: .BYTE   0                ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0                ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0                ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0                ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0                ;;CONTAINS TOTAL ERRORS DETECTED
001114     000                  $ITEMB: .BYTE   0                ;;CONTAINS ITEM CONTROL BYTE
001115     001                  $ERMAX: .BYTE   1                ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0                ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0                ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0                ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0                ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0                ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0                ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134     000                  $AUTOB: .BYTE   0                ;;AUTOMATIC MODE INDICATOR
001135     000                  $INTAG: .BYTE   0                ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  SWR:    .WORD   DSWR             ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP            ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560                   ;;TTY KBD STATUS
001146  177562                  $TKB:   177562                   ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564                   ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566                   ;;TTY PRINTER BUFFER REG. ADDRESS
001154     000                  $NULL:  .BYTE   0                ;;CONTAINS NULL CHARACTER FOR FILLS
001155     002                  $FILLS: .BYTE   2                ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156     012                  $FILLC: .BYTE   12               ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157     000                  $TPFLG: .BYTE   0                ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160     077                  $QUES:  .ASCII  /?/              ;;QUESTION MARK
001161     015                  $CRLF:  .ASCII  <15>             ;;CARRIAGE RETURN
001162  000012                  $LF:    .ASCIZ  <12>             ;;LINE FEED
                                ;;**************************************************************
001164  000000                  DRACTV: .WORD   0                ;ACTIVE DRIVE WORD

001166  000010                  LOGA:   .BLKW   10               ;TABLE OF ACTIVE DRIVE WORDS

001206  152525                  DRV0:   .WORD   152525           ;TABLE OF PATTERN = TO DRIVE #'S
001210  077777                          .WORD   077777
001212  000000                          .WORD   000000
001214  012345                          .WORD   012345
001216  125252                          .WORD   125252
001220  000001                          .WORD   000001
001222  177777                          .WORD   177777
001224  154320                          .WORD   154320

001226  000010                  RDTBL:  .BLKW   10               ;TABLE OF READ ADDRESS
```

```
                                ;TABLE OF CYLINDER BASE FOR AUTO MODE
001256  377     MSKTBL: .BYTE   377
001257  177             .BYTE   177
001260  077             .BYTE   077
001261  037             .BYTE   037
001262  017             .BYTE   017
001263  007             .BYTE   007
001264  003             .BYTE   003
001265  001             .BYTE   001

001266  000     BASE:   .BYTE   0       ;CYL 0  BASE CYLINDER ADDRESS
001267  050             .BYTE   50      ;CYL 40 BASE CYLINDER ADDRESS
001270  120             .BYTE   120     ;CYL 80 BASE CYLINDER ADDRESS
001271  170             .BYTE   170     ;CYL 120 BASE CYLINDER ADDRESS
001272  240             .BYTE   240     ;CYL 160 BASE CYLINDER ADDRESS
001273  303             .BYTE   303     ;CYL 195 BASE CYLINDER ADDRESS

001274  000011  CYLTBL:  BLKB    11      ;TABLE    SELECTED BASES

001305  000     SECTBL: .BYTE   0       ;SECTOR 0
001306  004             .BYTE   4       ;SECTOR 4
001307  007             .BYTE   7       ;SECTOR 7
001310  013             .BYTE   13      ;SECTOR 12

001311  000     DRCNT1: .BYTE   0       ;COUNT OF NUMBER OF DRIVES ON SYS. 1
001312  000     MODE:   .BYTE   0       ;IF -1 START 210 SELECTED
001313  000     PRONUM: .BYTE   0       ;IF 0 1 PROCESSOR SELECTED
001314  000     DRIVE:  .BYTE   0       ;DRIVE # UNDER TEST (MAN+AUTO MODE)
001315  000     CYLBAS: .BYTE   0       ;BASE SELECTED (MANUAL MODE)
001316  000     COMND:  .BYTE   0       ;IF 0 WRITE COMMAND
001317  000     WRTNBY: .BYTE   0       ;DRIVE WHICH DID WRITE (READ OPERATION)
001320  000     HDRFLG: .BYTE   0       ;FLAG FOR ONE HEADER PRINTOUT
001321  000     ECNT:   .BYTE   0       ;ERROR COUNTER
001322  000     CNTSIN: .BYTE   0       ;SEEK INCOM. COUNTER
001323  000     TIMR2:  .BYTE   0       ;SECOND PASS TIMER
001324  000     IDEX:   .BYTE   0       ;CURRENT INDEX #
001325  000     STFLG:  .BYTE   0
001326  000     OSPFLG: .BYTE   0

        001330          .EVEN

001330  000000  KYTEMP: .WORD   0       ;TEMP. KEYBOARD BUFFER
001332  000000  CONTRL: .WORD   0       ;TEMP. CONTROL+STATUS WORD
001334  000000  DSKADR: .WORD   0       ;TEMP. DISK ADDRESS WORD
001336  000000  BUSADR: .WORD   0       ;TEMP. BUS ADDRESS WORD
001340  000000  WRDCNT: .WORD   0       ;TEMP. WORD COUNT
001342  172000  CYLCNT: .WORD   -6000   ;WORD COUNT OF 1 CYLINDER
001344  177400  SECCNT: .WORD   -400    ;WORD COUNT OF 1 SECTOR
001346  000000  TIMR:   .WORD   0       ;TIMER FOR OPERATIONS
001350  000000  CHKCNT: .WORD   0       ;NUMBER OF ERROR PRINTOUTS
001352  000000  DSKTMP: .WORD   0       ;SAVE OF CURRENT DISK #
001354  004003  WRITCS: .WORD   4003    ;IBA+WRITE+GO
001356  000005  READCS: .WORD   5       ;READ+GO
001360  000000  ERRFLG: .WORD   0       ;ERROR FLAG INHIBIT ADDRESS CHANGE
001362  000000  PATTRN: .WORD   0       ;DATA PATTERN
```

```
                                RKER:   .WORD   177402
                                RKCS:   .WORD   177404
                                RKWC:   .WORD   177406
                                RKBA:   .WORD   177410
                                RKDA:   .WORD   177412
                                SENDAD: .WORD   0
                                SEEKI:  .WORD   0
                                SEEKO:  .WORD   0

                    105212      LFLF=   105212
                                BA:     BUFF
                                DA:     .WORD   0
                                WC:     .WORD   0
                                RBA:    RBUFF
                                RWC:    .WORD   0
                                EXTR:   .WORD   0
                                ERRWF:  .WORD   0
                                ERRRF:  .WORD   0
                                ERRRFC: .WORD   0
                                ERRWCH: .WORD   0
                                ERRWCS: .WORD   0

                                ;BIT DEFINITIONS

                    010000      DPL=BIT12
                    000100      RWS=BIT6
                    000040      WPS=BIT5
```

```
                        .SBTTL  ERROR POINTER TABLE

                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                        ;*NOTE.:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                        ;*      DH              ;;POINTS TO THE DATA HEADER
                        ;*      DT              ;;POINTS TO THE DATA
                        ;*      DF              ;;POINTS TO THE DATA FORMAT

001434                  $ERRTB:
                        ;;*****************************************************************

                        ;THE ERROR TABLE IS UNUSED IN THIS PROGRAM

                        ;;*****************************************************************
```

```
                                001312          STARTR: CLRB    @#MODE
                                                START:  RESET                   ;CLEAR THE BUS
                                001100                  MOV     #STACK,SP
                                000000                  MOV     #0,-(SP)       ;SET UP STACK FOR PSW=0
                                001460                  MOV     #2$,-(SP)      ;RETURN FOR RTI
                                                        RTI
                                                2$:     NOP
                                                .SBTTL  INITIALIZE THE COMMON TAGS
                                                ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
                                001100                  MOV     #$CMTAG,R6     ;;FIRST LOCATION TO BE CLEARED
                                                        CLR     (R6)+          ;;CLEAR MEMORY LOCATION
                                001140                  CMP     #SWR,R6 ;;DONE?
                                001374                  BNE     .-6            ;;LOOP BACK IF NO
                                001100                  MOV     #STACK,SP      ;;SETUP THE STACK POINTER

                                                ;;INITIALIZE A FEW VECTORS
                                024230  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
                                000340  000036          MOV     #340,@#TRAPVEC+2 ;LEVEL 7
                                024310  000024          MOV     #$PWRON,@#PWRVEC ;;POWER FAILURE VECTOR
                                000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7

                                                ;;SIZE FOR A HARDWARE SWITCH REGISTER, IF NOT FOUND OR IT IS
                                                ;;EQUAL TO A "-1" SETUP FOR A SOFTWARE SWITCH REGISTER.
                                000004                  MOV     @#ERRVEC,-(SP) ;;SAVE ERROR VECTOR
                                001572  000004          MOV     #64$,@#ERRVEC  ;;SET UP ERROR VECTOR
                                177570  001140          MOV     #DSWR,SWR      ;;SETUP FOR A HARDWARE SWICH REGISTER
                                177570  001142          MOV     #DOISP,DISPLAY ;;AND A HARDWARE DISPLAY REGISTER
                                177777  177352          CMP     #-1,@SWR       ;;TRY TO REFERENCE HARDWARE SWR
                                001012                  BNE     66$            ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                               ;;AND  THE HARDWARE SWR IS NOT = -1
                                000403                  BR      65$            ;;BRANCH IF NO TIMEOUT
                                001600          64$:    MOV     #65$,(SP)      ;;SET UP FOR TRAP RETURN
                                000002                  RTI
                                001140  001600  65$:    MOV     #SWREG,SWR     ;;POINT TO SOFTWARE SWR
                                001142  001606          MOV     #DISPREG,DISPLAY
                                000004  001614  66$:    MOV     (SP)+,@#ERRVEC ;;RESTORE ERROR VECTOR

                                004737  001620          JSR     PC,$TKINT      ;INITIALIZE THE TTY INTERRUPT HANDLER
                                                .SBTTL  TYPE PROGRAM NAME
                                                ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
                                177777  001624          INC     #-1            ;;FIRST TIME?
                                001045  001630          BNE     67$            ;;BRANCH IF NO
                                104401  001632          TYPE    ,68$           ;;TYPE ASCIZ STRING
                                                .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
                                005737  001636          TST     @#42           ;;ARE WE RUNNING UNDER XXDP/ACT?
                                001006  001642          BNE     69$            ;;BRANCH IF YES
                                023727  001644  001140  CMP     SWR #SWREG     ;;SOFTWARE SWITCH REG SELECTED?
                                001005  001652          BNE     70$            ;;BRANCH IF NO
                                104405  001654          GTSWR                  ;;GET SOFT-SWR SETTINGS
                                000403  001656          BR      70$
                                112737  000001  001134  69$:    MOVB    #1,$AUTOB      ;;SET AUTO-MODE INDICATOR
                                                70$:
                                000426  001666          BR      67$            ;;GET OVER THE ASCIZ
                                                ;;68$:  .ASCIZ  <CRLF>/RK11 UTILITY PACKAGE/<15><12>/MAINDEC-11-DZRKI-E/<CRLF>
                                                67$:
                                105737  001744          TSTB    @#MODE
                                100002  001750          BPL     1$
```

```
                                1$:     TSTB    STFLG                   ;PRINT ONLY THE FIRST TIME
                                        BEQ     10$
                                        JMP     TABLTY
                                10$:    INCB    STFLG
                                STRT1:  CLRB    OSPFLG
                                        TYPE    ,65$                    ;;TYPE ASCIZ STRING
                                        BR      64$                     ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12><15><12>/       NAME                    TYPE/
                                64$:
                                        TYPE    ,67$                    ;;TYPE ASCIZ STRING
                                        BR      66$                     ;;GET OVER THE ASCIZ
                                ;;67$:  .ASCIZ  <15><12>/INDEX                                  0/
                                66$:
                                        TYPE    ,69$                    ;;TYPE ASCIZ STRING
                                        BR      68$                     ;;GET OVER THE ASCIZ
                                ;;69$:  .ASCIZ  <15><12>/COMPATIBILITY PACKAGE                  1/
                                68$:
                                        TYPE    ,71$                    ;;TYPE ASCIZ STRING
                                        BR      70$                     ;;GET OVER THE ASCIZ
                                ;;71$:  .ASCIZ  <15><12>/OSCILLATING SEEK PACKAGE               2/
                                70$:
                                        TYPE    ,73$                    ;;TYPE ASCIZ STRING
                                        BR      72$                     ;;GET OVER THE ASCIZ
                                ;;73$:  .ASCIZ  <15><12>/FORMATTER-SURFACE VERIFIER             3/
                                72$:
                                        TYPE    ,75$                    ;;TYPE ASCIZ STRING
                                        BR      74$                     ;;GET OVER THE ASCIZ
                                ;;75$:  .ASCIZ  <15><12>/RK05 CONTROL PANEL TEST                4/
                                74$:
                                        TYPE    ,77$                    ;;TYPE ASCIZ STRING
                                        BR      76$                     ;;GET OVER THE ASCIZ
                                ;;77$:  .ASCIZ  <15><12>/RK05 CONTROL PANEL TEST #2             5/
                                76$:
                                        TYPE    ,79$                    ;;TYPE ASCIZ STRING
                                        BR      78$                     ;;GET OVER THE ASCIZ
                                ;;79$:  .ASCIZ  <15><12>/HEAD ALIGNMENT ROUTINE                 6/
                                78$:
                                        TYPE    ,81$                    ;;TYPE ASCIZ STRING
                                        BR      80$                     ;;GET OVER THE ASCIZ
                                ;;81$:  .ASCIZ  <15><12>/POWER FAILURE (WRITE) TEST             7/
                                80$:
                                TABLTY:
                                        TYPE    ,65$                    ;;TYPE ASCIZ STRING
                                        BR      64$                     ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12><15><12>/TYPE=/
                                64$:
                                        RDOCT                           ;GET THE TEST NUMBER FROM THE OPERATOR
                                        MOV     (SP)+,R0                ;STORE IT IN R0
                                        CMP     #10,R0                  ;VALID NUMBER ?
                                        BLE     NG                      ;BR IF NOT
                                        ROL     R0                      ;ALIGN THE NUMBER FOR DISPATCHING
                                        JMP     @BEGIN(R0)              ;GO TO THE SELECTED TEST
                                NG:     TYPE    ,$QUES                  ;'?'
                                        BR      TABLTY
```

```
                                BEGIN:  STRT1
                                        SECT.3
                                        SECT.2
                                        SECT.1
                                        SECT.0
                                        SECT.4
                                        SECT.5
                                        SECT.6


                                        .SBTTL  COMPATIBILITY TEST

                                ;ROUTINE TO PICK UP THE DRIVE NUMBER TO BE TESTED
                                ;ON SYSTEM 1.

002642  000240                  SECT.3: NOP                     ;NO-OP
002644                          AUTSL2:
002644  104401  002652                  TYPE    ,65$            ;;TYPE ASCIZ STRINC
002650  000415                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/TERMINATE WITH '.<CR>'/
002704                          64$:
002704  104401  002712                  TYPE    ,67$            ;;TYPE ASCIZ STRING
002710  000417                          BR      66$             ;;GET OVER THE ASCIZ
                                ;;67$:  .ASCIZ  <15><12>/DRIVE NUMBERS ON SYSTEM 1=/
002750                          66$:
002750  104410                          RDLIN
002752  012600                          MOV     (SP)+,R0        ;PICK UP THE ADDRESS OF THE INPUT BUFFER
002754  012701  001166                  MOV     #LOGA,R1        ;GET THE ADDRESS OF THE LOGICAL UNIT TBL.
002760  105037  001311                  CLRB    @#DRCNT1        ;CLEAR THE DRIVE COUNTER
002764  005037  001330          1$:     CLR     @#KYTEMP        ;CLEAR TEMP
002770  112037  001330                  MOVB    (R0)+,@#KYTEMP  ;GET THE FIRST DRIVE #
002774  122737  000054  001330          CMPB    #54,@#KYTEMP    ;IS IT A COMMA THAT WAS TYPED?
003002  001770                          BEQ     1$              ;IF YES GO BACK
003004  162737  000060  001330          SUB     #60,@#KYTEMP    ;MAKE ASCII A DRIVE #
003012  100403                          BMI     2$              ;IF RESULT NEGATIVE BRANCH
003014  004737  004072                  JSR     PC,STORE        ;IF RESULT POSITIVE JUMP
003020  000761                          BR      1$              ;AFTER STORING GET NEXT #
003022  122740  000056          2$:     CMPB    #56,-(R0)       ;WAS NEGATIVE RESULT A TERMINATOR?
003026  001402                          BEQ     3$              ;IF YES BRANCH
003030  004737  004142                  JSR     PC,ILEGAL       ;IF NO BAD CHARACTER JUMP
003034  022701  001206          3$:     CMP     #DRV0,R1        ;IS THE TABLE FULL
003040  001403                          BEQ     SECSY$          ;IF YES BRANCH
003042  012721  100000                  MOV     #100000,(R1)+   ;IF NO FILL TABLE WITH DOWN INDICATOR.
003046  000772                          BR      3$              ;GO BACK AND CHECK
                                ;
                                ;ROUTINE TO DETERMINE IF THERE IS A SECOND
                                ;SYSTEM AND IF SO TO GET THE NUMBER OF THE
                                ;DRIVE ON THIS SYSTEM

003050                          SECSYS:
003050  104401  003056                  TYPE    ,65$            ;;TYPE ASCIZ STRING
003054  000416                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/IS THERE A SECOND SYSTEM?/
003112                          64$:
```

```
                                                RDCHR                   ;READ A CHARACTER
003114  104407                                  MOV     (SP)+,@#KYTEMP  ;GET THE RESPONSE
003116  012637  001330                          TYPE    ,KYTEMP         ;ECHO
003122  104401  001330                          CMP     #131,@#KYTEMP   ;WAS IT A "Y" (FOR YES)?
003126  022737  000131  001330                  BEQ     PRO2            ;IF YES BRANCH TO PROCESSOR 2
003134  001411                                  CMP     #116,@#KYTEMP   ;WAS RESPONSE LEGAL (N FOR NO)?
003136  022737  000116  001330                  BEQ     PRO1            ;IF LEGAL BRANCH
003144  001460                                  TYPE    ,67$            ;;TYPE ASCIZ STRING
003146  104401  003154                          BR      66$             ;;GET OVER THE ASCIZ
003152  000401                          ;;67$:  .ASCIZ  /?/
                                        66$:
003156                                          BR      SECSYS          ;GO BACK ASK AGAIN
003156  000734                          PRO2:   BISB    #377,@#PRONUM   ;SET FLAG TWO PROCESSORS
003160  152737  000377  001313                  NOP                     ;***
003166  000240                                  TYPE    ,65$            ;;TYPE ASCIZ STRING
003170  104401  003176                          BR      64$             ;;GET OVER THE ASCIZ
003174  000406                          ;;65$:  .ASCIZ  <15><12>/DRIVE # =/
                                        64$:
003212                                          RDCHR                   ;READ A CHARACTER
003212  104407                                  MOV     (SP)+,@#KYTEMP  ;PICK UP THE RESPONSE
003214  012637  001330                          TYPE    ,KYTEMP         ;ECHO
003220  104401  001330                          SUB     #60,@#KYTEMP    ;MAKE IT A NUMBER
003224  162737  000060  001330                  BMI     BADINP          ;IF NOT A NUMBER, BRANCH
003232  100420                                  CMP     #10,@#KYTEMP    ;IS IT A LEGAL #?
003234  022737  000010  001330                  BLE     BADINP          ;IF NO BRANCH
003242  003414                                  SWAB    @#KYTEMP        ;GET THE DRIVE # TO THE HIGH BYTE
003244  000337  001330                          BIS     #BIT14,@#KYTEMP ;SET THE SECOND SYSTEM BIT
003250  052737  040000  001330                  MOVB    @#DRCNT1,R5     ;GET THE DRIVE COUNT
003256  113705  001311                          ROL     R5              ;MAKE IT AN INDEX
003262  006105                                  MOV     @#KYTEMP,LOCA(R5) ;STORE THE SYSTEM #2 WORD
003264  013765  001330  001166                  BR      GO              ;GO DO THE TEST
003272  000407
003274                                  BADINP:
003274  104401  003302                          TYPE    ,65$            ;;TYPE ASCIZ STRING
003300  000401                                  BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  /?/
003304                                  64$:
003304  000725                                  BR      PRO2            ;GO BACK ASK AGAIN
003306  105037  001313                  PRO1:   CLRB    @#PRONUM        ;CLEAR THE FLAG ONE PROCESSOR

                                        ;THIS IS THE ACTUAL PROGRAM

003312  012700  001166                  GO:     MOV     #LOCA,R0        ;GET THE TABLE ADDRESS TO R0
003316  105037  001324                          CLRB    @#INDEX         ;CLRB THE INDEX
003322  000405                                  BR      GO2             ;BRANCH AROUND INCREMENT ROUTINE

003324  062700  000002                  GO1:    ADD     #2,R0           ;INDEX THRU THE TABLE
003330  022700  001206                          CMP     #DRV0,R0        ;DONE?
003334  001414                                  BEQ     EXIT            ;IF YES GET OUT
003336  005710                          GO2:    TST     (R0)            ;IS THE DRIVE ACTIVE
003340  100001                                  BPL     GO3             ;IF YES BRANCH
003342  000770                                  BR      GO1             ;NO TRY THE NEXT ONE
003344  011037  001164                  GO3:    MOV     (R0),@#DRACTV   ;PICK UP THE ACTIVE DRIVE WORD
003350  004737  004174                          JSR     PC,CYCLE        ;CALL CYCLE (PICK UP DRIVE #, CYL BASE, AND CALL MOUNT)
003354  004737  005104                          JSR     PC,WRLINK       ;CALL WRITE LINK TO LOAD REGISTERS FOR WRITE
003360  004737  005632                          JSR     PC,RDLINK       ;CALL READ LINK TO LOAD REGISTERS FOR READ
```

```
                                EXIT:   MOV     #LOGA,R0
                                EXTFR2: CMP     #DRVD,R0
                                        BEQ     EXITX
                                        BIT     #BIT14,(R0)
                                        BNE     EXITX
                                        TST     (R0)+
                                        BMI     EXTFR2
                                        MOV     -(R0),R1
                                        JSR     PC,DO2
                                        JSR     PC,RDLINK
                                        TST     (R0)+
                                        BR      EXTFR2
                                EXITX:
003430  104401  003436                  TYPE    ,65$                    ;;TYPE ASCIZ STRING
003434  000404                          BR      64$                     ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/DONE!/
003446                          64$:
003446  000137  001440                  JMP     @#START                 ;RESTART

                                ;THIS IS PROCESSOR #2 CODE. THIS ROUTINE ASKS FOR AND UNPACKS THE CONTROL
                                ;WORDS FROM THE FIRST PROCESSOR.

003452                          SECOND.
003452  104401  003460                  TYPE    ,65$                    ;;TYPE ASCIZ STRING
003456  000415                          BR      64$                     ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/COMPATIBILITY-SYSTEM#2/
003512                          64$:
003512  012704  000200                  MOV     #200,R4                 ;SET UP MASK BIT IN R4
003516  012703  000001                  MOV     #1,R3                   ;SET UP WORD COUNTER IN R3
003522  012702  001166                  MOV     #LOGA,R2                ;GET THE TABLE ADDRESS
003526                          INSYS2:
003526  104401  003534                  TYPE    ,65$                    ;;TYPE ASCIZ STRING
003532  000405                          BR      64$                     ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/WORD /
003546                          64$:
003546  000240                          NOP                             ;***
003550  010346                          MOV     R3,-(SP)                ;GET READY TO TYPE WORD COUNTER
003552  104403                          TYPOS
003554     006                          .BYTE   6
003555     000                          .BYTE   0
003556  104401  003564                  TYPE    ,67$                    ;;TYPE ASCIZ STRING
003562  000401                          BR      66$                     ;;GET OVER THE ASCIZ
                                ;;67$:  .ASCIZ  /=/
003566                          66$:
003566  104411                          RDOCT
003570  012600                          MOV     (SP)+,R0                ;PICK UP THE OCTAL WORD
003572  110001                          MOVB    R0,R1                   ;GET THE FIRST DRIVE TO R1
003574  000300                          SWAB    R0                      ;GET THE SECOND DRIVE TO R0 LOW BYTE
003576  042700  177400                  BIC     #177400,R0              ;CLEAR THE UNUSED BITS
003602  042701  177400                  BIC     #177400,R1              ;CLEAR THE UNUSED BITS
003606  006000                          ROR     R0                      ;ROTATE RIGHT R0
003610  103003                          BCC     2$                      ;IF CARRY IS CLEAR BRANCH
003612  052700  000200                  BIS     #BIT7,R0                ;SET DOWN BIT IF CARRY SET
003616  000241                          CLC                             ;AND CLEAR THE CARRY BIT
003620  006001                  2$:     ROR     R1                      ;NOW DO THE SAME FOR R1
```

```
                                                BIS     #BIT7,R1        ;IF ERROR SET THE BIT
                                        3$:     MOVB    R1,1(R2)        ;SET DRIVE FIRST IN TABLE
                                                JSR     PC,MASKER       ;CALL THE MASK CONTROL SUBROUTINE
                                                MOVB    R0,1(R2)        ;SET DRIVE SECOND IN TABLE (NEXT WORD)
                                                JSR     PC,MASKER       ;CALL THE MASK CONTROL SUBROUTINE
                                                INC     R3              ;INCREMENT THE WORD COUNTER
                                                BR      INSYS2          ;GO BACK AND GET NEXT WORD
                                        EXITA:  BIS     R4,(R2)         ;FILL THE TABLE (LAST WORD)
                                                ROR     R4              ;WITH ALL BITS SET
                                                BCC     EXITA           ;GO BACK IF NOT DONE
                                        EXITB:  BIC     #174000,(R2)    ;CLEAR DOWN AND SECOND SYSTEM BITS AT TABLE
                                                MOV     R2,R0           ;GET ADDRESS TO R0 (CURRENT TABLE)
                                                TST     (R2)+           ;ADD 2 TO THE POINTER
                                        FIL.DN: CMP     #DRV0,R2        ;TABLE FULL?
                                                BEQ     2$              ;IF YES BRANCH
                                                MOV     #BIT15,(R2)+    ;FILL THE TABLE
                                                BR      FIL.DN          ;GO BACK TRY AGAIN
                                        2$:     MOV     (R0),R1         ;GET THE WORD TO R1
                                                MOVB    R1,R2
                                                JSR     PC,MASK
                                                JSR     PC,DO2          ;FORM DRIVE # FOR MOUNT
                                                JSR     PC,WRLINK       ;WRITE NEW INFO
                                                JSR     PC,RDLINK       ;READ SAMPLE (ALL DRIVES)
                                                TYPE    ,65$            ;;TYPE ASCIZ STRING
                                                BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <15><12>/DONE SYSTEM 2 RESTART SYSTEM 1, TYPE WORD /
                                        64$:
                                                MOV     (R0),-(SP)      ;GET WORD FOR SYSTEM 1 AND TYPE
                                                TYPOS
                                                .BYTE   6
                                                .BYTE   1
                                        1$:     HALT                    ;HALT (FINISHED SYSTEM #2)
                                                BR      1$              ;GO BACK TO HALT

                                        ;THIS ROUTINE SETS UP THE MASK BITS IN THE LOG TABLE FOR
                                        ;SYSTEM #2.  IF A DRIVE IS DOWN NO BIT IS SET BUT THE MASK
                                        ;IS SHIFTED.

                                        MASKER: TST     (R2)            ;IS THE DRIVE UP
                                                BMI     RETRN4          ;IF NO, BRANCH
                                                MOVB    R4,(R2)         ;MOVE THE MASK BIT IN THE TABLE
                                        RETRN4: ROR     R4              ;ROTATE THE MASK
                                                BCC     1$              ;DONE?, IF NO BRANCH
                                                MOV     #EXITB,(SP)     ;SET UP FOR RETURN
                                                RTS     PC
                                        1$:     BIT     #BIT14,(R2)     ;IS THIS SYSTEM # 2'S DRIVE?
                                                BEQ     2$              ;IF NO, BRANCH
                                                MOV     #EXITA,(SP)     ;SET UP FOR RETURN
                                                RTS     PC
                                        2$:     ADD     #2,R2           ;INDEX THRU LOGA TABLE
                                                RTS     PC              ;RETURN

                                        ;ROUTINE TO BUILD THE ACTIVE LOGICAL UNIT TABLE

                                        STORE:  CMP     #10,@#KYTEMP    ;IS INPUT A LEGAL NUMBER?
```

```
                                        BLE     ILEGAL          ;IF NOT BRANCH
004102  003417
                                        SWAB    @#KYTEMP        ;ALIGN DRIVE # FOR TABLE
004104  000337  001330
                                        MOV     @#KYTEMP,(R1)+  ;PUT THE WORD IN THE TABLE
004110  013721  001330
                                        CLR     @#KYTEMP        ;CLEAR THE TEMP WORD
004114  005037  001330
                                        INCB    @#DRCNT1        ;INCREMENT THE COUNTER
004120  105237  001311
                                        CMP     #DRV0,R1        ;IS THE TABLE FULL?
004124  022701  001206
                                        BEQ     TBLFUL          ;IF YES BRANCH
004130  001401
                                        RTS     PC              ;IF NO RETURN
004132  000207
                        TBLFUL:         MOV     #SECSYS,(SP)    ;IF TABLE FULL SET UP FOR SYSTEM #2
004134  012716  003050
                                        RTS     PC              ;RETURN
004140  000207
                        ILEGAL:         MOV     #AUTSL2,(SP)    ;IF ILLEGAL RESPONSE, GO BACK
004142  012716  002644
                                        TYPE    ,65$            ;;TYPE ASCIZ STRING
004146  104401  004154
                                        BR      64$             ;;GET OVER THE ASCIZ
004152  000407
                        ;;65$:          .ASCIZ  /ILLEGAL INPUT/
004172
                        64$:
                                        RTS     PC              ;RETURN
004172  000207

                                        ;THIS ROUTINE GETS A DRIVE # AND BUILDS A TABLE OF
                                        ;CYLINDER ADDRESS FOR USE BY WRITE. (R0)=ADDRESS OF ACTIVE
                                        ;WORD IN LOGICAL TABLE. IT ALSO SETS AND CLEARS THE MASK BITS
                                        ;OF THE TABLE AS OPERATIONS INDICATE

004174  011001                  CYCLE:  MOV     (R0),R1         ;GET THE LOGICAL UNIT ACTIVE WORD TO R1
004176  032701  040000                  BIT     #BIT14,R1       ;IS IT ON SYSTEM #2
004202  001402                          BEQ     CYCL2           ;IF NO BRANCH
004204  000137  006752                  JMP     @#SECONE        ;GO TO SYSTEM #2
004210  113703  001324          CYCL2:  MOVB    @#IDEX,R3       ;GET THE INDEX VALUE
004214  116302  001256                  MOVB    MSKTBL(R3),R2   ;GET THE MASK TO R2
004220  004737  005234          CYCLE2: JSR     PC,MASK         ;CALL THE MASK SUBROUTINE
004224  012703  001166          LDFLG:  MOV     #LOGA,R3        ;GET TABLE ADDRESS TO R3
004230  020003                  2$:     CMP     R0,R3           ;IS ACTIVE ADDRESS=TO FIRST ADDRESS
004232  001002                          BNE     3$              ;IF NO BRANCH
004234  050223                          BIS     R2,(R3)+        ;IF YES SET BITS TO SHOW WRITE
004236  000401                          BR      4$              ;BRANCH TO SEE IF DONE
004240  040223                  3$:     BIC     R2,(R3)+        ;CLEAR BITS TO SHOW OVER-WRITE
004242  022703  001206          4$:     CMP     #DRV0,R3        ;DONE
004246  001370                          BNE     2$              ;IF NO GO BACK
004250  000301                  DO2:    SWAB    R1              ;GET DRIVE # TO LOW BYTE
004252  000240                          NOP                     ;***
004254  110102                          MOVB    R1,R2           ;GET IT TO R2
004256  042702  000370                  BIC     #370,R2         ;CLEAR THE UNUSED BITS
004262  110237  001314                  MOVB    R2,@#DRIVE      ;GET THE DRIVE #
004266  006102                          ROL     R2              ;SHIFT THE DRIVE # TO
004270  006102                          ROL     R2              ;ALIGN IT FOR THE DRIVE ADDR.
004272  006102                          ROL     R2              ;KEEP IT MOVING!
004274  006102                          ROL     R2              ;A LITTLE MORE!
004276  006102                          ROL     R2              ;THERE IT IS
004300  110237  001353                  MOVB    R2,@#DSKTMP+1
004304  110237  001335                  MOVB    R2,@#DSKADR+1   ;GET IT TO DISK ADDR. TEMP.
004310  004737  004316                  JSR     PC,MOUNT        ;CALL MOUNT
004314  000207                          RTS     PC              ;RETURN

004316  105237  001324          MOUNT:  INCB    @#IDEX          ;INCREMENT THE INDEX
004322  000240                          NOP                     ;***
004324  112737  000005  001321          MOVB    #5,@#ECNT       ;SET ERROR CNTR TO 5
```

```
                                                TYPE    ,65$            ;;TYPE ASCIZ STRING
                                                BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <15><12>/MOUNT PACK ON DRIVE #/
                                        64$:
                                                MOV     DRIVE,-(SP)     ;;SAVE DRIVE FOR TYPEOUT
                                                TYPOS                   ;;GO TYPE--OCTAL ASCII
                                                .BYTE   1               ;;TYPE 1 DIGIT(S)
                                                .BYTE   0               ;;SUPPRESS LEADING ZEROS
                                                TYPE    ,67$            ;;TYPE ASCIZ STRING
                                                BR      66$             ;;GET OVER THE ASCIZ
                                        ;;67$:  .ASCIZ  <15><12>/MAKE PACK WRITE ENABLE/
                                        66$:
                                                TYPE    ,69$            ;;TYPE ASCIZ STRING
                                                BR      68$             ;;GET OVER THE ASCIZ
                                        ;;69$:  .ASCIZ  <15><12>/PRESS CONTINUE WHEN DRIVE RDY/
                                        68$:
                                                HALT
                                                JSR     PC,INITIL       ;CALL INITIALIZER
                                                RTS     PC              ;RETURN

                                        ;THIS ROUTINE INITIALIZES A DRIVE AND INSURES THAT IT IS READY AND
                                        ;WRITE ENABLED, IT IS ENTERED FROM MOUNT OR FROM EXECUTE IF OPERATION FAILS

                                        INITIL: MOV     R0,-(SP)        ;SAVE R0
                                                MOV     @#DSKADR,R0     ;GET THE DRIVE # TO R0
                                                BIC     #1777,R0        ;CLEAR THE UNUSED BITS
                                        INIT2:  CLR     @#TIMR          ;CLEAR THE TIMER
                                                CLRB    @#TIMR2
                                                NOP                     ;***
                                                MOV     R0,@RKDA        ;GET DRIVE # TO 'DA' REGISTER
                                                MOV     #1,@RKCS        ;ISSUE CONTROL RESET + GO
                                                JSR     PC,SMTME
                                        1$:     TSTB    @RKCS           ;DID CONTROL READY SET
                                                BMI     2$              ;IF YES BRANCH
                                                INC     @#TIMR          ;IF NO INCREMENT THE TIMER
                                                BNE     1$              ;IF TIMER NOT ZERO BRANCH
                                                TYPE    ,65$            ;;TYPE ASCIZ STRING
                                                BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <15><12>/CONTROL RESET TIME OUT/
                                        64$:
                                        2$:     MOV     R0,@RKDA        ;DRIVE NUMBER TO 'DA' REG.
                                                TSTB    @RKDS           ;IS DRIVE READY
                                                BMI     3$              ;IF YES BRANCH
                                                TYPE    ,67$            ;;TYPE ASCIZ STRING
                                                BR      66$             ;;GET OVER THE ASCIZ
                                        ;;67$:  .ASCIZ  <15><12>/DRIVE NOT READY/
                                        66$:
                                                BR      INIT2           ;GO BACK TRY AGAIN
                                        3$:     BIT     #BIT5,@RKDS     ;IS DRIVE WRITE LOCKED?
                                                BEQ     4$              ;IF NO, BRANCH
                                                TYPE    ,69$            ;;TYPE ASCIZ STRING
                                                BR      68$             ;;GET OVER THE ASCIZ
                                        ;;69$:  .ASCIZ  <15><12>/DRIVE WRITE PROTECTED/
                                        68$:
                                                BR      INIT2           ;YES, GO BACK TRY AGAIN
```

```
                                        MOV     R0,@RKDA        ;GET THE DRIVE # TO 'DA' REGISTER
                                        MOV     #15,@RKCS       ;ISSUE DRIVE RESET + GO
                                        JSR     PC,$MTME
                                5$:     TSTB    @RKCS
                                        BPL     5$
                                        BIT     #100,@RKDS      ;READ/WRITE/SEEK READY BIT SET?
                                        BNE     6$              ;IF YES, BRANCH
                                        INC     @#TIMR          ;NO, INCREMENT THE TIMER
                                        BNE     5$              ;GO BACK AND CHECK IF TIMER NOT 0
                                        TSTB    @#TIMR2
                                        BNE     7$
                                        INCB    @#TIMR2
                                        BR      5$
                                7$:
                                        TYPE    ,71$            ;;TYPE ASCIZ STRING
                                        BR      70$             ;;GET OVER THE ASCIZ
                                ;71$:   .ASCIZ  <15><12>/DRIVE RESET TIMED OUT/
                                70$:
                                        BR      4$              ;GO BACK, TRY AGAIN
                                6$:     MOV     (SP)+,R0        ;RESTORE R0
                                        RTS     PC              ;RETURN TO CALLER

                                ;THIS ROUTINE TAKES CARE OF ALL LINKAGES FOR THE
                                ;EXECUTE ROUTINE.  IT FORMS THE ADDRESS AND SETS UP ALL THE
                                ;REGISTERS FOR THE WRITE OPERATION

                                WRLINK: CLRB    @#COMND         ;INDICATE WRITE OPERATION
                                        NOP                     ;***
                                        MOVB    @#DRIVE,R1      ;PICK UP THE DRIVE #
                                        ROL     R1              ;MAKE IT A WORD INDEX
                                1$:     MOV     DRVD(R1),@#PATTRN ;PICK UP THE DATA PATTERN
                                        JSR     PC,CYLADR       ;CALL CYLINDER ADDRESS
                                        BR      2$              ;RETURN HERE IF NOT LAST BASE
                                        RTS     PC              ;RETURN HERE IF LAST BASE
                                2$:     MOV     #PATTRN,@#BUSADR ;GET THE ADDRESS OF THE OUTPUT
                                        MOV     @#CYLCNT,@#WRDCNT ;GET THE WORD COUNT
                                        MOV     @#WRITCS,@#CONTRL ;GET THE CONTROL + STATUS WORD
                                        JSR     PC,EXECUT       ;CALL EXECUTE
                                        BIT     #BIT4,@#DSKADR  ;WAS THIS WRITE SURFACE "1"?
                                        BNE     3$              ;IF YES BRANCH
                                        BIS     #BIT4,@#DSKADR  ;SET SURFACE ONE BIT
                                        COMB    @#PATTRN        ;MAKE IT SURFACE ONE DATA
                                        BR      2$              ;RELOAD REGISTERS AND EXECUTE
                                3$:     BIC     #BIT4,@#DSKADR  ;SET UP FOR SURFACE "0"
                                        COMB    @#PATTRN        ;MAKE IT SURFACE 0 DATA
                                        INC     R2              ;INC. THRU SELECTED CYL. OFFSET TABLE
                                        JSR     PC,CYLOFF       ;GET THE CYLINDER VALUE
                                        BR      2$              ;RETURN HERE IF MORE TO READ
                                        RTS     PC              ;RETURN HERE IF FINISHED

                                ;THIS ROUTINE EXPECTS TO FIND A MASK IN R2, AND FROM THIS MASK
                                ;BUILDS A TABLE (AT CYLTBL) OF CYLINDER ADDRESS OFFSETS; THE TABLE
                                ;IS TERMINATED BY A #377

                                MASK:   MOV     R5,-(SP)        ;SAVE R5
```

```
                                        NOP                     ;***
005242  000240                          MOV     #200,R3         ;SET UP THE COMPARE MASK
005244  012703  000200                  CLR     R4              ;CLR THE INDEX COUNTER
005250  005004                          MOV     #CYLTBL,R5      ;GET THE CYLINDER TABLE ADDRESS
005252  012705  001274                  BIT     R2,R3           ;IS THE MASK BIT SELECTED IN BASE
005256  030203                  1$:     BEQ     2$              ;IF NO BRANCH
005260  001401                          MOVB    R4,(R5)+        ;MOVE THE CYLINDER BASE TO THE TABLE
005262  110425                  2$:     INCB    R4              ;INCREMENT THE BASE
005264  105204                          ROR     R3              ;ROTATE THE COMPARE MASK
005266  006003                          BCC     1$              ;IF NOT DONE GO BACK
005270  103372                          MOVB    #377,(R5)       ;IF DONE LOAD FINISH FLAG
005272  112715  000377                  MOV     (SP)+,R5        ;RESTORE R5
005276  012605                          RTS     PC              ;RETURN TO CALLER
005300  000207

                                ;THIS ROUTINE FORMS A CYLINDER ADDRESS FOR BOTH THE READ AND WRITE ROUTINES
                                ;WHEN THE BASE TABLE IS FULLY INDEXED IT RETURNS TO PC+2 OF CALLER

005302  012703  001266          CYLADR: MOV     #BASE,R3        ;GET THE CYLINDER TABLE ADDRESS
005306  012702  001274          CYLAD2: MOV     #CYLTBL,R2      ;GET THE SELECTED CYL BASE ADDR.
005312  111204                  CYLOFF: MOVB    (R2),R4         ;GET THE SELECTED CYL VALUE TO R4
005314  000240                          NOP                     ;***
005316  122704  000377                  CMPB    #377,R4         ;IS IT THE TABLE TERMINATOR?
005322  001416                          BEQ     BASINC          ;IF YES BRANCH
005324  005046                          CLR     -(SP)           ;INSURE CLEAN WORD
005326  111316                          MOVB    (R3),(SP)       ;GET THE CYL ADDRESS ON THE STACK
005330  062604                          ADD     (SP)+,R4        ;AND IT TO THE SELECTED OFFSET
005332  006104                          ROL     R4              ;SHIFT THIS RESULT
005334  006104                          ROL     R4              ;TO ALIGN THE NEWLY FORMED
005336  006104                          ROL     R4              ;CYLINDER ADDRESS WITH BITS
005340  006104                          ROL     R4              ;5 THRU 12 OF RKDA AND
005342  006104                          ROL     R4              ;STORE THIS IN DSKADR
005344  042737  017777  001334          BIC     #017777,@#DSKADR;CLEAR ALL BUT DRIVE NUMBER
005352  050437  001334                  BIS     R4,@#DSKADR     ;PUT IT IN DSKADR
005356  000207                          RTS     PC
005360  005203                  BASINC: INC     R3              ;PICK UP ADDRESS OF NEXT BASE CYL.
005362  000240                          NOP                     ;***
005364  022703  001274                  CMP     #CYLTBL,R3      ;ARE YOU FINISHED?
005370  001401                          BEQ     RETRN3          ;IF YES, BRANCH
005372  000745                          BR      CYLAD2          ;NO GO BACK
005374  062716  000002          RETRN3: ADD     #2,(SP)         ;SET-UP FOR PC+2
005400  000207                          RTS     PC              ;RETURN

                                ;ROUTINE TO PERFORM INDICATED FUNCTION AND CHECK FOR
                                ;DONE AND ERRORS

005402  005037  001346          EXECUT: CLR     @#TIMR          ;CLEAR THE TIMER
005406  000240                          NOP                     ;HALT HERE TO CHECK COMMAND ABOUT TO BE EXECUTED
005410  105037  001323                  CLRB    @#TIMR2         ;CLEAR SECOND TIMER
005414  013777  001334  173754          MOV     @#DSKADR,@RKDA  ;LOAD THE DISK ADDRESS REGISTER
005422  013777  001336  173744          MOV     @#BUSADR,@RKBA  ;LOAD THE BUS ADDRESS REGISTER
005430  013777  001340  173734          MOV     @#WRDCNT,@RKWC  ;LOAD THE WORD COUNT REGISTER
005436  013777  001332  173724          MOV     @#CONTRL,@RKCS  ;LOAD THE CONTROL REGISTER
005444  004737  005614                  JSR     PC,SMTME        ;KILL TIME FOR RK11-C
005450  105777  173714          CHECK1: TSTB    @RKCS           ;IS CONTROL READY SET
005454  100011                          BPL     TIME            ;IF NO BRANCH
```

```
                                        TST     @#ERRFLG        ;ERROR?
                                        BEQ     1$              ;IF NO BRANCH
                                        CLR     @#ERRFLG        ;CLEAR THE FLAG
                                        BR      EXECUT          ;TRY AGAIN
                                1$:     RTS     PC
                                TIME:   INC     @#TIMR
                                        NOP                     ;***
                                        BNE     CHECK1
                                        TSTB    @#TIMR2         ;SECOND TIMEOUT?
                                        BNE     1$              ;IF YES BRANCH
                                        INCB    @#TIMR2         ;INDICATE SECOND TIMEOUT
                                        BR      CHECK1          ;GO BACK
                                1$:     JSR     PC,INITIL
                                        TYPE    ,65$            ;;TYPE ASCIZ STRING
                                        BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/TIMED OUT ON OPERATION RETRY IN PROGRESS/
                                64$:
                                        BR      EXECUT
                                SMTME:  MOV     #500,@#TIMR
                                1$:     DEC     @#TIMR
                                        BNE     1$
                                        RTS     PC

                                ;THIS ROUTINE CHECKS TO SEE IF A DRIVE IS ACTIVE FROM A
                                ;WRITE OPERATION. IT GETS THE READ MASK TO R3, AND THE
                                ;EXPECTED DATA PATTERN TO "PATTERN", AND THEN CALLS ADDRESS
                                ;CONTROL.

                                RDLINK: MOV     R0,-(SP)        ;SAVE R0
                                        NOP                     ;***
                                        BISB    #377,@#COMND    ;INDICATE READ OPERATION
                                        MOV     #LOGA,R1        ;GET THE TABLE ADDRESS TO R1
                                        MOV     #SECTBL,R5      ;GET THE SECTOR TABLE ADDRESS
                                        BR      RD2             ;SKIP OVER THE INDEX, FIRST PASS
                                RD1:    ADD     #2,R1           ;ADD 2 TO THE ADDRESS
                                        CMP     #DRV0,R1        ;ARE YOU THRU THE ENTIRE TABLE
                                        BEQ     EXIT2           ;IF YES EXIT
                                RD2:    TST     (R1)            ;IS THE DRIVE ACTIVE
                                        BPL     RD3             ;IF YES BRANCH
                                        BR      RD1             ;IF NO GET NEXT WORD
                                RD3:    MOV     (R1),R0         ;GET THE ACTIVE WORD TO R0
                                        MOV     R0,R2           ;COPY THE WORD
                                        SWAB    R0              ;GET THE DRIVE # TO THE LOW BYTE
                                        BIC     #177770,R0      ;CLR ALL BUT THE DRIVE #
                                        MOVB    R0,@#WRTNBY     ;SAVE THE DRIVE #
                                        ROL     R0              ;MAKE IT AN INDEX
                                        MOV     DRV0(R0),@#PATTRN ;PICK UP THE DATA PATTERN
                                        JSR     PC,MASK         ;CALL THE MASK SUBROUTINE
                                        JSR     PC,CYLADR       ;GO FORM A CYLINDER ADDRESS
                                        BR      RD4             ;RETURN HERE IF NOT LAST BASE ADDR.
                                        BR      RD1             ;IF LAST BASE ADDRESS, RETURN HERE
                                RD4:    BIS     @#DSKTMP,@#DSKADR ;SET THE DRIVE # BITS IN DISK ADDR.
                                RD5:    BISB    (R5)+,@#DSKADR  ;SET THE SECTOR BITS IN DISK ADDR.
                                RD6:    MOV     #RDBUFF,@#BUSADR ;GET THE BUFFER ADDR.
                                        NOP                     ;***
```

```
                                                MOV     @#READCS,@#CONTRL ;GET THE READ CONTROL WORD
                                                JSR     PC,EXECUT         ;DO THE READ
                                                JSR     PC,RDCHK          ;CHECK THE DATA
                                                BIC     #17,@#DSKADR      ;CLR THE SECTOR BITS IN DISK ADDR.
                                                CMP     @#RCNT1,R5        ;WAS THIS THE LAST SECTOR?
                                                BNE     RD5               ;IF NO GO BACK
                                                MOV     #SECTBL,R5        ;IF YES RESET SECTOR POINTER
                                                BIT     #BIT4,@#DSKADR    ;WAS IT SURFACE "1" THAT WAS READ?
                                                BNE     RD7               ;IF YES, BRANCH
                                                BIS     #BIT4,@#DSKADR    ;NO, SET SURFACE "1" BIT
                                                COMB    @#PATTRN          ;MAKE HEAD "1" PATTERN
                                                BR      RD5               ;GO BACK AND EXECUTE
                                RD7:            BIC     #BIT4,@#DSKADR    ;CLEAR THE SURFACE BIT
                                                COMB    @#PATTRN          ;MAKE IT SURFACE 0 DATA
                                                INC     R2                ;INCREMENT THE SELECTED CYL TABLE POINTER
                                                JSR     PC,CYLOFF         ;GO FORM NEXT ADDRESS
                                                BR      RD4               ;IF HERE IT IS NOT THE LAST BASE ADDR
                                                BR      RD1               ;IF HERE GET NEXT WORD-DRIVE FINISHED

                                EXIT2:          MOV     (SP)+,R0          ;RESTORE R0
                                                RTS     PC                ;RETURN TO MAIN LINE CODE


                                ;THE ERROR CHECK ROUTINE CHECKS IF AN ERROR OCCURRED
                                ;ON WRITING OR READING.

                                ERRCHK:         BIT     #140000,@RKCS     ;HARD ERROR OR ERROR SET?
                                                NOP                       ;HALT HERE TO EXAMINE ERROR REG.,ECT.
                                                BEQ     TSTSN1            ;IF NO, GO TEST 'SIN' BIT
                                                MOV     #1,@RKCS          ;IF YES, ISSUE CNTROL RESET + GO
                                                JSR     PC,SMTME
                                                MOV     #-1,@ERRFLG       ;FLAG AN ERROR (PREVENT UPDATE OF ADDR)
                                1$:             TSTB    @RKCS             ;CNTROL READY BIT SET (FROM CNTROL RESET)
                                                BPL     1$                ;IF NO WAIT,  (IF HUNG HERE RUN STATIC)
                                                DECB    @#ECNT            ;DECREMENT ERRVR COUNTER
                                                BNE     TSTSN1            ;HAVE ERROR BITS SET 5 TIMES?
                                                JMP     @#RESTRT          ;IF HERE 5 ERRORS HAVE OCCURRED
                                TSTSN1:         BIT     #1000,@RKDS       ;SEEK INCOMPLETE SET?
                                                NOP                       ;***
                                                BEQ     RETRN2            ;BRANCH IF NO
                                                MOV     #15,@RKCS         ;IF YES, ISSUE DRIVE RESET, GO
                                                MOV     #-1,@ERRFLG       ;FLAG AN ERROR (PREVENT UPDATE OF ADDR)
                                                JSR     PC,SMTME
                                2$:             TSTB    @RKCS
                                                BPL     2$
                                                BIT     #100,@RKDS        ;"R/W/S READY" BIT SET?
                                                BEQ     2$                ;IF NO WAIT! (IF HUNG HERE RUN STATIC)
                                                DECB    @#CNTSIN          ;DECREMENT SEEK INCOMPLETE COUNTER
                                                BNE     RETRN2            ;IF 3 'SIN' ERRORS FALL THROUGH
                                RESTRT:         TSTB    @#ECNT
                                                NOP                       ;***
                                                BEQ     1$
                                                TYPE    ,65$              ;;TYPE ASCIZ STRING
                                                BR      64$               ;;GET OVER THE ASCIZ
                                ;;65$:          .ASCIZ  <15><12>/3 'SIN' ERRORS OCCURRED/
                                64$:
```

```
                                1$:
006304                                  TYPE    ,67$            ;;TYPE ASCIZ STRING
006304  104401  006312                    BR      66$             ;;GET OVER THE ASCIZ
006310  000412                    ;;67$:  .ASCIZ  <15><12>/5 ERRORS OCCURRED/
                                66$:
006336                          2$:
006336                                  TYPE    ,69$            ;;TYPE ASCIZ STRING
006336  104401  006344                    BR      68$             ;;GET OVER THE ASCIZ
006342  000422                    ;;69$:  .ASCIZ  / DRIVE DECLARED DOWN!! NOT TESTED !/
                                68$:
006410                                  TSTB    @#COMND         ;TEST THE COMMAND
006410  105737  001316                  BPL     3$              ;IF WRITE, BRANCH
006414  100006                          ADD     #4,SP           ;POINT TO SAVE R0
006416  062706  000004                  MOV     (SP)+,R0        ;GET R0 BACK
006422  012600                          BIS     #BIT15,(R0)     ;SET THE DOWN BIT
006424  052710  100000                  RTS     PC              ;RETURN TO MAIN CODE
006430  000207                  3$:     BIS     #BIT15,(R0)     ;SET THE DOWN BIT
006432  052710  100000                  MOV     #STACK,SP       ;RESTORE THE STACK
006436  012706  001100                  JMP     @#G01
006442  000137  003324          RETRN2: RTS     PC
006446  000207

                                ;THIS ROUTINE CHECKS A SECTORS WORTH OF DATA ON A READ OPERATION
                                ;IT ALLOWS 5 ERROR PRINTOUTS PER SECTOR

006450  010446                  RDCHK:  MOV     R4,-(SP)        ;SAVE   R4
006452  010546                          MOV     R5,-(SP)        ;SAVE R5 FOR RDLINK
006454  105037  001320                  CLRB    @#HDRFLG        ;CLEAR THE PRINT HEADER FLAG
006460  000240                          NOP                     ;***
006462  012737  000005  001350          MOV     #5,@#CHKCNT     ;PUT ERROR COUNT IN CHECK COUNT
006470  012704  007356                  MOV     #RDBUFF,R4      ;GET THE TABLE ADDRESS TO R4
006474  013705  001362                  MOV     @#PATTRN,R5     ;GET THE EXPECTED DATA TO R5
006500  020524                  1$:     CMP     R5,(R4)+        ;ARE THEY THE SAME
006502  001515                          BEQ     3$              ;IF YES BRANCH
006504  105737  001320                  TSTB    @#HDRFLG        ;IS THE HEADER FLAG CLEAR
006510  001046                          BNE     2$              ;IF NO BRANCH
006512  104401  006520                  TYPE    ,65$            ;;TYPE ASCIZ STRING
006516  000420                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/ERROR! DATA WRITTEN BY DRIVE /
006560                          64$:
006560  152737  000377  001320          BISB    #377,@#HDRFLG   ;SET THE HEADER FLAG
006566  113746  001317                  MOVB    @#WRTNBY,-(SP)  ;PICK UP THE DRIVE # THAT WROTE
006572  104403                          TYPOS
006574     001                          .BYTE   1
006575     000                          .BYTE   0
006576  104401  006604                  TYPE    ,67$            ;;TYPE ASCIZ STRING
006602  000411                          BR      66$             ;;GET OVER THE ASCIZ
                                ;;67$:  .ASCIZ  / CANNOT BE READ./
006626                          66$:
006626                          2$:
006626  104401  006634                  TYPE    ,69$            ;;TYPE ASCIZ STRING
006632  000405                          BR      68$             ;;GET OVER THE ASCIZ
                                ;;69$:  .ASCIZ  <15><12>/  ADDR=/
006646                          68$:
006646  013746  001334                  MOV     @#DSKADR,-(SP)  ;PICK UP THE ADDRESS THAT FAILED
006652  104403                          TYPOS
```

```
1042  006655  001
1043  006656  104401  006664          .BYTE   1
1044  006662  000405                  TYPE    ,71$            ;;TYPE ASCIZ STRING
1045                                  BR      70$             ;;GET OVER THE ASCIZ
1046  006676                  ;;71$:  .ASCIZ  /  EXPCTD=/
1047  006676  010546          70$:
1048  006700  104404                  MOV     R5,-(SP)        ;PICK UP THE EXPECTED DATA (GOOD)
1049  006702  104401  006710          TYPON
1050  006706  000405                  TYPE    ,73$            ;;TYPE ASCIZ STRING
1051                                  BR      72$             ;;GET OVER THE ASCIZ
1052  006722                  ;;73$:  .ASCIZ  /  RECVD=/
1053  006722  016446  177776  72$:
1054  006726  104404                  MOV     -2(R4),-(SP)    ;PICK UP THE RECEIVED DATA (BAD)
1055  006730  005337  001350          TYPON
1056  006734  001403                  DEC     @#CHKCNT        ;DECREMENT THE CHECK COUNT
1057  006736  022704  010356          BEQ     4$              ;IF ZERO, BRANCH
1058  006742  001256          3$:     CMP     #MANSEL,R4      ;DONE ALL CHECKS?
1059  006744  012605                  BNE     1$              ;IF NO, GO BACK
1060  006746  012604          4$:     MOV     (SP)+,R5        ;RESTORE R5
1061  006750  000207                  MOV     (SP)+,R4        ;RESTORE R4
1062                                  RTS     PC              ;RETURN TO CALLER
1063
1064                          ;THIS ROUTINE BUILDS A TABLE OF PARAMETERS TO PASS TO THE SECOND SYSTEM
1065                          ;IT PACKS THE INFO FOR TWO DRIVES INTO ONE WORD
1066  006752  005003          SECONE: CLR     R3              ;CLEAR THE WORD COUNTER
1067  006754  000240                  NOP                     ;***
1068  006756  012702  001256          MOV     #MSKTBL,R2
1069  006762  005042          6$:     CLR     -(R2)
1070  006764  022702  001246          CMP     #PASTBL,R2
1071  006770  001374                  BNE     6$
1072  006772  012700  001166          MOV     #LOGA,R0        ;GET THE ACTIVE TABLE ADDRESS
1073  006776  012001          1$:     MOV     (R0)+,R1        ;PICK UP THE WORD
1074  007000  000301                  SWAB    R1              ;GET THE DRIVE # TO THE LOW BYTE
1075  007002  042701  177400          BIC     #177400,R1      ;CLEAR THE UNWANTED BITS
1076  007006  106101                  ROLB    R1              ;ROTATE THE BYTE, WAS DOWN SET?
1077  007010  103002                  BCC     2$              ;IF NO BRANCH
1078  007012  052701  000001          BIS     #BIT0,R1        ;SHOW THE DRIVE AS DOWN IN THE TABLE
1079  007016  105701          2$:     TSTB    R1              ;IS THIS THE SYSTEM #2 DRIVE?
1080  007020  100404                  BMI     3$              ;BRANCH IF YES
1081  007022  142701  000360          BICB    #360,R1         ;CLEAR THE UNUSED BITS
1082  007026  110122                  MOVB    R1,(R2)+        ;GET THIS # TO THE PASS TABLE
1083  007030  000762                  BR      1$              ;GET THE NEXT WORD FROM ACTIVE TABLE
1084  007032  110112          3$:     MOVB    R1,(R2)         ;GET THE LAST DRIVE TO THE PASS TABLE
1085  007034  012702  001246          MOV     #PASTBL,R2      ;RESTORE THE TABLE POINTER
1086  007040  104401  007046          TYPE    ,65$            ;;TYPE ASCIZ STRING
1087  007044  000425                  BR      64$             ;;GET OVER THE ASCIZ
1088                          ;;65$:  .ASCIZ  <15><12>/LOAD AND START ADDRESS 210 ON SYSTEM #2/
1089  007120                  64$:
1090  007120  104401  007126          TYPE    ,67$            ;;TYPE ASCIZ STRING
1091  007124  000424                  BR      66$             ;;GET OVER THE ASCIZ
1092                          ;;67$:  .ASCIZ  <15><12>/AND TYPE THE BELOW WHEN ASKED FOR IT./
1093  007176                  66$:
1094  007176  005203          4$:     INC     R3              ;INCREMENT THE WORD COUNTER
1095  007200  104401  007206          TYPE    ,69$            ;;TYPE ASCIZ STRING
1096  007204  000405                  BR      68$             ;;GET OVER THE ASCIZ
```

```
1098  007220
1099  007220  010346                    69$:
1100  007222  104403                            MOV     R3,-(SP)        ;GET THE WORD COUNT ON THE STACK
1101  007224     006                            TYPOS
1102  007225     000                            .BYTE   6
1103  007226  104401  007234                    .BYTE   0
1104  007232  000401                            TYPE    ,71$            ;;TYPE ASCIZ STRING
1105                                            BR      70$             ;;GET OVER THE ASCIZ
1106  007236                            ;;71$:  .ASCIZ  /=/
1107  007236  012246                    70$:
1108  007240  104403                            MOV     (R2)+,-(SP)     ;GET THE FIRST TO THE STACK
1109  007242     006                            TYPOS
1110  007243     001                            .BYTE   6
1111  007244  032762  100000  177776            .BYTE   1
1112  007252  001004                            BIT     #BIT15,-2(R2)   ;WAS THIS THE TABLE TERMINATOR
1113  007254  032762  000200  177776            BNE     5$              ;BRANCH IF YES
1114  007262  001745                            BIT     #BIT7,-2(R2)    ;TERMINATOR?
1115  007264  005740                            BEQ     4$              ;IF NO BRANCH
1116  007266  000000                    5$:     TST     -(R0)
1117                                            HALT
1118  007270                            RETFR2:
1119  007270  104401  007276                    TYPE    ,65$            ;;TYPE ASCIZ STRING
1120  007274  000404                            BR      64$             ;;GET OVER THE ASCIZ
1121                                    ;;65$:  .ASCIZ  <15><12>/WORD=/
1122  007306                            64$:
1123  007306  104411                            RDOCT
1124  007310  012602                            MOV     (SP)+,R2        ;GET THE WORD FROM SYSTEM 2 TO TABLE
1125  007312  042702  177400                    BIC     #177400,R2
1126  007316  012704  001166                    MOV     #LOGA,R4        ;SET POINTER LOOK FOR FIRST "UP" DRIVE
1127  007322  005724                    1$:     TST     (R4)+           ;DRIVE UP?
1128  007324  100776                            BMI     1$              ;IF NO BRANCH
1129  007326  010437  001100                    MOV     R4,@#$PASS
1130  007332  014401                            MOV     -(R4),R1
1131  007334  000240                            NOP                     ;***
1132  007336  004737  004224                    JSR     PC,LDFLG        ;CALL DO2+
1133  007342  004737  005632                    JSR     PC,RDLINK       ;CALL READ CHECK
1134  007346  013700  001100                    MOV     @#$PASS,R0
1135  007352  000137  003372                    JMP     @#EXTFR2        ;GO TO END OF TEST
1136
1137  007356  000400            RDBUFF: .BLKW   400
1138
1139  010356  000240            MANSEL: NOP                             ;TABLE TERMINATOR
1140
1141
1142
1143
1144
1145  010360                            BADONE:
1146  010360  104401  010366                    TYPE    ,65$            ;;TYPE ASCIZ STRING
1147  010364  000401                            BR      64$             ;;GET OVER THE ASCIZ
1148                                    ;;65$:  .ASCIZ  /?/
1149  010370                            64$:
1150
1151
1152                                            .SBTTL  OSCILLATING SEEK ROUTINE
```

```
1154  010370                                SECT.2:
1155  010370  104401  010376                      TYPE    ,65$              ;;TYPE ASCIZ STRING
1156  010374  000416                        BR      64$               ;;GET OVER THE ASCIZ
1157                                  ;;65$:  .ASCIZ  <15><12>/OSCILLATING SEEK PACKAGE/
1158  010432                          64$:
1159
1160  010432  012700  020614                MOV     #DRIV0,R0         ;FIND OUT WHICH DRIVES ARE
1161  010436  005001                        CLR     R1                ;PRESENT AND PUT THE
1162  010440  010177  170732          1$:   MOV     R1,@RKDA          ;DRIVE #'S IN A TABLE STARTING
1163  010444  105777  170714                TSTB    @RKDS             ;AT 'DRIV0'. BITS 15-13 CONTAINS
1164  010450  100001                        BPL     2$                ;THE DRIVE #
1165  010452  010120                        MOV     R1,(R0)+
1166  010454  062701  020000          2$:   ADD     #20000,R1
1167  010460  001367                        BNE     1$
1168  010462  012710  177777                MOV     #-1,(R0)          ;SET THE TERMINATOR TO THE TABLE
1169
1170  010466  013702  001376          INIT.2: MOV   RKDA,R2
1171  010472  012777  000001  170670        MOV     #1,@RKCS          ;ISSUE CONTROL RESET + GO !
1172  010500  004737  005614                JSR     PC,$MTME
1173  010504  105777  170660          1$:   TSTB    @RKCS             ;DID CONTROL READY SET?
1174  010510  100375                        BPL     1$                ;IF NO WAIT! (IF HUNG RUN STATIC)
1175  010512  012700  020614                MOV     #DRIV0,R0
1176  010516  012077  170654          3$:   MOV     (R0)+,@RKDA
1177  010522  012777  000015  170640        MOV     #15,@RKCS         ;ISSUE DRIVE RESET + GO!
1178  010530  004737  005614                JSR     PC,$MTME
1179  010534  105777  170630          2$:   TSTB    @RKCS
1180  010540  100375                        BPL     2$
1181  010542  022710  177777                CMP     #-1,(R0)
1182  010546  001363                        BNE     3$
1183  010550  104401  010556                TYPE    ,65$              ;;TYPE ASCIZ STRING
1184  010554  000432                        BR      64$               ;;GET OVER THE ASCIZ
1185                                  ;;65$:  .ASCIZ  <15><12>/SET SW0 TO SW7 TO SELECT DRIVES FOR TEST AND CONT/
1186  010642                          64$:
1187  010642  104401  010650                TYPE    ,67$              ;;TYPE ASCIZ STRING
1188  010646  000426                        BR      66$               ;;GET OVER THE ASCIZ
1189                                  ;;67$:  .ASCIZ  <15><12>/RESET SW0 TO SW7 TO TEST ALL AVAIL DRIVES/
1190  010724                          66$:
1191  010724  022737  000176  001140  7$:   CMP     #SWREG,SWR        ;SOFTWARE SWITCH REGISTER IN USE ?
1192  010732  001002                        BNE     9$                ;BR IF NOT
1193  010734  104405                        GTSWR                     ;REQUEST NEW CONTENTS FOR SWITCH REG
1194  010736  000401                        BR      8$                ;CONTINUE
1195  010740  000000                9$:     HALT                      ;WAIT FOR OPERATOR TO ENTER NEW SWR VALUE
1196  010742  117704  170172          8$:   MOVB    @SWR,R4           ;SW0 TO SW7 TO R4
1197  010746  001413                        BEQ     4$                ;NONE SET, SO TEST ALL
1198  010750  012700  020614                MOV     #DRIV0,R0         ;TABLE TO STORE DRIVE ADDRS
1199  010754  005001                        CLR     R1                ;ADDR OF DRIVE
1200  010756  006004                6$:     ROR     R4                ;NEXT SWITCH TO CARRY
1201  010760  103001                        BCC     5$                ;SWITCH NOT SET
1202  010762  010120                        MOV     R1,(R0)+          ;SWITCH SET, SO MOVE ADDR TO TABLE
1203  010764  062701  020000          5$:   ADD     #20000,R1         ;ADDR OF NEXT DRIVE
1204  010770  001372                        BNE     6$                ;ALL DONE WHEN ZERO
1205  010772  012720  177777                MOV     #-1,(R0)+         ;TABLE TERMINATOR
1206  010776  105737  001326          4$:   TSTB    OSPFLG            ;TYPED ONCE?
1207  011002  001165                        BNE     RWSRDY            ;IF YES, DONT RETYPE
1208  011004  104401  011012                TYPE    ,69$              ;;TYPE ASCIZ STRING
```

```
1210                                        ;;69$:  .ASCIZ  <15><12>/TOGGLE THE "FIRST CYLINDER ADDRESS" (OUTER LIMIT)/
1211  011076                                68$:
1212  011076  104401  011104                      TYPE    ,71$            ;;TYPE ASCIZ STRING
1213  011102  000441                            BR      70$             ;;GET OVER THE ASCIZ
1214                                        ;;71$:  .ASCIZ  <15><12>/INTO THE LOW BYTE (BIT0-7) OF THE SWITCH REGISTER AND THE "LAST
1215  011206                                70$:
1216  011206  104401  011214                      TYPE    ,73$            ;;TYPE ASCIZ STRING
1217  011212  000430                            BR      72$             ;;GET OVER THE ASCIZ
1218                                        ;;73$:  .ASCIZ  <15><12>/CYLINDER ADDRESS" (INNER LIMIT) INTO THE HIGH/
1219  011274                                72$:
1220  011274  104401  011302                      TYPE    ,75$            ;;TYPE ASCIZ STRING
1221  011300  000424                            BR      74$             ;;GET OVER THE ASCIZ
1222                                        ;;75$:  .ASCIZ  <15><12>/       BYTE (BIT8-15), THEN PRESS CONTINUE./
1223  011352                                74$:
1224  011352  105237  001326                      INCB    OSPFLG
1225  011356  032777  000100  170000  RWSRDY:     BIT     #100,@RKDS      ;"READ/WRITE/SEEK READY" BIT SET?
1226  011364  001774                            BEQ     RWSRDY          ;IF NO WAIT! (IF HUNG RUN STATIC)
1227  011366  022737  000176  001140  TRYAGN:     CMP     #SWREG,SWR      ;SOFTWARE SWITCH REGISTER  IN USE ?
1228  011374  001002                            BNE     1$              ;BR IF NOT
1229  011376  104405                            GTSWR                   ;GET NEW CONTENTS
1230  011400  000401                            BR      CONTIN          ;CONTINUE
1231  011402  000000                      1$:   HALT
1232  011404  012777  000001  167756  CONTIN:   MOV     #1,@RKCS        ;CONTROL RESET
1233  011412  105777  167752                      TSTB    @RKCS
1234  011416  100375                            BPL     .-4
1235  011420  013705  001140                      MOV     SWR,R5          ;GET THE ADDRESS OF THE SWITCH REG. TO R5
1236  011424  112501                      1$:   MOVB    (R5)+,R1        ;GET A BYTE TO R1
1237  011426  042701  177400                      BIC     #177400,R1      ;CLEAR THE UNUSED BITS
1238  011432  022701  000312                      CMP     #312,R1         ;IS ADDRESS LEGAL?
1239  011436  100034                            BPL     2$              ;BRANCH IF YES
1240  011440  104401  011446                      TYPE    ,65$            ;;TYPE ASCIZ STRING
1241  011444  000430                            BR      64$             ;;GET OVER THE ASCIZ
1242                                        ;;65$:  .ASCIZ  <15><12>/INVALID ADDRESS IN SWITCH REGISTER TRY AGAIN/
1243  011526                                64$:
1244  011526  000717                            BR      TRYAGN          ;GO BACK FOR NEW PARAMETERS
1245  011530  006101                      2$:   ROL     R1              ;ROTATING THIS REGISTER
1246  011532  006101                            ROL     R1              ;MAKES THE BYTE FROM THE
1247  011534  006101                            ROL     R1              ;SWITCH REGISTER LINE UP
1248  011536  006101                            ROL     R1              ;WITH THE CYLINDER BITS OF
1249  011540  006101                            ROL     R1              ;THE RKDA REGISTER.
1250  011542  042701  160037                      BIC     #160037,R1      ;CLEAR THE UNUSED BITS
1251  011546  032705  000001                      BIT     #1,R5           ;IS THIS THE LOW BYTE?
1252  011552  001003                            BNE     3$              ;BRANCH IF YES
1253  011554  010137  001402                      MOV     R1,@#SEEKI      ;STORE THE INNER LIMIT OF THE SEEK
1254  011560  000403                            BR      SEKSET          ;START SEEKS
1255  011562  010137  001404                3$:   MOV     R1,@#SEEKO      ;STORE THE OUTER LIMIT OF THE SEEK
1256  011566  000716                            BR      1$              ;GO BACK AND GET HIGH BYTE.
1257
1258  011570  012703  000050  SEKSET:   MOV     #50,R3          ;GET THE NUMBER OF SEEK CYCLES TO R3
1259  011574  013704  001404            MOV     @#SEEKO,R4      ;ADD THE OUTER LIMIT CYLINDER ADDRESS
1260  011600  013705  001402            MOV     @#SEEKI,R5      ;ADD THE INNER LIMIT CYLINDER ADDRESS
1261
1262  011604  012700  020614  LDSEEK:   MOV     #DRIV0,R0       ;INITIALIZE POINTER
1263  011610  010477  167562  5$:       MOV     R4,@RKDA        ;GET INNER LIMIT CYL ADRES
1264  011614  052077  167556            BIS     (R0)+,@RKDA     ;SET DRIVE ADRES
```

```
1266  011626  004737  005614                    JSR     PC,SMTME
1267  011632  105777  167532          3$:       TSTB    @RKCS
1268  011636  100375                            BPL     3$
1269
1270  011640  022710  177777                    CMP     #-1,(R0)        ;ALL DRIVES DONE?
1271  011644  001361                            BNE     5$              ;NO
1272  011646  012700  020614                    MOV     #DRIV0,R0
1273  011652  012077  167520          6$:       MOV     (R0)+,@RKDA     ;ADRES THE DRIVE
1274  011656  032777  000100  167500  7$:       BIT     #RWS,@RKDS      ;SEEK DONE?
1275  011664  001774                            BEQ     7$              ;NO, WAIT
1276  011666  022710  177777                    CMP     #-1,(R0)        ;ALL DRIVES DONE?
1277  011672  001367                            BNE     6$              ;NO
1278
1279  011674  012700  020614                    MOV     #DRIV0,R0
1280  011700  010577  167472          8$:       MOV     R5,@RKDA        ;SET OUTER CYL ADRES
1281  011704  052077  167466                    BIS     (R0)+,@RKDA     ;SET DRIVE ADRES
1282  011710  012777  000011  167452            MOV     #11,@RKCS       ;ISSUE SEEK+GO! (FOR OUTER LIMIT)
1283  011716  004737  005614                    JSR     PC,SMTME
1284  011722  105777  167442          9$:       TSTB    @RKCS
1285  011726  100375                            BPL     9$
1286
1287  011730  022710  177777                    CMP     #-1,(R0)        ;ALL DONE?
1288  011734  001361                            BNE     8$              ;NO
1289
1290  011736  012700  020614                    MOV     #DRIV0,R0
1291  011742  012077  167430          10$:      MOV     (R0)+,@RKDA     ;SET DRIVE ADRES
1292  011746  032777  000100  167410  11$:      BIT     #RWS,@RKDS              ;SEEK DONE?
1293  011754  001774                            BEQ     11$
1294  011756  022710  177777                    CMP     #-1,(R0)        ;ALL DONE?
1295  011762  001367                            BNE     10$
1296  011764  005303                            DEC     R3              ;DONE 50 SEEK CYCLES (100 SEEKS)
1297  011766  001306                            BNE     LDSEEK          ;IF NO BRANCH (KEEP CYCLING)
1298  011770  000605                            BR      CONTIN          ;CHECK SWR FOR CHANGE AND CONTINUE
1299
1300
1301
1302
1303
1304                                            .SBTTL  FORMATTER-SURFACE VERIFIER
1305
1306  011772                          BAD.IN:
1307  011772  104401  012000                    TYPE    ,65$            ;;TYPE ASCIZ STRING
1308  011776  000401                            BR      64$             ;;GET OVER THE ASCIZ
1309                                  ;;65$:    .ASCIZ  /?/
1310  012002                          64$:
1311  012002                          SECT.1:
1312  012002  104401  012010                    TYPE    ,65$            ;;TYPE ASCIZ STRING
1313  012006  000441                            BR      64$             ;;GET OVER THE ASCIZ
1314                                  ;;65$:    .ASCIZ  <15><12>/FORMATTER-SURFACE VERIFIER,SET SW REG FOR DRV #'S. PRESS CONT./
1315  012112                          64$:
1316  012112  022737  000176  001140            CMP     #SWREG,SWR      ;SOFTWARE SWITCH REGISTER IN USE ?
1317  012120  001002                            BNE     1$              ;BR IF NOT
1318  012122  104405                            GTSWR                   ;GET SWITCH REGISTER VALUE
1319  012124  000401                            BR      2$              ;CONTINUE
1320  012126  000000                  1$:       HALT                    ;WAIT FOR 'CONTINUE'
```

```
1322  012136  005037  020446                  CLR     DRVCNT          ;CLEAR DRIVE COUNT
1323  012142  033777  020444  166770  S13:    BIT     SHFCNT,@SWR     ;IS THIS SW SET?
1324  012150  001011                          BNE     S10             ;YES FORMAT THIS DRIVE
1325  012152  006337  020444          S11:    ASL     SHFCNT
1326  012156  005237  020446                  INC     DRVCNT
1327  012162  022737  000010  020446          CMP     #10,DRVCNT      ;ALL DONE?
1328  012170  001561                          BEQ     GO1
1329  012172  000763                          BR      S13
1330  012174  013700  020446          S10:    MOV     DRVCNT,R0
1331  012200  104401  001161                  TYPE    ,$CRLF
1332  012204  104401  020450                  TYPE    ,EM1            ;TYPE 'DRIVE'
1333  012210  010046                          MOV     R0,-(SP)        ;TYPE DRIVE #
1334  012212  104402                          TYPOC
1335  012214  000300                          SWAB    R0
1336  012216  006100                          ROL     R0
1337  012220  006100                          ROL     R0
1338  012222  006100                          ROL     R0
1339  012224  006100                          ROL     R0
1340  012226  006100                          ROL     R0
1341  012230  010037  001352                  MOV     R0,@#DSKTMP
1342  012234  012737  000000  001422          MOV     #0,ERRWF
1343  012242  012737  000000  001424          MOV     #0,ERRRF        ;CLEAR OUT ERROR COUNTS.
1344  012250  012737  000000  001426          MOV     #0,ERRRFC
1345  012256  012737  000000  001430          MOV     #0,ERRWCH
1346  012264  012737  000000  001432          MOV     #0,ERRWCS
1347  012272  012737  177750  001416  S12:    MOV     #-24.,RWC       ;SET WORD COUNT FOR READ FORMAT.
1348  012300  012737  164000  001412          MOV     #-6144.,WC      ;SET UP WORD COUNT FOR WRITES.
1349  012306  012737  000000  001420          MOV     #0,EXTR         ;CLEAR EXTRA BIT FOR 12 SECTOR PACK.
1350  012314  012701  177772          COMMON: MOV     #-6.,R1         ;SET UP LOOP COUNT FOR THE CLEANER.
1351  012320  012777  014500  167050  COM:    MOV     #14500,@RKDA    ;SET UP FOR A SEEK TO 202.
1352  012326  053777  001352  167042          BIS     @#DSKTMP,@RKDA
1353  012334  105777  167030          1$:     TSTB    @RKCS           ;IS THE CONTROLER READY?
1354  012340  100375                          BPL     1$              ;NO SO WAIT.
1355  012342  012777  000011  167020          MOV     #11,@RKCS       ;DO THE SEEK.
1356  012350  032777  000100  167006  2$:     BIT     #BIT6,@RKDS     ;IS THE SEEK DONE?
1357  012356  001774                          BEQ     2$              ;NO SO WAIT.
1358  012360  105777  167004          3$:     TSTB    @RKCS           ;IS CONTROLER READY?
1359  012364  100375                          BPL     3$              ;NO
1360  012366  012777  000015  166774          MOV     #15,@RKCS       ;DO A DRIVE RESET.
1361  012374  032777  000100  166762  4$:     BIT     #BIT6,@RKDS     ;IS DRIVE RESET DONE.
1362  012402  001774                          BEQ     4$              ;NO
1363  012404  005201                          INC     R1              ;COUNT THE CLEANER LOOP.
1364  012406  001344                          BNE     COM             ;MORE TO GO.
1365  012410  012737  000000  001410          MOV     #0,DA           ;START OUT AT CYL. 0.
1366  012416  012777  177777  166762  NEXT:   MOV     #177777,@BA     ;PUT ALL ONE'S IN BUFFER.
1367  012424  004137  012540                  JSR     R1,IO           ;GO DO THE DISK THING.
1368  012430  012777  000000  166750          MOV     #0,@BA          ;PUT ALL ZERO'S IN BUFFER.
1369  012436  004137  012540                  JSR     R1,IO           ;GO DO IT AGIAN.
1370  012442  012777  125252  166736          MOV     #125252,@BA     ;PUT A ALT. PATTERN IN BUFFER.
1371  012450  004137  012540                  JSR     R1,IO           ;ONCE MORE.
1372  012454  005177  166726                  COM     @BA             ;COMPLEMENT THE LAST PATTERN.
1373  012460  004137  012540                  JSR     R1,IO           ;AND AGAIN.
1374  012464  062737  000040  001410          ADD     #40,DA          ;INCREMENT TO THE NEXT CYL.
1375  012472  022737  014540  001410          CMP     #14540,DA       ;ARE WE DONE WITH THIS ONE?
1376  012500  001346                          BNE     NEXT            ;NO SO DO THE NEXT CYL.
```

```
                                        TYPE    ,65$            ;;TYPE ASCIZ STRING
                                        BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <CR><LF>/PACK GOOD     /
                                64$:
                                        BR      S11
                                GD1:    JMP     @#START         ;RESTART
                                ;
                                ;
                                ;DISK I/O SUBROUTINE.
                                ;
                                ;
                                ;SET UP FOR A WRITE/FORMAT.
                                IO:     MOV     WC,@RKWC        ;SET UP THE WORD COUNT REG.
                                        MOV     DA,@RKDA        ;SET UP THE DISK ADDRESS.
                                        BIS     @#DSKTMP,@RKDA  ;SET THE UNIT NUMBER UP.
                                        MOV     BA,@RKBA        ;SET UP THE BUSS ADDRESS.
                                        MOV     #0,@RKCS        ;CLEAR THE CONTROL REG. FOR SET UP.
                                        BIS     #BIT10+BIT11,@RKCS ;SET FORMAT&INHIBT INC. BITS.
                                        BIS     #BIT1,@RKCS     ;SET UP WRITE FUN.
                                        BIS     EXTR,@RKCS      ;SET UP 12OR16 SECTOR PACK.
                                        BIS     #BIT0,@RKCS     ;GO DO THE WRITE FORMAT.
                                1$:     TSTB    @RKCS           ;IS WRITE FORMAT DONE?
                                        BPL     1$              ;NO SO WAIT.
                                        TST     @RKCS           ;WAS THERE A ERROR?
                                        BMI     WFERR           ;YES GO SERVICE IT.
                                        MOV     #0,ERRWF        ;CLEAR OUT THE ERROR COUNTER.
                                ;
                                ;SET UP FOR A READ/FORMAT
                                ;
                                        MOV     RWC,@RKWC       ;SET UP WORD COUNT REG.
                                        MOV     DA,@RKDA        ;SET UP DISK ADDRESS.
                                        BIS     @#DSKTMP @RKDA  ;SET THE UNIT NUMBER .
                                        MOV     RBA,@RKBA       ;SET UP THE BUSS ADDRESS.
                                        MOV     #0,@RKCS        ;CLEAR THE CONTROL RE
                                        BIS     #BIT10,@RKCS    ;SET THE FORMAT BIT.
                                        BIS     #BIT2,@RKCS     ;SET UP READ FUN.
                                        BIS     EXTR,@RKCS      ;SET UP 12 OR 16 SECTOR PACK.
                                        BIS     #BIT0,@RKCS     ;GO DO THE READ FORMAT.
                                2$:     TSTB    @RKCS           ;IS THE READ FORMAT DONE?
                                        EPL     2$              ;NO SO WAIT.
                                        BIT     #BIT14,@RKCS    ;WAS TRERE A ERROR?
                                        BNE     RFERR           ;YES GO SERVICE IT.
                                        MOV     #0,ERRRF        ;CLEAR OUT THE ERROR COUNT.
                                ;
                                ;SET UP FOR A WRITE CHECK.
                                ;
                                        MOV     WC,@RKWC        ;SET UP WORD COUNT REG.
                                        MOV     DA,@RKDA        ;SET UP DISK ADDRESS.
                                        BIS     @#DSKTMP,@RKDA  ;SET UP THE UNIT NUMBER
                                        MOV     BA,@RKBA        ;SET UP BUSS ADDRESS.
                                        MOV     #0,@RKCS        ;CLEAR THE CONTROL REG.
                                        BIS     #BIT11+BIT8,@RKCS ;SET INHIBIT INCR.&STOP ON SOFT ERROR BITS.
                                        BIS     EXTR,@RKCS      ;SET 12 OR 16 SECTOR PACK.
                                        BIS     #BIT1+BIT2,@RKCS ;SET UP WRITE CHECK FUN.
                                        BIS     #BIT0,@RKCS     ;GO DO THE WRITE CHECK.
```

```
                                        ;CHECK HEADERS READ BY THE READ/FORMAT.
                                        ;
013050  013703  001416                  MOV     RWC,R3          ;PUT NUMBER OF WORDS TO
013054  005403                          NEG     R3              ;CHECK IN REG 3.
013056  063703  001414                  ADD     RBA,R3          ;SET REG 3 TO THE LAST WORD TO BE CHECKED.
013062  013702  001414                  MOV     RBA,R2          ;SET REG 2 TO STARTING ADD. OF BUFF.
013066  023722  001410          MORE:   CMP     DA,(2)+         ;CHECK THAT HEADER IS RIGHT.
013072  001073                          BNE     RFCERR          ;THIS HEADER WAS WRONG GO SERVICE IT.
013074  020302                          CMP     R3,R2           ;ARE WE DONE?
013076  001373                          BNE     MORE            ;NO GO CHECK THE NEXT ONE.
013100  012737  000000  001426          MOV     #0,ERRRFC       ;CLEAR OUT THE ERROR COUNT.
                                        ;
                                        ;LETS CHECK ON THE WRITE CHECK WE STARTED.
                                        ;
013106  105777  166256          1$:     TSTB    @RKCS
013112  100375                          BPL     1$              ;THE CONTROLER IS STILL BUSY.
013114  005777  166250                  TST     @RKCS           ;WAS THERE A ERROR?
013120  100407                          BMI     WCERRR          ;YES GO SERVICE IT.
013122  012737  000000  001430          MOV     #0,ERRWCH       ;CLEAR OUT THE
013130  012737  000000  001432          MOV     #0,ERRWCS       ;ERROR COUNTERS.
013136  000201                          RTS     R1              ;RETURN TO THE MAIN LINE.
013140  000137  013624          WCERRR: JMP     WCERR
                                        ;
                                        ;ERRORS FOR WRITE FORMAT.
                                        ;
013144  005237  001422          WFERR:  INC     ERRWF           ;ADD ONE TO THE ERROR COUNT.
013150  022737  000004  001422          CMP     #4,ERRWF        ;HAS IT HAPPEND 4 TIMES ON THIS CYL.
013156  001016                          BNE     RETRY           ;NO.
013160                          SYSER:
013160  104401  013166                  TYPE    65$             ;;TYPE ASCIZ STRING
013164  000410                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  15><12>/SYSTEM ERROR/
013206                          64$:
013206  000000                          HALT                    ;LET THE TECH. BREATH.
013210  000137  001440                  JMP     START           ;RESTART THE TEST.
013214  012777  000000  166146  RETRY:  MOV     #0,@RKCS        ;CLEAR OUT THE CONTROL REG
013222  012777  000015  166140          MOV     #15,@RKCS       ;DO A DRIVE RESET.
013230  032777  000100  166126  1$:     BIT     #BIT6,@RKDS     ;IS IT DONE.
013236  001774                          BEQ     1$              ;NO SO WAIT.
013240  000137  012540                  JMP     IO              ;TRY AGAIN.
                                        ;
                                        ;ERRORS FOR READ/FORMAT.
                                        ;
013244  005237  001424          RFERR:  INC     ERRRF           ;ADDONE TO ERROR COUNT.
013250  022737  000004  001424          CMP     #4,ERRRF        ;HAS IT HAPPEND 4 TIMES ON THIS CYL?
013256  001356                          BNE     RETRY           ;NO DO IT AGAIN.
013260  000737                          BR      SYSER           ;YES SO TELL HIM SO.
                                        ;
                                        ;READ/FORMAT ERRORS FOUND BY SOFTWARE CHECKS.
                                        ;
013262  005237  001426          RFCERR: INC     ERRRFC          ;ADD ONE TO ERROR COUNT.
013266  105777  166076          1$:     TSTB    @RKCS           ;WAIT FOR THE WRITE CHECK.
013272  100375                          BPL     1$
013274  022737  000004  001426          CMP     #4,ERRRFC       ;IS IT 4?
013302  001401                          BEQ     FAILED          ;PUT OUT FAILED MESSAGE.
```

```
1490  013306  042777  000037  166062  FAILED: BIC     #37,@RKDA       ;PUT WHICH SECTORS HEADER
1491  013314  042702  177740                  BIC     #177740,R2
1492  013320  060277  166052                  ADD     R2,@RKDA        ;FAILED IN RKDA FOR THE MESSAGE.
1493  013324                          FAIL:
1494  013324  104401  013332                  TYPE    ,65$            ;;TYPE ASCIZ STRING
1495  013330  000417                          BR      64$             ;;GET OVER THE ASCIZ
1496                                  ;;65$:  .ASCIZ  <15><12>/PACK FAILED AT (IN OCTAL) /
1497  013370                          64$:
1498  013370  017701  166002                  MOV     @RKDA,R1        ;GENERAT THE CYL,SECTOR,SURFACE
1499  013374  010102                          MOV     R1,R2           ;MESSAGE FROM RKDA
1500  013376  042702  177770                  BIC     #177770,R2
1501  013402  062702  000260                  ADD     #260,R2
1502  013406  110237  013565                  MOVB    R2,SEC+1
1503  013412  004337  013612                  JSR     R3,SHF3
1504  013416  042702  177776                  BIC     #177776,R2
1505  013422  062702  000260                  ADD     #260,R2
1506  013426  110237  013564                  MOVB    R2,SEC
1507  013432  004337  013616                  JSR     R3,SHF1
1508  013436  042702  177776                  BIC     #177776,R2
1509  013442  062702  000260                  ADD     #260,R2
1510  013446  110237  013576                  MOVB    R2,SUR
1511  013452  004337  013616                  JSR     R3,SHF1
1512  013456  042702  177770                  BIC     #177770,R2
1513  013462  062702  000260                  ADD     #260,R2
1514  013466  110237  013554                  MOVB    R2,CYL+2
1515  013472  004337  013612                  JSR     R3,SHF3
1516  013476  042702  177770                  BIC     #177770,R2
1517  013502  062702  000260                  ADD     #260,R2
1518  013506  110237  013553                  MOVB    R2,CYL+1
1519  013512  004337  013612                  JSR     R3,SHF3
1520  013516  042702  177774                  BIC     #177774,R2
1521  013522  062702  000260                  ADD     #260,R2
1522  013526  110237  013552                  MOVB    R2,CYL
1523  013532  104401  013542                  TYPE    ,1$             ;TYPE OUT THE GENERATED MESSAGE
1524  013536  000137  013604                  JMP     STOP            ;BYPASS THE INLINE MESSAGE
1525  013542  000015  054503  027114  1$:     .ASCII  <15><12>/CYL.   /
1526  013550  020040
1527  013552  030060  020060          CYL:    .ASCII  /000 /
1528  013556  042523  027103  020040          .ASCII  /SEC   /
1529  013564  030060      040      SEC:    .ASCII  /00 /
1530  013567      123  051125  027106          .ASCII  /SURF.  /
1531  013574  020040
1532  013576  020060  005015      000 SUR:    .ASCIZ  /0 /<15><12>
1533          013604                          .EVEN
1534  013604  000000          STOP:   HALT                            ;LET OPER DO HIS THING.
1535  013606  000137  001440                  JMP     START           ;RESTART THE TEST.
1536                                  ;
1537                                  ;SHIFT SUBROUTINES.
1538                                  ;
1539  013612  006201          SHF3:   ASR     R1                      ;HERE FOR A SHIFT OF 3.
1540  013614  006201          SHF2:   ASR     R1                      ;HERE FOR A SHIFT OF 2.
1541  013616  006201          SHF1:   ASR     R1                      ;HERE FOR A SHIFT OF 1.
1542  013620  010102                  MOV     R1,R2                   ;PUT RESULTES IN THE WORKING REG.
1543  013622  000203                  RTS     R3
1544                                  ;
```

```
1546
1547  013624  032777  040000  165536  WCERR:  BIT     #BIT14,@RKCS    ;WAS IT A HARD ERROR.
1548  013632  001010                          BNE     WCHERR          ;YES GO PROSSES IT.
1549  013634  005237  001432                  INC     ERRWCS          ;ADD 1 TO THE SOFT ERROR COUNT.
1550  013640  022737  000004  001432          CMP     #4,ERRWCS       ;HAS THERE BEEN 4 OF THEM?
1551  013646  001626                          BEQ     FAIL            ;YES PUT OUT FAILED MESSAGE.
1552  013650  000137  012540                  JMP     IO              ;NO SO TRY AGAIN.
1553  013654  005237  001430          WCHERR: INC     ERRWCH          ;ADD 1 TO THE HARD ERROR COUNT.
1554  013660  022737  000004  001430          CMP     #4,ERRWCH       ;HAS THERE BEEN 4 OF THEM?
1555  013666  001402                          BEQ     SYSERR          ;YES PUT OUT SYSTEM ERROR MESSAGE.
1556  013670  000137  013214                  JMP     RETRY           ;NO SO TRY AGAIN.
1557  013674  000137  013160          SYSERR: JMP     SYSER
1558                                  ;
1559                                  ;BUFFERS.
1560                                  ;
1561  013700  000000                  BUFF:   .WORD   0
1562  013702  000030                  RBUFF:  .BLKW   30
1563
1564
1565
1566
1567
1568                                          .SBTTL  RK05 CONTROL PANEL TEST
1569
1570  013762                          BAD.ON:
1571  013762  104401  013770                  TYPE    ,65$            ;;TYPE ASCIZ STRING
1572  013766  000401                          BR      64$             ;;GET OVER THE ASCIZ
1573                                  ;;65$:  .ASCIZ  /?/
1574  013772                          64$:
1575  013772                          SECT.0:
1576  013772  104401  014000                  TYPE    ,65$            ;;TYPE ASCIZ STRING
1577  013776  000424                          BR      64$             ;;GET OVER THE ASCIZ
1578                                  ;;65$:  .ASCIZ  <15><12>/RK05 CONTROL PANEL TEST, WHICH DRIVE?/
1579  014050                          64$:
1580  014050  104407                          RDCHR
1581  014052  011600                          MOV     (SP),R0
1582  014054  104403                          TYPOS
1583  014056     001                          .BYTE   1
1584  014057     000                          .BYTE   0
1585  014060  162700  000060                 SUB     #60,R0
1586  014064  100736                          BMI     BAD.ON
1587  014066  022700  000010                 CMP     #10,R0
1588  014072  003733                          BLE     BAD.ON
1589  014074  110037  001314                 MOVB    R0,@#DRIVE
1590  014100  000300                          SWAB    R0
1591  014102  006100                          ROL     R0
1592  014104  006100                          ROL     R0
1593  014106  006100                          ROL     R0
1594  014110  006100                          ROL     R0
1595  014112  006100                          ROL     R0
1596  014114  010037  001352                 MOV     R0,@#DSKTMP
1597  014120  104401  014126                 TYPE    ,67$            ;;TYPE ASCIZ STRING
1598  014124  000414                          BR      66$             ;;GET OVER THE ASCIZ
1599                                  ;;67$:  .ASCIZ  <15><12>/MOUNT PACK ON DRIVE#/
1600  01415_                          66$:
```

```
1602  014162  104403                        TYPOS                   ;;GO TYPE--OCTAL ASCII
1603  014164  001                           .BYTE   1               ;;TYPE 1 DIGIT(S)
1604  014165  000                           .BYTE   0               ;;SUPPRESS LEADING ZEROS
1605  014166  104401  014174                TYPE    ,69$            ;;TYPE ASCIZ STRING
1606  014172  000425                        BR      68$             ;;GET OVER THE ASCIZ
1607                                ;;69$:  .ASCIZ  <15><12>/PLACE DRIVE IN RUN ;SHOULD SEE THE RUN,/
1608  014246                        68$:
1609  014246  104401  014254                TYPE    ,71$            ;;TYPE ASCIZ STRING
1610  014252  000423                        BR      70$             ;;GET OVER THE ASCIZ
1611                                ;;71$:  .ASCIZ  <15><12>/POWER, AND ON CYLINDER LAMPS LIGHT./
1612  014322                        70$:
1613  014322  104401  014330                TYPE    ,73$            ;;TYPE ASCIZ STRING
1614  014326  000425                        BR      72$             ;;GET OVER THE ASCIZ
1615                                ;;73$:  .ASCIZ  <15><12>/MAKE DRIVE WRITE ENABLE PRESS CONTINUE/
1616  014402                        72$:
1617  014402  000000                        HALT
1618  014404  004737  016260                JSR     PC,WRRDCK       ;GO WRITE 0'S, RD 0'S, CHECK
1619  014410  104401  014416                TYPE    ,75$            ;;TYPE ASCIZ STRING
1620  014414  000430                        BR      74$             ;;GET OVER THE ASCIZ
1621                                ;;75$:  .ASCIZ  <13><12><15><12>/WRITE PROTECT THE DRIVE THEN PRESS CONTINUE/
1622  014476                        74$:
1623  014476  000000                        HALT
1624  014500  004737  016470                JSR     PC,WRPRO        ;GO TRY OVERWRITE
1625  014504  104401  014512                TYPE    ,77$            ;;TYPE ASCIZ STRING
1626  014510  000426                        BR      76$             ;;GET OVER THE ASCIZ
1627                                ;;77$:  .ASCIZ  <15><12><15><12>/CLEAR WRITE PROTECT THEN PRESS CONTINUE/
1628  014556                        76$:
1629  014566  000000                        HALT
1630  014570  004737  016260                JSR     PC,WRRDCK       ;GO WRITE 0'S, RD 0'S, CHECK
1631  014574  013777  001352  164574        MOV     @#DSKTMP,@RKDA  ;SET UP DRIVE#
1632  014602  012777  000017  164560        MOV     #17,@RKCS       ;FUNCTION WRITE PROTECT
1633  014610  004737  005614                JSR     PC,$MTME        ;GO WAIST TIME FOR RK11-C
1634  014614  105777  164550        1$:     TSTB    @RKCS           ;IS CONTROL READY SET
1635  014620  100375                        BPL     1$              ;IF NO, BRANCH
1636  014622  004737  016470                JSR     PC,WRPRO        ;GO TRY OVERWRITE OF IERO'S
1637  014626                        PRTTWO:
1638  014626  104401  014634                TYPE    ,65$            ;;TYPE ASCIZ STRING
1639  014632  000431                        BR      64$             ;;GET OVER THE ASCIZ
1640                                ;;65$:  .ASCIZ  <15><12><15><12>/CAUTION! TRY TO OPEN THE DOOR, DO NOT FORCE:/
1641  014716                        64$:
1642  014716  104401  014724                TYPE    ,67$            ;;TYPE ASCIZ STRING
1643  014722  000414                        BR      66$             ;;GET OVER THE ASCIZ
1644                                ;;67$:  .ASCIZ  <15><12>/DOOR SHOULD NOT OPEN!/
1645  014754                        66$:
1646  014754  104401  014762                TYPE    ,69$            ;;TYPE ASCIZ STRING
1647  014760  000420                        BR      68$             ;;GET OVER THE ASCIZ
1648                                ;;69$:  .ASCIZ  <15><12>/PRESS CONTINUE WHEN FINISHED/
1649  015022                        68$:
1650  015022  000000                        HALT
1651  015024  104401  015032                TYPE    ,71$            ;;TYPE ASCIZ STRING
1652  015030  000426                        BR      70$             ;;GET OVER THE ASCIZ
1653                                ;;71$:  .ASCIZ  <15><12><15><12>/PUT DRIVE IN LOAD, WAIT FOR LOAD LIGHT/
1654  015106                        70$:
1655  015106  104401  015114                TYPE    ,73$            ;;TYPE ASCIZ STRING
1656  015112  000420                        BR      72$             ;;GET OVER THE ASCIZ
```

```
                                        72$:
                                                HALT
015154                                          MOV     @#DSKTMP,@RKDA  ;SET UP DISK ADDRESS
015154  0[illegible]                            MOV     #15,@RKCS       ;ISSUE A DRIVE RESET
015156  01[illegible]7  001352  164212          MOV     PC,$MTME        ;KILL TIME FOR RK11-C
015164  012777  000015  164176                  JSR     @RKCS           ;CONTROL READY SET?
015172  004737  005614                  1$:     TSTB    1$              ;IF NO, BRANCH
015176  105777  164166                          BPL     #100200,@RKER   ;DRE SET
015202  100375                                  BIT     2$              ;IF YES BRANCH
015204  032777  100200  164154                  BNE     ,75$            ;;TYPE ASCIZ STRING
015212  001057                                  TYPE    ,74$            ;;GET OVER THE ASCIZ
015214  104401  015222                          BR      <15><12>/DRE=BIT15 OF RKER DID NOT SET IF AN RK11-C/
015220  000427                          ;;75$:  .ASCIZ
                                        74$:
015300                                          TYPE    ,77$            ;;TYPE ASCIZ STRING
015300  104401  015306                          BR      ,76$            ;;GET OVER THE ASCIZ
015304  000422                          ;;77$:  .ASCIZ  <15><12>/OR BIT07 DID NOT SET IF AN RK11-D/
                                        76$:
015352                                  2$:     BIT     #140000,@RKCS   ;DID HARD ERROR ON ERROR SET
015352  032777  140000  164010                  BNE     3$              ;BRANCH IF YES
015360  001015                                  TYPE    ,79$            ;;TYPE ASCIZ STRING
015362  104401  015370                          BR      ,78$            ;;GET OVER THE ASCIZ
015366  000412                          ;;79$:  .ASCIZ  <15><12>/ERROR DID NOT SET/
                                        78$:
015414                                  3$:     MOV     #1,@RKCS        ;ISSUE A CONTROL RESET
015414  012777  000001  163746                  JSR     PC,$MTME        ;WAIST TIME
015422  004737  005614                  4$:     TSTB    @RKCS           ;CONTROL READY SET
015426  105777  163736                          BPL     4$              ;IF NO, BRANCH
015432  100375                                  BIT     #BIT15,@RKER    ;'DRE' CLEAR
015434  032777  100000  163724                  BEQ     5$              ;IF YES BRANCH
015442  001425                                  TYPE    ,81$            ;;TYPE ASCIZ STRING
015444  104401  015452                          BR      ,80$            ;;GET OVER THE ASCIZ
015450  000422                          ;;81$:  .ASCIZ  <15><12>/CONTROL RESET DID NOT CLEAR 'DRE'/
                                        80$:
015516                                  5$:     BIT     #140000,@RKCS   ;ERROR BITS CLEAR
015516  032777  140000  163644                  BEQ     X               ;IF YES BRANCH
015524  001431                                  TYPE    ,83$            ;;TYPE ASCIZ STRING
015526  104401  015534                          BR      ,82$            ;;GET OVER THE ASCIZ
015532  000426                          ;;83$:  .ASCIZ  <15><12>/CONTROL RESET DID NOT CLEAR 'ERROR', RKCS/
                                        82$:
015610                                  X:
015610                                          TYPE    ,65$            ;;TYPE ASCIZ STRING
015610  104401  015616                          BR      ,64$            ;;GET OVER THE ASCIZ
015614  000422                          ;;65$:  .ASCIZ  <15><12><15><12>/OPEN THE DOOR, PUT DRIVE IN RUN/
                                        64$:
015662                                          TYPE    ,67$            ;;TYPE ASCIZ STRING
015662  104401  015670                          BR      ,66$            ;;GET OVER THE ASCIZ
015666  000425                          ;;67$:  .ASCIZ  <15><12>/CAUTION! IF RUN LIGHT ON ERROR! DEPRESS/
                                        66$:
015742                                          TYPE    ,69$            ;;TYPE ASCIZ STRING
015742  104401  015750                          BR      ,68$            ;;GET OVER THE ASCIZ
015746  000426                          ;;69$:  .ASCIZ  <15><12>/LOAD IMMEDIATELY, CONTINUE WHEN FINISHED/
                                        68$:
016024                                  XX:     HALT
016024  000000                                  TYPE    ,65$            ;;TYPE ASCIZ STRING
016026  104401  016034                          BR      ,64$            ;;GET OVER THE ASCIZ
016032  000422
```

```
1714  016100                          64$:
1715  016100  104401  016106                TYPE    ,67$            ;;TYPE ASCIZ STRING
1716  016104  000423                    BR      66$             ;;GET OVER THE ASCIZ
1717                                ;;67$:  .ASCIZ  <15><12>/PUT DRIVE IN RUN, DRIVE SHOULD NOT/
1718  016154                          66$:
1719  016154  104401  016162                TYPE    ,69$            ;;TYPE ASCIZ STRING
1720  016160  000423                    BR      68$             ;;GET OVER THE ASCIZ
1721                                ;;69$:  .ASCIZ  <15><12>/RUN...INTERCLOCKS HAVE BEEN CHECKED/
1722  016230                          68$:
1723  016230  104401  016236                TYPE    ,71$            ;;TYPE ASCIZ STRING
1724  016234  000407                    BR      70$             ;;GET OVER THE ASCIZ
1725                                ;;71$:  .ASCIZ  <15><12>/DONE!      /
1726  016254                          70$:
1727  016254  000137  001440          WRRDCK: JMP     @#START
1728  016260  005037  001362                  CLR     @#PATTRN        ;MAKE A PATTERN OF ZERO'S
1729  016264  013777  001352  163104        MOV     @#DSKTMP,@RKDA  ;SET UP DRIVE ADDRESS
1730  016272  012777  000001  163070        MOV     #1,@RKCS        ;ISSUE A CONTROL RESET
1731  016300  004737  005614                JSR     PC,SMTME
1732  016304  105777  163060          5$:   TSTB    @RKCS           ;CONTROL READY SET
1733  016310  100375                    BPL     5$              ;IF NO BRANCH
1734  016312  013777  001352  163056        MOV     @#DSKTMP,@RKDA  ;SET UP DRIVE ADDRESS
1735  016320  012777  001362  163046        MOV     #PATTRN,@RKBA   ;GET BUSS ADDRESS
1736  016326  013777  001344  163036        MOV     @#SECCNT,@RKWC  ;WORD COUNT 1 SECTOR
1737  016334  013777  001354  163026        MOV     @#WRITCS,@RKCS  ;IBA + WRITE + GO
1738  016342  004737  005614                JSR     PC,SMTME        ;KILL TIME FOR RK11-C
1739  016346  105777  163016          1$:   TSTB    @RKCS           ;CONTROL READY SET
1740  016352  100375                    BPL     1$              ;IF NO, BRANCH
1741  016354  013777  001352  163014        MOV     @#DSKTMP,@RKDA  ;SET UP RK REGISTERS
1742  016362  012777  007356  163004        MOV     #RDBUFF,@RKBA   ;TO READ ONE SECTOR
1743  016370  013777  001344  162774        MOV     @#SECCNT,@RKWC  ;TO THE READ BUFFER
1744  016376  013777  001356  162764        MOV     @#READCS,@RKCS
1745  016404  004737  005614                JSR     PC,SMTME        ;KILL TIME FOR RK11-C
1746  016410  105777  162754          2$:   TSTB    @RKCS           ;CONTROL READY SET
1747  016414  100375                    BPL     2$              ;IF NO, BRANCH
1748  016416  012704  007356                MOV     #RDBUFF,R4      ;GET BUFFER TO R4
1749  016422  005005                    CLR     R5              ;SET UP TO COMPARE
1750  016424  020524                3$:   CMP     R5,(R4)+        ;FOR ZERO'S
1751  016426  001414                    BEQ     4$              ;IF OK, BRANCH
1752  016430  104401  016436                TYPE    ,65$            ;;TYPE ASCIZ STRING
1753  016434  000410                    BR      64$             ;;GET OVER THE ASCIZ
1754                                ;;65$:  .ASCIZ  <15><12>/WRITE FAILED/
1755  016456                          64$:
1756  016456  000700                    BR      WRRDCK          ;GO BACK TRY AGAIN
1757  016460  022704  010356          4$:   CMP     #MANSEL,R4      ;DONE ALL CHECKS
1758  016464  001357                    BNE     3$              ;IF NO, BRANCH
1759  016466  000207                    RTS     PC              ;IF YES, RETURN
1760  016470  032777  000040  162666  WRPRO:  BIT     #BIT5,@RKDS     ;BIT 5 ON
1761  016476  001021                    BNE     1$              ;IF YES, BRANCH
1762  016500  104401  016506                TYPE    ,65$            ;;TYPE ASCIZ STRING
1763  016504  000416                    BR      64$             ;;GET OVER THE ASCIZ
1764                                ;;65$:  .ASCIZ  <15><12>/WPS=BIT5 OF RKDS NOT SET/
1765  016542                          64$:
1766  016542  012737  177777  001362  1$:    MOV     #177777,@#PATTRN ;GO LOAD ALL
1767  016550  013777  001352  162620        MOV     @#DSKTMP,@RKDA  ;RK REGISTERS
1768  016556  012777  001362  162610        MOV     #PATTRN,@RKBA   ;TO WRITE
```

```
 1770  016572  013777  001354  162570          MOV     @#WRITCS,@RKCS  ;OVER THE ZERO'S
 1771  016600  004737  005614                  JSR     PC,SMTME        ;KILL TIME FOR RK11-C
 1772  016604  105777  162560          2$:     TSTB    @RKCS           ;CONTROL READY SET?
 1773  016610  100375                  BPL     2$              ;IF NO, BRANCH
 1774  016612  032777  020000  162546          BIT     #BIT13,@RKER    ;WLO BIT SET
 1775  016620  001032                  BNE     3$              ;IF YES BRANCH
 1776  016622  104401  016630                  TYPE    ,67$            ;;TYPE ASCIZ STRING
 1777  016626  000427                  BR      66$             ;;GET OVER THE ASCIZ
 1778                                  ;;67$:  .ASCIZ  <15><12>/EXPECTED WLO=BIT13 OF RKER BUT DID NOT SET/
 1779  016706                          66$:
 1780  016706  012777  000001  162454  3$:     MOV     #1,@RKCS        ;DO A CONTROL RESET
 1781  016714  004737  005614                  JSR     PC,SMTME        ;KILL TIME FOR RK11-C
 1782  016720  105777  162444          4$:     TSTB    @RKCS           ;CONTROL READY SET?
 1783  016724  100375                  BPL     4$              ;IF NO BRANCH
 1784  016726  032777  020000  162432          BIT     #BIT13,@RKER    ;WLO BIT CLEAR
 1785  016734  001431                  BEQ     RDCHK0          ;IF YES, BRANCH
 1786  016736  104401  016744                  TYPE    ,69$            ;;TYPE ASCIZ STRING
 1787  016742  000426                  BR      68$             ;;GET OVER THE ASCIZ
 1788                                  ;;69$:  .ASCIZ  <15><12>/CONTROL RESET DID NOT CLEAR 'WLO' OF RKER/
 1789  017020                          68$:
 1790  017020  013777  001352  162350  RDCHK0: MOV     @#DSKTMP,@RKDA  ;SET UP RK REGISTERS
 1791  017026  012777  007356  162340          MOV     #RDBUFF,@RKBA   ;TO READ SECTOR 0,
 1792  017034  013777  001344  162330          MOV     @#SECCNT,@RKWC  ;CYLINDER 0, HEAD 0
 1793  017042  013777  001356  162320          MOV     @#READCS,@RKCS  ;TO ENSURE NO WRITE TOOK PLACE
 1794  017050  004737  005614                  JSR     PC,SMTME        ;KILL TIME
 1795  017054  105777  162310          3$:     TSTB    @RKCS
 1796  017060  100375                  BPL     3$
 1797  017062  012703  000005                  MOV     #5,R3
 1798  017066  012704  007356                  MOV     #RDBUFF,R4      ;CHECK TO INSURE NO WRITE
 1799  017072  005005                  CLR     R5              ;TOOK PLACE
 1800  017074  020524          1$:     CMP     R5,(R4)+        ;WITH WRITE LOCK
 1801  017076  001474                  BEQ     2$
 1802  017100  005303                  DEC     R3              ;DEC THE ERROR COUNT
 1803  017102  001475                  BEQ     4$              ;IF ZERO BRANCH
 1804  017104  104401  017112                  TYPE    ,65$            ;;TYPE ASCIZ STRING
 1805  017110  000422                  BR      64$             ;;GET OVER THE ASCIZ
 1806                                  ;;65$:  .ASCIZ  <15><12>/WRITE OCCURRED WITH WRITE PROTECT/
 1807  017156                          64$:
 1808  017156  005744                  TST     -(R4)
 1809  017160  104401  017166                  TYPE    ,67$            ;;TYPE ASCIZ STRING
 1810  017164  000410                  BR      66$             ;;GET OVER THE ASCIZ
 1811                                  ;;67$:  .ASCIZ  <15><12>/BUFFER ADDR=/
 1812  017206                          66$:
 1813  017206  010446                  MOV     R4,-(SP)
 1814  017210  104403                  TYPOS
 1815  017212     006                  .BYTE   6
 1816  017213     001                  .BYTE   1
 1817  017214  104401  017222                  TYPE    ,69$            ;;TYPE ASCIZ STRING
 1818  017220  000406                  BR      68$             ;;GET OVER THE ASCIZ
 1819                                  ;;69$:  .ASCIZ  /    EXPCTD=/
 1820  017236                          68$:
 1821  017236  010546                  MOV     R5,-(SP)
 1822  017240  104404                  TYPON
 1823  017242  104401  017250                  TYPE    ,71$            ;;TYPE ASCIZ STRING
 1824  017246  000406                  BR      70$             ;;GET OVER THE ASCIZ
```

```
1826  017264                        70$:
1827  017264  012446                        MOV     (R4)+,-(SP)
1828  017266  104404                        TYPON
1829  017270  022704  010356        2$:     CMP     #MANSEL,R4      ;FINISHED ALL CHECKS
1830  017274  001277                        BNE     1$              ;IF NO, BRANCH
1831  017276  000207                4$:     RTS     PC              ;RETURN
1832
1833
1834
```

```
                                ;THE FOLLOWING REVISION WAS MADE BY JIM KAPADIA

                                        .SBTTL  CONTROL PANEL TEST # 2

                                ;THIS IS THE ENTRY POINT INTO CONTROL PANEL TEST #2.  ALL
                                ;THE DRIVES THAT ARE PRESENT AND IN 'RDY' CONDITION ARE
                                ;REPORTED (ON LINE).

017300  000240                  SECT.4: NOP
017302  012777  000001  162060          MOV     #1,@RKCS
017310  105777  162054          3$:     TSTB    @RKCS
017314  100375                          BPL     3$
017316  012700  020614                  MOV     #DRIV0,R0
017322  005001                          CLR     R1
017324  005002                          CLR     R2

017326  010210                  1$:     MOV     R2,(R0)         ;SET UP ADDRESS TABLE
017330  010277  162042                  MOV     R2,@RKDA        ;ADDRESS THE DRIVE
017334  105777  162024                  TSTB    @RKDS           ;IS IT PRESENT?
017340  100021                          BPL     2$              ;NO

017342  104401  020450                  TYPE    ,EM1            ;TYPE 'DRIVE'
017346  010146                          MOV     R1,-(SP)        ;TYPE OUT DRIVE #
017350  104402                          TYPOC
017352  104401  020461                  TYPE    ,EM2            ;TYPE 'ON LINE'
017356  052710  000300                  BIS     #BIT6+BIT7,(R0) ;SET BITS INDICATING THIS
                                                                ;DRIVE PRESENT

017362  012777  000015  162000          MOV     #15,@RKCS       ;ISSUE A DRIVE RESET
017370  004737  005614                  JSR     PC,$MTME        ;ALLOW SOME TIME
017374  032777  000100  161762  4$:     BIT     #RWS,@RKDS      ;WAIT FOR RWS RDY
017402  001774                          BEQ     4$

017404  005720                  2$:     TST     (R0)+
017406  005201                          INC     R1
017410  062702  020000                  ADD     #20000,R2       ;NXT DRIVE
017414  001344                          BNE     1$              ;ALL DONE?

017416  104401  001161                  TYPE    ,$CRLF

                                ;THIS CODE CHECKS THE CONDITION OF 'DRY' BIT IN RKDS FOR EVERY
                                ;DRIVE.  IF 'DRY' IS SET DRIVE IS SAID TO BE 'ON LINE', OTHERWISE IT
                                ;IS OFFLINE.  IF THE 'DRY' BIT HAS CHANGED FROM LAST TIME, THEN
                                ;IT IS REPORTED.  IF THERE IS NO CHANGE NOTHING IS REPORTED.

017422  012700  020614          BEGCT:  MOV     #DRIV0,R0       ;INITIALIZE POINTERS
017426  005001                          CLR     R1

017430  011077  161742          BEGCT1: MOV     (R0),@RKDA      ;ADDRESS A DRIVE
017434  042777  017777  161734          BIC     #17777,@RKDA    ;MASK OUT NON DR# BITS
017442  105777  161716                  TSTB    @RKDS           ;IS THIS DRIVE ON LINE?
017446  100044                          BPL     1$              ;NO
                                                                ;YES
017450  105710                          TSTB    (R0)            ;WAS IT 'ON LINE' LAST TIME?
017452  100454                          BMI     NXT1            ;YES, NO MESSAGE TO REPORT
```

```
1892  017460  104401  020450          TYPE    ,EM1            ;LINE, REPORT MESSAGE
1893  017464  010146                  MOV     R1,-(SP)
1894  017466  104402                  TYPOC
1895  017470  104401  020461          TYPE    ,EM2            ;TYPE 'ON LINE'
1896  017474  032777  000040  161662  BIT     #WPS,@RKDS      ;WRITE ENABLED?
1897  017502  001417                  BEQ     2$              ;YES, OK
1898  017504  104401  017512          TYPE    ,65$            ;;TYPE ASCIZ STRING
1899  017510  000414                  BR      64$             ;;GET OVER THE ASCIZ
1900                          ;;65$:  .ASCIZ  <15><12>/EROR,NOT WRT ENABLED/
1901  017542                  64$:
1902  017542  012777  000017  161620 2$:     MOV     #17,@RKCS       ;WRITE PROT THE DISK
1903  017550  105777  161614        3$:     TSTB    @RKCS
1904  017554  100375                  BPL     3$
1905  017556  000412                  BR      NXT1
1906
1907  017560  105710                  1$:     TSTB    (R0)            ;WAS THIS DRIVE OFF LINE LAST
1908  017562  100010                  BPL     NXT1            ;TIME?  BRNCH IF YES
1909  017564  104401  020450          TYPE    ,EM1            ;IF NOT, REPORT THE CHANGE
1910  017570  010146                  MOV     R1,-(SP)        ;TYPE DRIVE #
1911  017572  104402                  TYPOC
1912  017574  104401  020473          TYPE    ,EM3            ;TYPE 'OFF LINE'
1913  017600  042710  000200          BIC     #BIT7,(R0)      ;CLEAR BIT TO INDICATE THIS
1914                                                          ;DRIVE 'OFF LINE'
1915
1916                          ;THIS CODE CHECKS 'WPS' BIT FOR EVERY DRIVE THAT IS IN 'DRY'
1917                          ;CONDITION (ON LINE).  IT REPORTS ANY CHANGE IN THE CONDITION OF
1918                          ;THE 'WPS' BIT.  IF THERE WAS NO CHANGE FROM LAST TIME NOTHING
1919                          ;IS REPORTED.  AT THE TIME OF ENTRY R0 POINTS TO DRIVE FLAG.
1920
1921  017604  105777  161554  NXT1:   TSTB    @RKDS           ;IS THIS DRIVE PRESENT?
1922                                                          ;RKDA CONTAINS THE DRV #
1923  017610  100033                  BPL     NXT2            ;NO, SKIP CHECKING
1924
1925  017612  032777  000040  161544        BIT     #WPS,@RKDS      ;WPS BIT SET?
1926  017620  001014                  BNE     1$              ;YES
1927                                                          ;WPS BIT CLEAR
1928  017622  032710  000004          BIT     #BIT2,(R0)      ;WAS IT CLR LAST TIME ALSO?
1929  017626  001424                  BEQ     NXT2            ;YES, NOTHING TO REPORT.
1930                                                          ;WPS CHANGED FROM 'SET'
1931  017630  104401  020450          TYPE    ,EM1            ;TO 'CLR', REPORT IT
1932  017634  010146                  MOV     R1,-(SP)        ;TYPE DRIVE #
1933  017636  104402                  TYPOC
1934  017640  042710  000004          BIC     #BIT2,(R0)      ;INDICATE THAT 'WPS' IS CLEAR
1935  017644  104401  020521          TYPE    ,EM5            ;TYPE 'WPS CLEAR'
1936  017650  000413                  BR      NXT2
1937                                                          ;WPS BIT IS SET
1938  017652  032710  000004        1$:     BIT     #BIT2,(R0)      ;WAS IT SET LAST TIME ALSO?
1939  017656  001010                  BNE     NXT2            ;YES, NOTHING TO REPORT.
1940                                                          ;WPS CHANGED, FROM 'CLR' TO
1941                                                          ;'SET', REPORT THIS CHANGE
1942  017660  104401  020450          TYPE    ,EM1            ;TYPE 'DRIVE'
1943  017664  010146                  MOV     R1,-(SP)        ;TYPE DRIVE #
1944  017666  104402                  TYPOC
1945  017670  104401  020506          TYPE    ,EM4            ;TYPE 'WPS SET'
1946  017674  052710  000004          BIS     #BIT2,(R0)      ;SET FLAG BIT INDICATING WPS SET
```

```
                                        ;THIS CODE PERFORMS A SEEK FUNCTION ON A DRIVE AND CHECKS IF
                                        ;THE 'DPL' BIT SET AS A RESULT, (IF THE POWER WAS CUT OFF
                                        ;FROM THE DRIVE).  NOTE THAT ONLY THOSE DRIVES ARE
                                        ;CHECKED WHICH WERE FOUND TO BE PRESENT AT BEGINNING (WHEN
                                        ;THIS TEST WAS ENTERED).  SEEK IS DONE TO CYLINDER 1.
                                        ;AT THE TIME OF ENTRY R0 POINTS TO THE DRIVE FLAG.

017700  032710  000100          NXT2:   BIT     #BIT6,(R0)      ;WAS THIS DRIVE PRESENT AT BEGNG
017704  001403                          BEQ     4$              ;NO
017706  105777  161452                  TSTB    @RKDS           ;IS IT PRESENT NOW?
017712  100402                          BMI     3$              ;YES
017714  000137  020352          4$:     JMP     DN1DRV          ;IF NOT SKIP THIS CHECK

017720  052777  000040  161450  3$:     BIS     #40,@RKDA       ;RKDA ALREADY HAS THE DRV #
                                                                ;SET CYL 1 ADDRESS
017726  012777  000011  161434          MOV     #11,@RKCS       ;SEEK, GO

017734  105777  161430          1$:     TSTB    @RKCS           ;WAIT FOR CONTROL RDY?
017740  100375                          BPL     1$              ;SOMETHING WRONG IF CNTAL RDY
                                                                ;DOES NOT COME BACK
017742  032777  010000  161414          BIT     #DPL,@RKDS      ;DPL BIT SET?
017750  001414                          BEQ     2$              ;NO
                                                                ;YES, DPL SET
017752  032710  000001                  BIT     #BIT0,(R0)      ;WAS 'DPL' SET LAST TIME ALSO?
017756  001167                          BNE     CLRDPL          ;YES, NOTHING TO REPORT.
                                                                ;DPL CHANGED, GOT SET THIS
017760  104401  020450                  TYPE    ,EM1            ;TIME, REPORT IT
017764  010146                          MOV     R1,-(SP)
017766  104402                          TYPOC
017770  104401  020537                  TYPE    ,EM6            ;TYPE 'POWER LO'
017774  052710  000001                  BIS     #BIT0,(R0)      ;SET FLAG BIT INDICATING THAT
                                                                ;DPL SET THIS TIME
020000  000556                          BR      CLRDPL
                                                                ;'DPL' BIT IS CLEAR
020002  032710  000001          2$:     BIT     #BIT0,(R0)      ;WAS 'DPL' CLEAR LAST TIME ALSO?
020006  001410                          BEQ     WATSK           ;YES, NOTHING TO REPORT
                                                                ;REPORT THAT 'DPL' BIT CHANGED,
020010  104401  020450                  TYPE    ,EM1            ;FROM SET TO CLEAR
020014  010146                          MOV     R1,-(SP)
020016  104402                          TYPOC
020020  104401  020560                  TYPE    ,EM7            ;TYPE 'POWER UP'
020024  042710  000001                  BIC     #BIT0,(R0)      ;SET FLAG BIT INDICATING THAT DPL
                                                                ;IS CLEAR THIS TIME

                                ;THIS CODE WAITS FOR THE SEEK (DONE ABOVE) TO FINISH.  WAITING
                                ;TIME IS APPROX. 50 MS (FOR THE WORST CASE).  IF R/W/S RDY
                                ;DOES NOT SET WITHIN 50 MS, THEN IT IS ASSUMED THAT A 'SIN'
                                ;IS POSSIBLE AND THE PROGRAM WAITS FOR 1450 MS MORE, SO THAT
                                ;THE 'SIN' CAN SET.  IF 'SIN' DOES NOT SET WITHIN THIS
                                ;TIME AN ERROR IS REPORTED:
                                ;       SIN DIDN'T OCCUR
                                ;IF R/W/S RDY SETS WITHIN 50 MS THE PROGRAM PROCEEDS TO
                                ;CHECK THE NEXT DRIVE.

020030  012705  164220  WATSK:  MOV     #-6000.,R5      ;SET COUNT TO WAIT FOR
```

```
2004  020034  032777  000100  161322  1$:     BIT     #RWS,@RKDS      ;R/W/S. RDY SET?
2005  020042  001042                          BNE     3$              ;YES
2006  020044  005205                          INC     R5              ;WAIT
2007  020046  001372                          BNE     1$
2008                                                                  ;50 MS OVER, R/W/S RDY
2009                                                                  ;DIDN'T SET. WAIT FOR
2010                                                                  ;SIN TO SET.
2011  020050  005004                          CLR     R4
2012  020052  012705  177777                  MOV     #177777,R5      ;SET UP COUNT
2013  020056  032777  001000  161300  2$:     BIT     #SIN,@RKDS      ;SIN SET?
2014  020064  001045                          BNE     SINST           ;YES
2015  020066  005305                          DEC     R5              ;WAIT
2016  020070  001372                          BNE     2$
2017  020072  005704                          TST     R4
2018  020074  001002                          BNE     4$
2019  020076  005204                          INC     R4
2020  020100  000766                          BR      2$
2021                                                                  ;1500 MS ELAPSED, BUT SIN
2022                                                                  ;DIDN'T SET. ERROR!
2023  020102                          4$:
2024  020102  104401  020110                  TYPE    ,65$             ;;TYPE ASCIZ STRING
2025  020106  000415                          BR      64$              ;;GET OVER THE ASCIZ
2026                                  ;;65$:  .ASCIZ  <15><12>/SIN DIDN'T OCCUR, DRVE/
2027  020142                          64$:
2028  020142  010146                          MOV     R1,-(SP)                ;TYPE DRIVE #
2029  020144  104402                          TYPOC
2030  020146  000501                          BR      DN1DRV
2031  020150  032710  000002          3$:     BIT     #BIT1,(R0)      ;DID R/W/S RDY SET LAST TIME?
2032  020154  001476                          BEQ     DN1DRV          ;YES
2033  020156  042710  000002                  BIC     #BIT1,(R0)      ;CLR FLAG INDICATING THAT SEEK IS OK
2034  020162  104401  020450                  TYPE    ,EM1            ;REPORT THAT SEEK IS OK
2035  020166  010146                          MOV     R1,-(SP)
2036  020170  104402                          TYPOC
2037  020172  104401  020601                  TYPE    ,EM9
2038  020176  000465                          BR      DN1DRV
2039
2040                                  ;IF SIN SET, DO DRIVE RESET AND CLEAR IT
2041
2042  020200  032710  000002          SINST:  BIT     #BIT1,(R0)      ;DID 'SIN' SET LAST TIME ALSO?
2043  020204  001010                          BNE     4$              ;YES, NOTHING TO REPORT
2044  020206  052710  000002                  BIS     #BIT1,(R0)      ;SET FLAG INDICATING THAT
2045  020212  104401  020450                  TYPE    ,EM1            ;'SIN' SET, AND REPORT THE CHANGE
2046  020216  010146                          MOV     R1,-(SP)
2047  020220  104402                          TYPOC
2048  020222  104401  020573                  TYPE    ,EM8            ;TYPE 'SIN'
2049
2050  020226  017705  161144          4$:     MOV     @RKDA,R5        ;SAVE RKDA
2051  020232  012777  000001  161130          MOV     #1,@RKCS        ;DO CONTROL RESET
2052  020240  105777  161124          1$:     TSTB    @RKCS           ;WAIT FOR CONTROL RDY
2053  020244  100375                          BPL     1$
2054  020246  010577  161124                  MOV     R5,@RKDA
2055  020252  012777  000015  161110          MOV     #15,@RKCS       ;DO DRIVE RESET, RKDA
2056                                                                  ;ALREADY HAS THE DRVE #
2057  020260  105777  161104          2$:     TSTB    @RKCS           ;WAIT FOR CNTRL RDY
2058  020264  100375                          BPL     2$
```

```
2060  020270  032777  000100  161066  3$:     BIT     #RWS,@RKDS      ;R/W/S SET?
2061  020276  001C25                          BNE     DN1DRV          ;YES
2062  020300  005205                          INC     R5
2063  020302  001372                          BNE     3$              ;WAIT FOR R/W/S RDY
2064                                                                  ;REPORT ERROR. R/W/S RDY CLR
2065  020304  104401  020312                  TYPE    ,65$            ;;TYPE ASCIZ STRING
2066  020310  000411                          BR      64$             ;;GET OVER THE ASCIZ
2067                                  ;;65$:  .ASCIZ  <15><12>/RWS RDY NOT SET/
2068  020334                          64$:
2069
2070  020334  000406                          BR      DN1DRV
2071
2072                                  ;IF DPL SET CLEAR THE ERROR BY DOING CONTROL RESET.
2073
2074  020336  012777  000001  161024  CLRDPL: MOV     #1,@RKCS        ;CONTROL RESET
2075  020344  105777  161020          1$:     TSTB    @RKCS           ;WAIT FOR CNTRL RDY
2076    7350  100375                          BPL     1$
2077                                  ;AT THIS STAGE THE DRIVE (# IN RKDA) HAS BEEN CHECKED
2078                                  ;FOR DRY, WPS, DPL, & SIN. THE POINTERS ARE INCREMENTED
2079                                  ;AND THE SAME CHECKS WILL BE DONE ON THE NEXT
2080                                  ;DRIVE & THEN THE NEXT ONE & SO ON. NOTE THAT
2081                                  ;THIS SUB-PROGRAM KEEPS ON CYCLING THROUGH
2082                                  ;ALL THE DRIVES. AT THE TIME OF ENTRY (HERE)
2083                                  ;R0 POINTS TO THE FLAG FOR THE DRIVE THAT WAS
2084                                  ;JUST CHECKED. BEFORE GOING ON TO THE NEXT
2085                                  ;DRIVE THE H' DS ARE BROUGHT BACK TO CYLINDER
2086                                  ;0 (FOR THE NEXT CYCLE).
2087
2088  020352  011077  161020          DN1DRV: MOV     (R0),@RKDA      ;GET DRIVE #
2089  020356  105777  161002                  TSTB    @RKDS           ;DRIVE PRESENT?
2090  020362  100017                          BPL     3$              ;NO
2091  020364  042777  017777  161004          BIC     #17777,@RKDA    ;CYL ADRES = 0
2092  020372  012777  000011  160770          MOV     #11,@RKCS       ;GO, SEEK
2093
2094  020400  105777  160764          1$:     TSTB    @RKCS           ;WAIT FOR CNTRL RDY
2095  020404  100375                          BPL     1$
2096
2097  020406  004737  005614                  JSR     PC,SMTME
2098  020412  032777  000100  160744  4$:     BIT     #RWS,@RKDS
2099  020420  001774                          BEQ     4$
2100
2101  020422  005720                  3$:     TST     (R0)+           ;INCREMENT POINTERS TO
2102  020424  005201                          INC     R1              ;NEXT DRIVE
2103  020426  020127  000010                  CMP     R1,#10          ;ALL DONE, THIS CYCLE?
2104  020432  001402                          BEQ     2$              ;YES
2105  020434  000137  017430                  JMP     BEGCT1          ;GO DO NEXT DRIVE
2106  020440  000137  017422          2$:     JMP     BEGCT           ;RESTART THE CYCLE OVER
2107                                                                  ;AGAIN
2108
2109
2110
2111  020444  000000                  SHFCNT: .WORD   0
2112  020446  000000                  DRVCNT: .WORD   0
2113                                  ;MESSAGES
2114  020450  005015  051104  053111  EM1:    .ASCIZ  <15><12>/DRIVE /
```

```
2116  020461  040  047440  020116  EM2:   .ASCIZ  /  ON LINE/
2117  020466  044514  042516  000
2118  020473  040  047440  043106  EM3:   .ASCIZ  /  OFF LINE/
2119  020500  046040  047111  000105
2120  020506  020040  051127  020124  EM4:    ASCIZ  /  WRT PROT/
2121  020514  051120  052117  000
2122  020521  040  053440  052122  EM5:   .ASCIZ  /  WRT ENABLED/
2123  020526  042440  040516  046102
2124  020534  042105  000
2125  020537  040  042040  044522  EM6:   .ASCIZ  /  DRIVE POWER LO/
2126  020544  042526  050040  053517
2127  020552  051105  046040  000117
2128  020560  020040  047520  042527  EM7:   .ASCIZ  /  POWER UP/
2129  020566  020122  050125  000
2130  020573  040  051440  047111  EM8:   .ASCIZ  /  SIN/
2131  020600  000
2132  020601  040  051440  042505  EM9:   .ASCIZ  /  SEEK OK/
2133  020606  020113  045517  000
2134
2135                          ;DRIVE FLAGS FOR CONTROL PANEL TEST #2
2136                          ;BITS 15,14,13 GIVE THE DRIVE NO (EX: 0,1,2,---)
2137                          ;BIT 7 IS SET WHEN 'DRY' BIT IS SET FOR THE DRIVE (ON LINE)
2138                          ;BIT 7 IS CLEAR WHEN 'DRY' IS CLEAR (WHEN DRIVE IS IN LOAD/OFF LINE,
2139                          ;DRIVE POWER IS CUT OFF)
2140                          ;BIT 6 IS SET IF A DRIVE IS FOUND TO BE PRESENT (DRY) AT
2141                          ; THE BEGINING. UNLIKE BIT 7 THIS BIT DOES NOT GET SET OR
2142                          ;CLEARED AS THE DRIVE CONDITIONS CHANGE. IT JUST INDICATES
2143                          ;THAT THE DRIVE IS AVAILABLE FOR CHECKING.
2144                          ;BIT 0 IS SET IF 'DPL' BIT GETS SET, IE: DRIVE POWER OFF
2145                          ;BIT 0 IS CLEARED WHEN DRIVE POWER IS ON.
2146                          ;BIT 1 IS SET WHEN SEEK INCOMPLETE 'SIN' OCCURS.
2147                          ;BIT 1 IS CLEAR WHEN SEEK IS OK.
2148                          ;BIT 2 IS SET WHEN WRT PROT IS SET FROM CONSOLE.
2149                          ;BIT 2 IS CLEARED WHEN DRIVE IS WRITE ENABLED.
2150
2151  020614                        .EVEN
2152  020614  000000  DRIV0:  .WORD  0          ;DRIVE FLAGS
2153  020616  000000  DRIV1:  .WORD  0
2154  020620  000000  DRIV2:  .WORD  0
2155  020622  000000  DRIV3:  .WORD  0
2156  020624  000000  DRIV4:  .WORD  0
2157  020626  000000  DRIV5:  .WORD  0
2158  020630  000000  DRIV6:  .WORD  0
2159  020632  000000  DRIV7:  .WORD  0
2160
```

```
                                        .SBTTL  HEAD ALIGNMENT ROUTINE

                                ;HEAD ALIGNMENT ROUTINE
                                ;THIS MAINTAINANCE ROUTINE IS HELPFUL IN HEAD ALIGNMENT. UPON ENTRY
                                ;THE QUESTION - DRIVE? - IS ASKED.  THE USER SHOULD REPLY WITH THE
                                ;DRIVE NUMBER THAT IS TO BE ALIGNED. IF THE DRIVE IS AN RK-05F
                                ;THE LETTER 'F' IS ADDED AS A SUFFIX. FOR SELECTING SURFACE 0
                                ;PUT SW0=0, FOR SELECTING SURFACE 1 PUT SW0=1. SET SW1 =1 TO SELECT
                                ;CYLINDER 64.  SET SW1=0 TO SELECT CYLINDER 105.
                                ;IF THE DRIVE IS AN RK-05F, CYLINDER 64 BECOMES CYLINDER 130
                                ;OF THE EVEN DRIVE, AND CYLINDER 105 BECOMES CYLINDER 5 OF THE ODD DRIVE
                                ;THE HEADS ARE PLACED ON THE SELECTED CYLINDER AND DATA IS READ
                                ;CONTINUOSLY FROM THE CYLINDER (SECTOR 0)
                                ;  THE UPPER OR LOWER HEAD AND CYLINDER CAN BE SELECTED
                                ;DYNAMICALLY, IE. THE PROGRAM DOES NOT HAVE TO BE STOPPED TO SELECT THE
                                ;UPPER OR LOWER HEAD OR CYLINDER.
                                ;IN ORDER TO SELECT ANOTHER DRIVE, PUT ANY SWITCH FROM SW2 TO SW15 UP AND
                                ;THE PROGRAM WILL AGAIN ASK THE QUESTION (DRIVE?).

020634  000240                  SECT.5: NOP
020636  104401  020644                  TYPE    ,65$                    ;;TYPE ASCIZ STRING
020642  000426                          BR      64$                     ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <15><12>/SET SW0=0 FOR SURFACE 0, SW0=1 FOR SUR 1./
020720                          64$:
020720  104401  020726                  TYPE    ,67$                    ;;TYPE ASCIZ STRING
020724  000432                          BR      66$                     ;;GET OVER THE ASCIZ
                                ;;67$:  .ASCIZ  <15><12>/SET SW1=0 FOR CYLINDER 105, SW1=1 FOR CYLINDER 64/
021012                          66$:
021012  104401  021020                  TYPE    ,69$                    ;;TYPE ASCIZ STRING
021016  000427                          BR      68$                     ;;GET OVER THE ASCIZ
                                ;;69$:  .ASCIZ  <15><12>/PUT ANY SW FROM 2-15 HI TO SELECT NEW DRVE/
021076                          68$:
021076  104401  021532          HDALGN: TYPE    ,EM10                           ;ASK FOR DRIVE #
021102  005037  021526                  CLR     FFLAG                           ;FLAG FOR RK-05F
021106  104410                          RDLIN                                   ;GET OPR INPUT
021110  012601                          MOV     (SP)+,R1                        ;ADDR OF COMMAND STRING
021112  112100                          MOVB    (R1)+,R0                        ;FIRST CHAR
021114  162700  000060                  SUB     #60,R0                          ;0 TO 7
021120  002766                          BLT     HDALGN                          ;TOO SMALL
021122  022700  000067                  CMP     #67,R0                          ;MUST BE 7 OR LESS
021126  002763                          BLT     HDALGN                          ;TOO BIG
021130  000241                          CLC
021132  006000                          ROR     R0
021134  006000                          ROR     R0
021136  006000                          ROR     R0
021140  006000                          ROR     R0
021142  010037  020614                  MOV     R0,DRIV0                        ;ADDRESS OF DRIVE
021146  112100                          MOVB    (R1)+,R0                        ;NEXT INPUT CHAR
021150  001412                          BEQ     5$                              ;ALL DONE IF C.R.
021152  020027  000106                  CMP     R0,#'F                          ;IS IT F?
021156  001347                          BNE     HDALGN                          ;NO, SO ERROR
021160  105711                          TSTB    (R1)                            ;NEXT CHAR MUST BE C.R.
021162  001345                          BNE     HDALGN                          ;ELSE, ERROR
021164  042737  020000  020614          BIC     #BIT13,DRIV0                    ;USE EVEN DRIVE IF R' 05F
021172  005237  021526                  INC     FFLAG                           ;SHOW F TYPE DRIVE
```

```
2218  021202  022737  000176  001140          CMP     #SWREG,SWR      ;SOFTWARE SWITCH REGISTER IN USE?
2219  021210  001002                          BNE     15$             ;BR IF NOT
2220  021212  104405                          GTSWR                   ;REQUEST NEW CONTENTS FOR SWITCH REG
2221  021214  000401                          BR      16$             ;CONTINUE
2222  021216  000000                  15$:    HALT                    ;WAIT FOR OPERATOR TO ENTER NEW SWR VALUE
2223  021220  017737  157714  021530  16$:    MOV     @SWR,SWTCH      ;HOLD SWITCHES
2224  021226  042737  177775  021530          BIC     #177775,SWTCH   ;WANT SW1 ONLY
2225  021234  001005                          BNE     7$              ;SW1 SET, SO LOW CYLINDER
2226  021236  005737  021526                  TST     FFLAG           ;F DRIVE?
2227  021242  001402                          BEQ     7$              ;NO
2228  021244  052700  020000                  BIS     #BIT13,R0       ;ODD DRIVE IF HIGH TRACK OF F
2229  021250  010077  160122          7$:     MOV     R0,@RKDA        ;ADDRESS DRIVE
2230  021254  012777  000017  160106          MOV     #17,@RKCS       ;WRITE PROTECT
2231  021262  105777  160102          8$:     TSTB    @RKCS
2232  021266  100375                          BPL     8$              ;WAIT FOR DRIVE READY
2233  021270  012777  000001  160072          MOV     #1,@RKCS        ;RESET CONTROLLER
2234  021276  105777  160066          9$:     TSTB    @RKCS
2235  021302  100375                          BPL     9$              ;WAIT FOR READY
2236  021304  005737  021526                  TST     FFLAG           ;F DRIVE?
2237  021310  001410                          BEQ     13$             ;NO
2238  021312  012701  000240                  MOV     #5.*40,R1       ;TRACK 5 OF HIGH
2239  021316  005737  021530                  TST     SWTCH           ;SW1 SET?
2240  021322  001412                          BEQ     10$             ;YES SO TEST TRACK 8 OF DRIVE HIGH
2241  021324  062701  010100                  ADD     #130.*40,R1     ;TRACK 130. IF SW1 SET
2242  021330  000407                          BR      10$
2243  021332  012701  004000          13$:    MOV     #64.*40,R1      ;CYLINDER 64 IF NOT F
2244  021336  005737  021530                  TST     SWTCH           ;SW1 SET?
2245  021342  001002                          BNE     10$             ;YES, SO CYLINDER 64
2246  021344  062701  002440                  ADD     #41.*40,R1      ;CYLINDER 105
2247  021350  005777  160014          10$:    TST     @RKCS           ;ANY ERROR?
2248  021354  100006                          BPL     11$             ;NO, CONTINUE
2249  021356  012777  000001  160004          MOV     #1,@RKCS        ;RESET
2250  021364  105777  160000          12$:    TSTB    @RKCS
2251  021370  100375                          BPL     12$             ;WAIT FOR READY
2252  021372  017702  157542          11$:    MOV     @SWR,R2         ;SWITCH REG TO R2
2253  021376  042702  177775                  BIC     #^177775,R2     ;SW1 O'NLY
2254  021402  020237  021530                  CMP     R2,SWTCH        ;ANY CHANGE SINCE LAST?
2255  021406  001273                          BNE     5$              ;YES, GO SET-UP ADDR AGAIN
2256  021410  010077  157762          6$:     MOV     R0,@RKDA        ;ADDRESS THE DRIVE
2257  021414  012777  000017  157746          MOV     #17,@RKCS       ;WRITE  PROTECT THE DRIVE
2258  021422  105777  157742                  TSTB    @RKCS           ;WAIT FOR CONTROL RDY
2259  021426  100375                          BPL     .-4
2260  021430  042700  000020          4$:     BIC     #20,R0          ;CLEAR TRACK ADDR
2261  021434  032777  000001  157476          BIT     #1,@SWR         ;SW0 SET?
2262  021442  001402                          BEQ     2$              ;NO TEST TRACK 0
2263  021444  052700  000020                  BIS     #20,R0          ;TEST TRACK 1
2264  021450  042700  017740          2$:     BIC     #17740,R0       ;CLEAR CYLINDER ADDR
2265  021454  050100                          BIS     R1,R0           ;PUT CYLINDER ADDR IN ADDR
2266  021456  010077  157714                  MOV     R0,@RKDA        ;ADRES THE DRIVE
2267  021462  012777  177400  157702          MOV     #-400,@RKWC     ;READ 1 SECTOR
2268  021470  012777  007356  157676          MOV     #RDBUFF,@RKBA   ;INTO THIS BUFFER
2269  021476  012777  000005  157664          MOV     #5,@RKCS        ;READ, GO
2270
2271  021504  105777  157660          3$:     TSTB    @RKCS           ;DONE?
2272  021510  100375                          BPL     3$              ;NO
```

```
2274  021512  032777  177774  157420          BIT     #177774,@SWR            ;EXIT OUT?
2275  021520  001713                          BEQ     10$                     ;NO, CONTINUE ON THIS DRIVE
2276  021522  000137  021076                  JMP     HDALGN                  ;YES, GET NEW DRIVE
2277
2278  021526  000000                  FFLAG:  0
2279  021530  000000                  SWITCH: 0
2280  021532  005015  051104  053111  EM10:   .ASCIZ  <15><12>/DRIVE?/
2281  021540  037505     000
2282
2283
2284
2285                                          .SBTTL  DISK POWER FAILURE TEST
2286
2287                                  ;(DISK)POWER FAILURE (DURING DISK WRITE) TEST
2288                                  ;THIS TEST CHECKS THAT THE INFORMATION WRITTEN ON THE DISK IS
2289                                  ;NOT DESTROYED WHEN THE DISK SENSES A LOSS OF POWER WHILE DOING A WRITE
2290                                  ;AND RETRACTS THE HEADS. UPON ENTRY THE PROGRAM FINDS OUT THE
2291                                  ;FIRST AVAILABLE DRIVE INDICATES IT (DRIVE XX) AND PROCEEDS TO TEST.
2292                                  ;CYLINDERS 0 TO 15 ARE WRITTEN WITH UNIQUE PATTERNS, THEN THE HEADS
2293                                  ;ARE POSITIONED ON CYLINDER 10 (DECIMAL) AND A MESSAGE (DROP
2294                                  ;POWER) IS GIVEN.  AFTER RECEIVING THIS MESSAGE THE USER SHOULD
2295                                  ;DROP POWER FROM THE DRIVE.  ON SENSING A LOSS OF POWER, THE
2296                                  ;PROGRAM ASKS THE USER TO PUT BACK THE POWER.  THE ERRORS (DPL)
2297                                  ;ARE CLEARED AND A WRITE-CHECK IS PERFORMED TO CHECK IF THE
2298                                  ;UNIQUE PATTERNS ON THE DISK (CYLINDERS 0-9 AND 11-15) ARE STILL
2299                                  ;THERE.  IF NOT A WRITE CHECK ERROR IS REPORTED.
2300          021544                          .EVEN
2301
2302  021544  005000                  SECT.6: CLR     R0                      ;INITIALIZE DRIVE #
2303  021546  005037  020614                  CLR     DRIVO
2304  021552  010077  157620          8$:     MOV     R0,@RKDA                ;IS IT PRESENT?
2305  021556  105777  157602                  TSTB    @RKDS                   ;IF NOT SKIP
2306  021562  100406                          BMI     12$
2307  021564  005237  020614          10$:    INC     DRIVO
2308  021570  062700  020000                  ADD     #20000,R0
2309  021574  001366                          BNE     8$
2310  021576  000762                          BR      SECT.6
2311  021600  013746  020614          12$:     MOV    DRIVO,-(SP)             ;GET DRIVE #
2312  021604  032777  000040  157552          BIT     #40,@RKDS
2313  021612  001406                          BEQ     9$
2314  021614  104401  022234                  TYPE    ,EM11
2315  021620  104402                          TYPOC
2316  021622  104401  022244                  TYPE    ,EM12
2317  021626  000756                          BR      10$
2318  021630  104401  020450          9$:     TYPE    ,EM1
2319  021634  013746  020614                  MOV     DRIVO,-(SP)
2320  021640  104402                          TYPOC
2321  021642  012777  000001  157520          MOV     #1,@RKCS                ;CONTROL RESET
2322  021650  105777  157514                  TSTB    @RKCS
2323  021654  100375                          BPL     .-4
2324  021656  005005                          CLR     R5                      ;INITIALIZE PATTERN TO BE WRITTEN
2325                                                                          ;0 ON CYL 0, 1 ON CYL 1, ETC
2326  021660  013701  001376                  MOV     RKDA,R1
2327  021664  013702  001372                  MOV     RKWC,R2
2328  021670  013703  001374                  MOV     RKBA,R3
```

```
2330  021700  010011                        1$:     MOV     R0,@R1
2331  021702  010537  022232                        MOV     R5,BUFR         ;FILL THE PATTER IN DATA BUFFER.
2332  021706  012713  022232                        MOV     #BUFR,@R3       ;BUS ADRES
2333  021712  012712  164000                        MOV     #-14000,@R2     ;WRITE 1 CYL (256X12X2 WORDS)
2334  021716  012714  004003                        MOV     #4003,@R4       ;WRITE, GO, IBA SET
2335  021722  105714                              2$: TSTB    @R4             ;WAIT FOR CONTROL READY
2336  021724  100376                              3$: BPL     .-2
2337                                                                        ;DONE
2338  021726  005205                              4$: INC     R5              ;WRITTEN ALL 15 CYLINDERS?
2339  021730  020527  000020                        CMP     R5,#20          ;IF NOT, GO BAK
2340  021734  001362                              5$: BNE     1$
2341
2342  021736  010005                              6$: MOV     R0,R5           ;DRIVE #
2343  021740  052705  000500                        BIS     #500,R5         ;CYL 10
2344  021744  012737  000012  022232                MOV     #12,BUFR        ;PATERN TO BE WRITTEN
2345  021752  010511                              7$: MOV     R5,@R1          ;ADRES THE DISK
2346  021754  012712  164000                        MOV     #-14000,@R2     ;WORD COUNT= 1 CYLINDER
2347  021760  012713  022232                        MOV     #BUFR,@R3       ;BUS ADRES
2348  021764  012714  004003                        MOV     #4003,@R4       ;WRITE, GO, IBA
2349  021770  032777  000100  157366              8$: BIT     #RKDS,@RKDS     ;WAIT FOR THE HEADS TO SETTLE
2350  021776  001774                              9$: BEQ     2$              ;ON CYL 10
2351  022000  104401  022006                        TYPE    ,65$            ;;TYPE ASCIZ STRING
2352  022004  000406                              10$:BR      64$             ;;GET OVER THE ASCIZ
2353                                              ;;65$:  .ASCIZ  /DROP POWER/
2354  022022                                      64$:
2355
2356  022022  000407                              11$:BR      5$
2357  022024  010511                              3$: MOV     R5,@R1          ;ADRES THE DISK
2358  022026  012712  164000                        MOV     #-14000,@R2     ;WORD COUNT= 1 CYLINDER
2359  022032  012713  022232                        MOV     #BUFR,@R3       ;BUS ADRES
2360  022036  012714  004003                        MOV     #4003,@R4       ;WRITE, GO, IBA
2361  022042  105714                              5$: TSTB    @R4             ;WAIT FOR CONTROL READY
2362  022044  100376                              6$: BPL     .-2
2363  022046  005714                              7$: TST     @R4             ;WAIT FOR DRIVE POWER TO GO DOWN,
2364                                                                        ;OTHERWISE, KEEP ON WRITING ON CYL 10
2365  022050  100365                              8$: BPL     3$
2366                                                                        ;IF DRIVE POWER LOSS WAS SENSED,
2367                                                                        ;ASK TO PUT POWER ON.
2368  022052  104401  022060                        TYPE    ,67$            ;;TYPE ASCIZ STRING
2369  022056  000406                              9$: BR      66$             ;;GET OVER THE ASCIZ
2370                                              ;;67$:  .ASCIZ  <15><12>/POWER ON/
2371  022074                                      66$:
2372  022074  105777  157264                        TSTB    @RKDS           ;WAIT FOR DRIVE READY
2373  022100  100375                              1$: BPL     .-4
2374  022102  012711  000001                        MOV     #1,@R4          ;CONTROL RESET, CLEAR ERROR
2375  022106  105714                              2$: TSTB    @R4
2376  022110  100376                              3$: BPL     .-2
2377  022112  010077  157260                        MOV     R0,@RKDA
2378  022116  005005                              4$: CLR     R5              ;INITIALIZE PATTERN
2379  022120  010537  022232                      6$: MOV     R5,BUFR
2380  022124  012713  022232                        MOV     #BUFR,@R3
2381  022130  012712  164000                        MOV     #-14000,@R2
2382  022134  012714  004007                        MOV     #4007,@R4       ;WRITE CHECK, GO, IBA
2383  022140  105714                              7$: TSTB    @R4
2384  022142  100376                              8$: BPL     .-2
```

```
023A6  022144  005714                          TST     @R4             ;ANY ERROR?
2387   022146  100023                          BPL     7$              ;NO
2388   022150  104401  022156                  TYPE    ,69$            ;;TYPE ASCIZ STRING
2389   022154  000416                          BR      68$             ;;GET OVER THE ASCIZ
2390                                   ;;69$:   .ASCIZ  <15><12>/ERROR, ON PWR-UP,  RKDA=/
2391   022212                          68$:
2392   022212  011146                          MOV     @R1,-(SP)
2393   022214  104402                          TYPOC
2394   022216  005205                  7$:     INC     R5
2395   022220  020527  000020                  CMP     R5,#20
2396   022224  001335                          BNE     6$
2397
2398   022226  000137  021564                  JMP     10$
2399
2400   022232  000000                  BUFR:   .WORD   0
2401   022234  051104  053111  020105, EM11:   .ASCIZ  /DRIVE  /
2402   022242  000040
2403   022244  051511  053440  044522  EM12:   .ASCIZ  /IS WRITE PROTECTED /
2404   022252  042524  050040  047522
2405   022260  042524  052103  042105
2406   022266  000040
2407
2408
2409                                   .SBTTL  TYPE ROUTINE
2410
2411                                   ;;*****************************************************************
2412                                   ;*ROUTINE TO TYPE ASCIZ MESSAGE, MESSAGE MUST TERMINATE WITH A 0 BYTE.
2413                                   ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
2414                                   ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
2415                                   ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
2416                                   ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
2417                                   ;*
2418                                   ;*CALL:
2419                                   ;*1) USING A TRAP INSTRUCTION
2420                                   ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
2421                                   ;*OR
2422                                   ;*      TYPE
2423                                   ;*      MESADR
2424                                   ;*
2425
2426   022270  105737' 001157  $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
2427   022274  100002                  BPL     1$              ;;BR IF YES
2428   022276  000000                  HALT                    ;;HALT HERE IF NO TERMINAL
2429   022300  000407                  BR      3$              ;;LEAVE
2430   022302  010046          1$:     MOV     R0,-(SP)        ;;SAVE R0
2431   022304  017600  000002          MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
2432   022310  112046          2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
2433   022312  001005                  BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
2434   022314  005726                  TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
2435   022316  012600          6O$:    MOV     (SP)+,R0        ;;RESTORE R0
2436   022320  062716  000002  3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
2437   022324  000002                  RTI                     ;;RETURN
2438   022326  122716  000011  4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
2439   022332  001430                  BEQ     8$
2440   022334  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
```

```
2442  022342  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
2443  022344  104401                          TYPE                    ;;TYPE A CR AND LF
2444  022346  001161                          $CRLF
2445  022350  105037  022504                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
2446  022354  000755                          BR      2$              ;;GET NEXT CHARACTER
2447  022356  004737  022440          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
2448  022362  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
2449  022366  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
2450  022370  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
2451                                                                  ;;AND THE NULL CHAR.
2452  022374  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
2453  022400  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
2454  022402  004737  022440                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
2455  022406  105337  022504                  DECB    $CHARCNT        ;;DO N T COUNT AS A COUNT
2456  022412  000770                          BR      7$              ;;LOOP
2457
2458                                  ;HORIZONTAL TAB PROCESSOR
2459
2460  022414  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
2461  022420  004737  022440          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
2462  022424  132737  000007  022504          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
2463  022432  001372                          BNE     9$              ;;TAB STOP
2464  022434  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
2465  022436  000724                          BR      2$              ;;GET NEXT CHARACTER
2466  022440  105777  156504          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
2467  022444  100375                          BPL     $TYPEC
2468  022446  116677  000002  156476          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
2469  022454  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
2470  022462  001003                          BNE     1$              ;;BRANCH IF NO
2471  022464  105037  022504                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
2472  022470  000406                          BR      $TYPEX          ;;EXIT
2473  022472  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
2474  022500  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
2475  022502  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
2476  022504  000000          $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
2477  022506  000207          $TYPEX: RTS     PC
2478
2479                                  .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
2480
2481                                  ;;*****************************************************************
2482                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
2483                                  ;*OCTAL (ASCII) NUMBER AND TYPE IT.
2484                                  ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
2485                                  ;*CALL:
2486                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
2487                                  ;*      TYPOS                   ;;CALL FOR TYPEOUT
2488                                  ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
2489                                  ;*      .BYTE   M               ;;M=1 OR 0
2490                                  ;*                                      ;;1=TYPE LEADING ZEROS
2491                                  ;*                                      ;;0=SUPPRESS LEADING ZEROS
2492                                  ;*
2493                                  ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
2494                                  ;*$TYPOS OR $TYPOC
2495                                  ;*CALL:
2496                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
```

```
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT
                                        ;
022510  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
022514  116637  000001  022733          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
022522  112637  022735                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
022526  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
022532  000406                          BR      $TYPON
022534  112737  000001  022733  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
022542  112737  000006  022735          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
022550  112737  000005  022732  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
022556  010346                          MOV     R3,-(SP)        ;;SAVE R3
022560  010446                          MOV     R4,-(SP)        ;;SAVE R4
022562  010546                          MOV     R5,-(SP)        ;;SAVE R5
022564  113704  022735                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
022570  005404                          NEG     R4
022572  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
022576  110437  022734                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
022602  113704  022733                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
022606  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
022612  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
022614  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
022616  000404                          BR      3$              ;;GO DO MSB
022620  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
022622  006105                          ROL     R5
022624  006105                          ROL     R5
022626  010503                          MOV     R5,R3
022630  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
022632  105337  022734                  DECB    $OMODE          ;;TYPE THIS DIGIT?
022636  100016                          BPL     7$              ;;BR IF NO
022640  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
022644  001002                          BNE     4$              ;;TEST FOR 0
022646  005704                          TST     R4              ;;SUPPRESS THIS 0?
022650  001403                          BEQ     5$              ;;BR IF YES
022652  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
022654  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
022660  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
022664  110337  022730                  MOVB    R3,8$           ;;SAVE FOR TYPING
022670  104401  022730                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
022674  105337  022732          7$:     DECB    $OCNT           ;;COUNT BY 1
022700  003347                          BGT     2$              ;;BR IF MORE TO DO
022702  002402                          BLT     6$              ;;BR IF DONE
022704  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
022706  000744                          BR      2$              ;;GO DO THE LAST DIGIT
022710  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
022712  012604                          MOV     (SP)+,R4        ;;RESTORE R4
022714  012603                          MOV     (SP)+,R3        ;;RESTORE R3
022716  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
022724  012616                          MOV     (SP)+,(SP)
022726  000002                          RTI                     ;;RETURN
022730     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
022731     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
```

```
                                $OFILL:  BYTE   0               ;;ZERO FILL SWITCH
                                $OMODE:  .WORD  0               ;;NUMBER OF DIGITS TO TYPE
                                .SBTTL  TTY INPUT ROUTINE

                                ;;**************************************************************
                                .ENABL  LSB
                                $TKCNT:  .WORD  0               ;;NUMBER OF ITEMS IN QUEUE
                                $TKQIN:  .WORD  0               ;;INPUT POINTER
                                $TKQOUT: .WORD  0               ;;OUTPUT POINTER
                                $TKQSRT: .BLKB  1               ;;TTY KEYBOARD QUEUE
                                $TKQEND=.
                                .EVEN

                                ;*TK INITIALIZE ROUTINE
                                ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
                                ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
                                ;
                                ;*CALL:
                                ;*      JSR     PC,$TKINT
                                ;*      RETURN
                                ;
022746  005037  022736          $TKINT: CLR     $TKCNT          ;;CLEAR COUNT OF ITEMS IN QUEUE
022752  012737  022744  022740          MOV     #$TKQSRT,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
022760  013737  022740  022742          MOV     $TKQIN,$TKQOUT  ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
022766  012737  023016  000060          MOV     #$TKSRV,@#TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
022774  012737  000200  000062          MOV     #200,@#TKVEC+2  ;;"BR" LEVEL 4
023002  005777  156140                  TST     @$TKB           ;;CLEAR DONE FLAG
023006  012777  000100  156130          MOV     #100,@$TKS      ;;ENABLE TTY KEYBOARD INTERRUPT
023014  000207                        RTS     PC              ;;RETURN TO CALLER

                                ;*TK SERVICE ROUTINE
                                ;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
                                ;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
                                ;*IT IN THE QUEUE.
                                ;
023016  117746  156120          $TKSRV: MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
023022  042716  177600                  BIC     #^C177,(SP)     ;;STRIP THE JUNK
023026  021627  000007          1$:     CMP     (SP),#7         ;;IS IT A CONTROL G?
023032  001004                        BNE     2$              ;;BRANCH IF NO
023034  022737  000176  001140          CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
023042  001500                        BEQ     6$              ;;GO TO SWR CHANGE

023044                          2$:
023044  022737  000001  022736          CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
023052  001004                        BNE     3$              ;;BRANCH IF NO
023054  104401  024066                  TYPE    ,$BELL          ;;RING THE TTY BELL
023060  005726                        TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
023062  000451                        BR      5$              ;;EXIT
023064  021627  000023          3$:     CMP     (SP),#23        ;;IS IT A CONTROL-S?
023070  001021                        BNE     32$             ;;BRANCH IF NO
023072  005077  156046                  CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
023076  005726                        TST     (SP)+           ;;CLEAN CHAR OFF STACK
023100  105777  156040          31$:    TSTB    @$TKS           ;;WAIT FOR A CHAR
023104  100375                        BPL     31$             ;;LOOP UNTIL ITS THERE
023106  117746  156034                  MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
```

```
2610  023116  022627  000021              CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
2611  023122  001366                      BNE     31$             ;;BRANCH IF NO
2612  023124  012777  000100  156012      MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
2613  023132  000002                      RTI                     ;;RETURN
2614  023134  005237  022735      32$:    INC     $TKCNT          ;;COUNT THIS CHARACTER
2615  023140  021627  000140              CMP     (SP),#140       ;;IS IT UPPER CASE?
2616  023144  002405                      BLT     4$              ;;BRANCH IF YES
2617  023146  021627  000175              CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
2618  023152  003002                      BGT     4$              ;;BRANCH IF YES
2619  023154  042716  000040              BIC     #40,(SP)        ;;MAKE IT UPPER CASE
2620  023160  112677  177554      4$:     MOVB    (SP)+,@$TKQIN   ;;AND PUT IT IN QUEUE
2621  023164  005237  022740              INC     $TKQIN          ;;UPDATE THE POINTER
2622  023170  023727  022740  022745      CMP     $TKQIN,#$TKQEND ;;GO OFF THE END?
2623  023176  001003                      BNE     5$              ;;BRANCH IF NO
2624  023200  012737  022744  022740      MOV     #$TKQSRT,$TKQIN ;;RESET THE POINTER
2625  023206  000002              5$:     RTI                     ;;RETURN
2626
2627                                      ;;**********************************************************************
2628                                      ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
2629                                      ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
2630                                      ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
2631                                      ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
2632  023210  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED
2633  023216  001104                      BNE     15$             ;;EXIT IF NOT
2634  023220  105777  155720              TSTB    @$TKS           ;;IS A CHAR WAITING?
2635  023224  100101                      BPL     15$             ;;IF NOT, EXIT
2636  023226  117746  155714              MOVB    @$TKB,-(SP)     ;;YES
2637  023232  042716  177600              BIC     #^C177,(SP)     ;;MAKE IT  7-BIT ASCII
2638  023236  021627  000007              CMP     (SP),#7         ;;IS IT A CONTROL-G?
2639  023242  001300                      BNE     2$              ;;IF NOT, PUT IT IN THE TTY QUEUE
2640                                                              ;;AND EXIT
2641
2642                                      ;;**********************************************************************
2643                                      ;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
2644                                      ;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
2645                                      ;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
2646  023244  123727  001134  000001  6$:     CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
2647  023252  001674                      BEQ     2$              ;;BRANCH IF YES
2648  023254  005726                      TST     (SP)+           ;;CLEAR CONTROL-G OFF STACK
2649  023256  004737  022746              JSR     PC,$TKINT       ;;FLUSH THE TTY INPUT QUEUE
2650  023262  005077  155656              CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
2651  023266  112737  000001  001135      MOVB    #1,$INTAG       ;;SET INTERRUPT MODE INDICATOR
2652
2653  023274  104401  024077              TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
2654  023300  104401  024104      $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
2655  023304  013746  000176              MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
2656  023310  104402                      TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2657  023312  104401  024115              TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
2658  023316  005046              19$:    CLR     -(SP)           ;;CLEAR COUNTER
2659  023320  005046                      CLR     -(SP)           ;;THE NEW SWR
2660  023322  105777  155616      7$:     TSTB    @$TKS           ;;CHAR THERE?
2661  023326  100375                      BPL     7$              ;;IF NOT TRY AGAIN
2662
2663  023330  117746  155612              MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
2664  023334  042716  177600              BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
```

```
2666
2667
2668  023340  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
2669  023344  001005                          BNE     10$             ;;BRANCH IF NOT
2670  023346  104401  024072                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (↑U)
2671  023352  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
2672  023356  000757                          BR      19$             ;;LET'S TRY IT AGAIN
2673
2674
2675  023360  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
2676  023364  001022                          BNE     16$             ;;BRANCH IF NO
2677  023366  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
2678  023372  001403                          BEQ     11$             ;;BRANCH IF YES
2679  023374  016677  000002  155536          MOV     2(SP),@SWR      ;;SAVE NEW SWR
2680  023402  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
2681  023406  104401  001161          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
2682  023412  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
2683  023420  001003                          BNE     15$             ;;BRANCH IF NOT
2684  023422  012777  000100  155514          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
2685  023430  000002          15$:    RTI                             ;;RETURN
2686  023432  004737  022440          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
2687  023436  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
2688  023442  002420                          BLT     18$             ;;BRANCH IF YES
2689  023444  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
2690  023450  003015                          BGT     18$             ;;BRANCH IF YES
2691  023452  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
2692  023456  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
2693  023462  001403                          BEQ     17$             ;;BRANCH IF YES
2694  023464  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
2695  023466  006316                          ASL     (SP)            ;;   CHAR OVER TO MAKE
2696  023470  006316                          ASL     (SP)            ;;   ROOM FOR NEW ONE.
2697  023472  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
2698  023476  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
2699  023502  000707                          BR      7$              ;;GET THE NEXT ONE
2700  023504  104401  001160          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
2701  023510  000720                          BR      20$             ;;SIMULATE CONTROL-U
2702                                  .DSABL  LSB
2703
2704
2705                                  ;;**************************************************************
2706                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
2707                                  ;*CALL:
2708                                  ;*      RDCHR                   ;;GET A CHARACTER FROM THE QUEUE
2709                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
2710                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
2711                                  ;
2712
2713  023512  011646          $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC AND
2714  023514  016666  000004  000002          MOV     4(SP),2(SP)     ;;THE PS
2715  023522  005066  000004                  CLR     4(SP)           ;;GET READY FOR A CHARACTER
2716  023526  005046                          CLR     -(SP)           ;;PUT NEW PS ON STACK
2717  023530  012746  023536                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
2718  023534  000002                          RTI                     ;;POP NEW PC AND PS
2719  023536                          64$:
2720  023536  005737  022736          1$:     TST     $TKCNT          ;;WAIT ON A CHARACTER
```

```
2722  023544  005337  022736                  DEC     $TKCNT                  ;;DECREMENT THE COUNTER
2723  023550  117766  177166  000004          MOVB    @$TKQOUT,4(SP)          ;;GET ONE CHARACTER
2724  023556  005237  022742                  INC     $TKQOUT                 ;;UPDATE THE POINTER
2725  023562  023727  022742  022745          CMP     $TKQOUT,#$TKQEND        ;;DID IT GO OFF OF THE END?
2726  023570  001003                          BNE     2$                      ;;BRANCH IF NO
2727  023572  012737  022744  022742          MOV     #$TKQSRT,$TKQOUT        ;;RESET THE POINTER
2728  023600  000002                  2$:     RTI                             ;;RETURN
2729                                          ;;**************************************************************
2730                                          ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
2731                                          ;*CALL:
2732                                          ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
2733                                          ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
2734                                          ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
2735
2736  023602  010346                  $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
2737  023604  005046                          CLR     -(SP)                   ;;CLEAR THE RUBOUT KEY
2738  023606  012703  024036          1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
2739  023612  022703  024066          2$:     CMP     #$TTYIN+30,R3           ;;BUFFER FULL?
2740  023616  101456                          BLOS    4$                      ;;BR IF YES
2741  023620  104407                          RDCHR                           ;;GO READ ONE CHARACTER FROM THE TTY
2742  023622  112613                          MOVB    (SP)+,(R3)              ;;GET CHARACTER
2743  023624  122713  000177          10$:    CMPB    #177,(R3)               ;;IS IT A RUBOUT
2744  023630  001022                          BNE     5$                      ;;BR IF NO
2745  023632  005716                          TST     (SP)                    ;;IS THIS THE FIRST RUBOUT?
2746  023634  001007                          BNE     6$                      ;;BR IF NO
2747  023636  112737  000134  024034          MOVB    #'\,9$                  ;;TYPE A BACK SLASH
2748  023644  104401  024034                  TYPE    ,9$
2749  023650  012716  177777                  MOV     #-1,(SP)                ;;SET THE RUBOUT KEY
2750  023654  005303                  6$:     DEC     R3                      ;;BACKUP BY ONE
2751  023656  020327  024036                  CMP     R3,#$TTYIN              ;;STACK EMPTY?
2752  023662  103434                          BLO     4$                      ;;BR IF YES
2753  023664  111337  024034                  MOVB    (R3),9$                 ;;SETUP TO TYPEOUT THE DELETED CHAR.
2754  023670  104401  024034                  TYPE    ,9$                     ;;GO TYPE
2755  023674  000746                          BR      2$                      ;;GO READ ANOTHER CHAR.
2756  023676  005716                  5$:     TST     (SP)                    ;;RUBOUT KEY SET?
2757  023700  001406                          BEQ     7$                      ;;BR IF NO
2758  023702  112737  000134  024034          MOVB    #'\,9$                  ;;TYPE A BACK SLASH
2759  023710  104401  024034                  TYPE    ,9$
2760  023714  005016                          CLR     (SP)                    ;;CLEAR THE RUBOUT KEY
2761  023716  122713  000025          7$:     CMPB    #25,(R3)                ;;IS CHARACTER A CTRL U?
2762  023722  001003                          BNE     8$                      ;;BR IF NO
2763  023724  104401  024072                  TYPE    ,$CNTLU                 ;;TYPE A CONTROL "U"
2764  023730  000726                          BR      1$                      ;;GO START OVER
2765  023732  122713  000022          8$:     CMPB    #22,(R3)                ;;IS CHARACTER A "↑R"?
2766  023736  001011                          BNE     3$                      ;;BRANCH IF NO
2767  023740  105013                          CLRB    (R3)                    ;;CLEAR THE CHARACTER
2768  023742  104401  001161                  TYPE    ,$CRLF                  ;;TYPE A "CR" & "LF"
2769  023746  104401  024036                  TYPE    ,$TTYIN                 ;;TYPE THE INPUT STRING
2770  023752  000717                          BR      2$                      ;;GO PICKUP ANOTHER CHACTER
2771  023754  104401  001160          4$:     TYPE    ,$QUES                  ;;TYPE A '?'
2772  023760  000712                          BR      1$                      ;;CLEAR THE BUFFER AND LOOP
2773  023762  111337  024034          3$:     MOVB    (R3),9$                 ;;ECHO THE CHARACTER
2774  023766  104401  024034                  TYPE    ,9$
2775  023772  122723  000015                  CMPB    #15,(R3)+               ;;CHECK FOR RETURN
2776  023776  001305                          BNE     2$                      ;;LOOP IF NOT RETURN
```

```
2778  024004  104401  001162                  TYPE    $LF             ;;TYPE A LINE FEED
2779  024010  005726                          TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
2780  024012  012603                          MOV     (SP)+,R3        ;;RESTORE R3
2781  024014  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
2782  024016  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
2783  024024  012766  024036  000004          MOV     #$TTYIN,4(SP)
2784  024032  000002                          RTI                     ;;RETURN
2785  024034     000                  9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
2786  024035     000                          .BYTE   0               ;;TERMINATOR
2787  024036  000030                  $TTYIN: .BLKB   30              ;;RESERVE 30 BYTES FOR TTY INPUT
2788  024066  177607  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
2789  024072  052536  005015     000  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
2790  024077     136  006507  000012  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
2791  024104  005015  053523  020122  $MSWR:  .ASCIZ  <15><12>/SWR = /
2792  024112  020075     000
2793  024115     040  047040  053505  $MNEW:  .ASCIZ  /  NEW = /
2794  024122  036440  000040
2795                                  .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
2796
2797                                  ;;**************************************************************
2798                                  ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
2799                                  ;*CHANGE IT TO BINARY.
2800                                  ;*CALL:
2801                                  ;*      RDOCT                   ;;READ AN OCTAL NUMBER
2802                                  ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
2803                                  ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
2804
2805  024126  011646                  $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
2806  024130  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
2807  024136  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
2808  024140  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2809  024142  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
2810  024144  104410                  1$:     RDLIN                   ;;READ AN ASCIZ LINE
2811  024146  012600                          MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
2812  024150  005001                          CLR     R1              ;;CLEAR DATA WORD
2813  024152  005002                          CLR     R2
2814  024154  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
2815  024156  001412                          BEQ     3$              ;;IF ZERO GET OUT
2816  024160  006301                          ASL     R1              ;;*2
2817  024162  006102                          ROL     R2
2818  024164  006301                          ASL     R1              ;;*4
2819  024166  006102                          ROL     R2
2820  024170  006301                          ASL     R1              ;;*8
2821  024172  006102                          ROL     R2
2822  024174  042716  177770                BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
2823  024200  062601                          ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
2824  024202  000764                          BR      2$              ;;LOOP
2825  024204  005726                  3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
2826  024206  010166  000012                  MOV     R1,12(SP)       ;;SAVE THE RESULT
2827  024212  010237  024226                  MOV     R2,$HIOCT
2828  024216  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
2829  024220  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
2830  024222  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
2831  024224  000002                          RTI                     ;;RETURN
2832  024226  000000                  $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
```

```
                                ;;**********************************************************************
                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                ;*GO TO THAT ROUTINE.

024230  010046          $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
024232  016600  000002          MOV     2(SP),R0        ;;GET TRAP ADDRESS
024236  005740                  TST     -(R0)           ;;BACKUP BY 2
024240  111000                  MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
024242  006300                  ASL     R0              ;;POSITION FOR INDEXING
024244  016000  024264          MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
024250  000200                  RTS     R0              ;;GO TO ROUTINE

                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

024252  011646          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
024254  016666  000004  000002  MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
024262  000002                  RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

                                ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.

                                ;       ROUTINE
                                ;       -------
024264  024252          $TRPAD: .WORD   $TRAP2
024266  022270                  $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
024270  022534                  $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
024272  022510                  $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
024274  022550                  $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)

024276  023300                  $GTSWR  ;;CALL=GTSWR    TRAP+5(104405)  GET SOFT-SWR SETTING

024300  023210                  $CKSWR  ;;CALL=CKSWR    TRAP+6(104406)  TEST FOR CHANGE IN SOFT-SWR
024302  023512                  $RDCHR  ;;CALL=RDCHR    TRAP+7(104407)  TTY TYPEIN CHARACTER ROUTINE
024304  023602                  $RDLIN  ;;CALL=RDLIN    TRAP+10(104410) TTY TYPEIN STRING ROUTINE
024306  024126                  $RDOCT  ;;CALL=RDOCT    TRAP+11(104411) READ AN OCTAL NUMBER FROM TTY
                        .SBTTL  POWER DOWN AND UP ROUTINES

                                ;;**********************************************************************
                                ;POWER DOWN ROUTINE
024310  012737  024450  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
024316  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
024324  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
024326  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
024330  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
024332  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
024334  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
024336  010546                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
024340  017746  154574          MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
024344  010637  024454          MOV     SP,$SAVR6       ;;SAVE SP
```

```
2890  024356  000000                        HALT
2891  024360  000776                        BR      .-2             ;;HANG UP
2892
2893                                        ;;*****************************************************************
2894                                        ;POWER UP ROUTINE
2895  024362  012737  024450  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
2896  024370  013706  024454                MOV     $SAVR6,SP       ;;GET SP
2897  024374  005037  024454                CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
2898  024400  005237  024454          1$:   INC     $SAVR6          ;;WAIT FOR THE INC
2899  024404  001375                        BNE     1$              ;;OF  WORD
2900  024406  012677  154526                MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
2901  024412  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
2902  024414  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
2903  024416  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
2904  024420  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
2905  024422  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
2906  024424  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
2907  024426  012737  024310  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
2908  024434  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
2909  024442  104401                        TYPE                    ;REPORT THE POWER FAILURE
2910  024444  024456          $PWRMG:       .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
2911  024446  000002                        RTI
2912  024450  000000          $ILLUP:       HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
2913  024452  000776                        BR      .-2             ;;  BEFORE THE POWER DOWN WAS COMPLETE
2914  024454  000000          $SAVR6:       0                       ;;PUT THE SP HERE
2915  024456  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
2916  024464  000122
2917                                        .EVEN
```

```
AUTSI2  002644   443#   660
BA      001406   275#  1366*  1368*  1370*  1372*  1393  1427
BADINP  003274   504    506    513#
BADONE  010360  1145#
BAD.IN  011772  1306#
BAD.ON  013762  1570#  1586   1588
BASE    001266   219#   835
BASINC  005360   840    852#
BEGCT   017422  1881#  2106
BEGCT1  017430  1884#  2105
BEGIN   002622   421    427#
BIT0  = 000001   114#  1078   1398  1415  1432  1971  1978  1982  1989
BIT00 = 000001   104#   114
BIT01 = 000002   103#   113
BIT02 = 000004   102#   112
BIT03 = 000010   101#   111
BIT04 = 000020   100#   110
BIT05 = 000040    99#   109
BIT06 = 000100    98#   108
BIT07 = 000200    97#   107
BIT08 = 000400    96#   106
BIT09 = 001000    95#   105
BIT1  = 000002   113#  1396   1431  2031  2033  2042  2044
BIT10 = 002000    94#  1395   1412
BIT11 = 004000    93#  1395   1429
BIT12 = 010000    92#   289
BIT13 = 020000    91#  1774   1784  2215  2228
BIT14 = 040000    90#   508    541   639   673  1418  1547
BIT15 = 100000    89#   609   1000  1002  1111  1685
BIT2  = 000004   112#  1413   1431  1928  1934  1938  1946
BIT3  = 000010   111#
BIT4  = 000020   110#   800    802   805   937   939   942
BIT5  = 000040   109#   291    754  1760
BIT6  = 000100   108#   290   1356  1361  1471  1861  1955
BIT7  = 000200   107#   590    594  1113  1861  1891  1913
BIT8  = 000400   106#  1429
BIT9  = 001000   105#   292
BPTVEC= 000014   121#
BUFF    013700   275   1561#
BUFR    022232  2331*  2332   2344*  2347  2359  2379*  2380  2400#
BUSADR  001336   253#   796*   867   927*
CHECK1  005450   871#   881    885
CHKCNT  001350   258#  1014*  1055*
CKSWR = 104406  2871#
CLRDPL  020336  1972   1980   2074#
CNTSIN  001322   242#   705*   976*
COM     012320  1351#  1364
COMMON  012314  1350#
COMND   001316   238#   788*   904*   996
CONTIN  011404  1230   1232#  1298
CONTRL  001332   251#   798*   869   930*
CR    = 000015    29#  1381   2469  2479
CRLF  = 000200    30#   366   2440  2479
CYCLE   004174   534    672#
CYCLE2  004220   678#
```

```
CYL     013552  1514* 1518* 1522* 1527#
CYLADR  005302   793  835#  922
CYLAD2  005306   836# 856
CYLBAS  001315   237#
CYLCNT  001342   255#  797
CYLOFF  005312   808  837#  945
CYLTBL  001274   226#  821   836   854
DA      001410   276#  1365* 1374* 1375  1391  1408  1425  1440
DDISP = 177570    36#  181   338
DISPLA  001142   181#  338*  346*
DISPRE  000174   136#  346
DN1DRV  020352  1959  2030  2032  2038  2061  2070  2088#
DO2     004250   546   614   687#
DPL   = 010000   289#  1968
DRACTV  001164   194#  533*
DRCNT1  001311   233#  455*  509   654*  934
DRIVE   001314   236#  691*  710   790   1589* 1601
DRIV0   020614  1160  1175  1198  1262  1272  1279  1290  1848  1881  2152#  2208*  2215*  2217
                2303* 2307* 2311  2319
DRIV1   020616  2153#
DRIV2   020620  2154#
DRIV3   020622  2155#
DRIV4   020624  2156#
DRIV5   020626  2157#
DRIV6   020630  2158#
DRIV7   020632  2159#
DRVCNT  020446  1322* 1326* 1327  1330  1312#
DRVD    001206   198#  467   528   539   607   655   685   792   909   920
DSKADR  001334   252#  698*  730   800   802*  805*  849*  850*  866   925*  926*  933*  937
                939*  942*  1039
DSKTMP  001352   259#  697*  925   1341* 1352  1392  1409  1426  1596*  1631  1660  1729  1734
                1741  1767  1790
DSWR  = 177570    35#  180   337
ECNT    001321   241#  704*  963*  978
EMTVEC= 000030   124#
EM1     020450  1332  1857  1892  1909  1931  1942  1974  1985  2034  2045  2114#  2318
EM10    021032  2194  2280#
EM11    022234  2314  2401#
EM12    022244  2316  2403#
EM2     020461  1860  1895  2116#
EM3     020473  1912  2118#
EM4     020506  1945  2120#
EM5     020521  1935  2122#
EM6     020537  1977  2125#
EM7     020560  1988  2128#
EM8     020573  2048  2130#
EM9     020601  2037  2132#
ERRCHK  006102   873   955#
ERRFLG  001360   262#  874   876*  960*  970*
ERRRF   001424   282#  1343* 1420* 1477* 1478
ERRRFC  001426   283#  1344* 1444* 1484* 1487
ERRVEC= 000004   117#  335   336*  347*
ERRWCH  001430   284#  1345* 1452* 1553* 1554
ERRWCS  001432   285#  1346* 1453* 1549* 1550
ERRWF   001422   281#  1342* 1403* 1459* 1460
```

```
EXIT    003366          529     538#
EXITA   003654          601#    603     641
EXITB   003662          604#    637
EXITX   003430          540     542     550#
EXIT2   006076          910     919#
EXTFR2  003372          539#    544     549     1135
EXTR    001420          280#    1349#   1397    1414    1430
FAIL    013324          1493#   1551
FAILED  013306          1488    1490#
FFLAG   021526          2195#   2216#   2226    2236    2278#
FIL.DN  003672          607#    610
GD1     012534          1328    1383#
GNS     = ******  U     135     365     377     381     385     389     393     397     401     405     409     414     446
                        450     479     491     498     516     553     563     571     580     619     663     708     716
                        720     744     751     758     778     809     983     989     994     1023    1032    1037    1045
                        1051    1088    1092    1097    1105    1121    1148    1157    1185    1189    1210    1214    1218
                        1222    1242    1309    1314    1380    1465    1496    1573    1578    1599    1607    1611    1615
                        1621    1627    1640    1644    1648    1653    1657    1669    1673    1679    1689    1695    1700
                        1704    1708    1713    1717    1721    1725    1754    1764    1778    1788    1806    1811    1819
                        1825    1900    2026    2067    2184    2188    2192    2353    2370    2390    2864    2865    2866
                        2867    2869    2871    2872    2873    2874
GO      003312          512     523#
GOOT    012502          1377#
GO1     003324          527#    532     537     1004
GO2     003336          525     530#
GO3     003344          531     533#
GTSWR   = 104405        360     1193    1229    1318    2220    2869#
HDALGN  021076          2194#   2200    2202    2212    2214    2276
HDRFLG  001320          240#    1012#   1019    1025#
HT      = 000011        27#     2438    2479
IDEX    001324          244#    524#    676     702#
ILEGAL  004142          466     650     660#
INITIL  004524          723     729#    886
INITI2  004536          732#    753     760
INIT.2  010466          1170#
INSYS2  003526          568#    600
IO      012540          1367    1369    1371    1373    1390#   1473    1552
IOTVEC= 000020          122#
KYTEMP  001330          250#    456#    457#    458     460#    483#    484     485     487     501#    502     503#    505
                        507#    508#    511     648     651#    652     653#
LDFLG   004224          679#    1132
LDSEEK  011604          1262#   1297
LF      = 000012        28#     1381    2473    2479
LFLF    = 105212        274#
LOGA    001166          196#    454     511#    523     538     567     679     905     1072    1126
MANSEL  010356          1057    1139#   1757    1829
MASK    005234          613     678     816#    921
MASKER  004030          596     598     632#
MODE    001312          141#    234#    314#    367
MORE    013066          1440#   1443
MOUNT   004316          699     702#
MSKTBL  001256          210#    677     1068
NEXT    012416          1366#   1376
NG      002614          419     422#
NXT1    017604          1890    1905    1908    1921#
```

```
OSPFLG  001326   246#   374#  1206  1224#
PASTBL  001246   208#  1070  1085
PATTRN  001362   263#   792#   796   803#   806#   920#   940#   943#  1016  1728#  1735  1766#  1768
PIRQ  = 177772    34#
PIRQVE= 000240   128#
PRONUM  001313   235#   494#   519#
PRO1    003306   488    519#
PRO2    003160   486    494#   518
PRTTWO  014626  1637#
PR0   = 000000    51#
PR1   = 000040    52#
PR2   = 000100    53#
PR3   = 000140    54#
PR4   = 000200    55#
PR5   = 000240    56#
PR6   = 000300    57#
PR7   = 000340    58#
PS    = 177776    31#    32
PSW   = 177776    32#
PWRVEC= 000024   123#   331#   332#  2879#  2880#  2889#  2895#  2907#  2908#
RBA     001414   278#  1410  1438  1439
RBUFF   013702   278   1562#
RDBUFF  007356   927   1015  1137#  1742  1748  1791  1798  2268
RDCHK   006450   932   1010#
RDCHKO  017020  1785   1790#
RDCHR = 104407   482    500  1580  2741  2872#
RDLIN = 104410   452   2196  2810  2873#
RDLINK  005632   536    547   616   902#  1133
RDOCT = 104411   416    582  1123  2874#
RDTBL   001226   207#
RD1     005656   908#   913   924   947
RD2     005670   907    911#
RD3     005676   912    914#
RD4     005740   923    925#   946
RD5     005746   926#   935   941
RD6     005752   927#
RD7     006052   938    942#
READCS  001356   261#   930  1744  1793
RESTRT  006232   965    978#
RESVEC= 000010   118#
RETFR2  007270  1118#
RETRN2  006446   968    977  1005#
RETRN3  005374   855    857#
RETRN4  004036   633    635#
RETRY   013214  1461  1469#  1479  1489  1556
RFCERR  013262  1441  1484#
RFERR   013244  1419  1477#
RKBA    001374   268#   867#  1393#  1410#  1427#  1735#  1742#  1768#  1791#  2268#  2328
RKCS    001370   266#   736#   738   763#   765   869#   871   955   958#   961   969#   972  1171#
                1173  1177#  1179  1232#  1233  1265#  1267  1282#  1284  1353  1355#  1358  1360#
                1394#  1395#  1396#  1397#  1398#  1399  1401  1411#  1412#  1413#  1414#  1415#  1416
                1418  1428#  1429#  1430#  1431#  1432#  1448  1450  1469#  1470#  1485  1547  1632#
                1634  1661#  1663  1675  1681#  1683  1691  1730#  1732  1737#  1739  1744#  1746
                1770#  1772  1780#  1782  1793#  1795  1845#  1846  1864#  1902#  1903  1963#  1965
                2051#  2052  2055#  2057  2074#  2075  2092#  2094  2230#  2231  2233#  2234  2247
```

```
RKDA    001376  269#  735#  746#  762#  866#  1162#  1170  1176#  1263#  1264#  1273#  1280#  1281#
                1291#  1351#  1352#  1391#  1392#  1408#  1409#  1425#  1426#  1490#  1492#  1498  1631#
                1660#  1729#  1734#  1741#  1767#  1790#  1853#  1884#  1885#  1961#  2050  2054#  2088#
                2091#  2229#  2256#  2266#  2304#  2326  2377#
RKDS    001364  264#  747  754  767  966  974  1163  1225  1274  1292  1356  1361  1471
                1760  1854  1866  1886  1896  1921  1925  1957  1968  2004  2013  2060  2089
                2098  2305  2312  2349  2372
RKER    001366  265#  1665  1685  1774  1784
RKWC    001372  267#  868#  1390#  1407#  1424#  1736#  1743#  1769#  1792#  2267#  2327
RWC     001416  279#  1347#  1407  1436
RWS  =  000100  290#  1274  1292  1866  2004  2060  2098  2349
RWSRDY  011356  1207  1225#  1226
SEC     013564  1502#  1506#  1529#
SECCNT  001344  256#  929  1736  1743  1769  1792
SECOND  003452  369  560#
SECONE  006752  675  1066#
SECSYS  003050  468  476#  493  658
SECTBL  001305  228#  906  936
SECT.0  013772  431  1575#
SECT.1  012002  430  1311#
SECT.2  010370  429  1154#
SECT.3  002642  428  442#
SECT.4  017300  432  1844#
SECT.5  020634  433  2181#
SECT.6  021544  434  2302#  2310
SEEKI   001402  271#  1253#  1260
SEEKO   001404  272#  1255#  1259
SEKSET  011570  1254  1258#
SHFCNT  020444  1321#  1323  1325#  2111#
SHF1    013616  1507  1511  1541#
SHF2    013614  1540#
SHF3    013612  1503  1515  1519  1539#
SIN  =  001000  292#  2013
SINST   020200  2014  2042#
SMTME   005614  737  764  870  892#  959  971  1172  1178  1266  1283  1633  1662  1682
                1731  1738  1745  1771  1781  1794  1865  2097
STACK=  001100  22#  316  327  1003
START   001440  142  315#  555  1383  1468  1535  1727
STARTR  001434  139  314#
STFLG   001325  245#  370  373#
STKLMT= 177774  33#
STOP    013604  1524  1534#
STORE   004072  462  648#
STRTI   001774  374#  427
SUR     013576  1510#  1532#
SWR     001140  180#  325  337#  339  345#  358  1191  1196  1227  1235  1316  1323  2218
                2223  2252  2261  2274  2593  2632  2679#  2887  2900#
SWREG   000176  137#  345  358  1191  1227  1316  2218  2593  2632  2655
SWTCH   021530  2223#  2224#  2239  2244  2254  2279#
SW0  =  000001  86#
SW00 =  000001  76#  86
SW01 =  000002  75#  85
SW02 =  000004  74#  84
SW03 =  000010  73#  83
SW04 =  000020  72#  82
```

```
SW06  = 000100            70#     80
SW07  = 000200            69#     79
SW08  = 000400            68#     78
SW09  = 001000            67#     77
SW1   = 000002            85#
SW10  = 002000            66#
SW11  = 004000            65#
SW12  = 010000            64#
SW13  = 020000            63#
SW14  = 040000            62#
SW15  = 100000            61#
SW2   = 000004            84#
SW3   = 000010            83#
SW4   = 000020            82#
SW5   = 000040            81#
SW6   = 000100            80#
SW7   = 000200            79#
SW8   = 000400            78#
SW9   = 001000            77#
SYSER   013160          1462#   1480    1557
SYSERR  013674          1555    1557#
S10     012174          1324    1330#
S11     012152          1325#   1382
S12     012272          1347#
S13     012142          1323#   1329
TABLTY  002554           372     411#    423
TBITVE= 000014           119#
TBLFUL  004134           656     658#
TIME    005500           872     879#
TIMR    001346           257#    732*    740*    761*    769*    863*    879*    892*    893*
TIMR2   001323           243#    733*    771     773*    865*    882     884*
TKVEC = 000060           126#   2578*   2579*
TPVEC = 000064           127#
TRAPVE= 000034           125#    329*    330*
TRTVEC= 000014           120#
TRYAGN  011366          1227#   1244
TSTSN1  006154           957     964     966#
TYPE  = 104401           354     375     379     383     387     391     395     399     403     407     412     422     444
                         445     477     484     489     496     502     514     551     561     569     578     617     661
                         706     714     718     742     749     756     776     887     981     987     992    1021    1030
                        1035    1043    1049    1086    1090    1095    1103    1119    1146    1155    1183    1187    1208
                        1212    1216    1220    1240    1307    1312    1331    1332    1378    1463    1494    1523    1571
                        1576    1597    1605    1609    1613    1619    1625    1638    1642    1646    1651    1655    1667
                        1671    1677    1687    1693    1698    1702    1706    1711    1715    1719    1723    1752    1762
                        1776    1786    1804    1809    1817    1823    1857    1860    1874    1892    1895    1898    1909
                        1912    1931    1935    1942    1945    1974    1977    1985    1988    2024    2034    2037    2045
                        2048    2065    2182    2186    2190    2194    2314    2316    2318    2351    2368    2388    2443
                        2539    2599    2653    2654    2657    2670    2681    2700    2748    2754    2759    2763    2768
                        2769    2771    2774    2778   2864#    2909
TYPOC = 104402          1334    1859    1894    1911    1933    1944    1976    1987    2029    2036    2047    2315    2320
                        2393    2656   2865#
TYPON = 104404          1048    1054    1822    1828   2867#
TYPOS = 104403           575     622     711    1027    1040    1100    1108    1582    1602    1814   2866#
WATSK   020030          1983   2002#
WC      001412           277#   1348*   1390    1424
```

```
WCERRR  013140            1451    1455#
WCHERR  013654            1548    1553#
WFERR   013144            1402    1459#
WPS   = 000040             291#   1896    1925
WRDCNT  001340             254#    797#    868     929#
WRITCS  001354             260#    798    1737    1770
WRLINK  005104             535     615     788#
WRPRO   016470            1624    1636    1760#
WRRDCK  016260            1618    1630    1728#   1756
WRTNBY  001317             239#    918#   1026
X       015610            1692    1697#
XX      016024            1710#
$AUTOB  001134             177#    362#   2646    2795
$BOADR  001122             172#
$BOOAT  001126             174#
$BELL   024066            2599    2788#
$CHARC  022504            2445#   2455#   2462    2471#   2476#
$CKSWR  023210            2632#   2871
$CMTAG  001100             160#    322     323
$CM3  = 000000             190#
$CNTLG  024077            2653    2790#
$CNTLU  024072            2670    2763    2789#
$CRLF   001161             191#   1331    1874    2444    2479    2681    2768    2788
$ENDAD  001400             149     270#
*ERFLG  001103             163#
$ERMAX  001115             169#
$ERRPC  001116             170#
$ERRTB  001434             307#
$ERTTL  001112             167#
$FILLC  001156             188#   2448    2479
$FILLS  001155             187#   2479
$GOADR  001120             171#
$GOOAT  001124             173#
$GTSWR  023300            2654#   2869
$HO   = 000003              11      12
$HIOCT  024226            2827#   2832#
$ICNT   001104             164#
$ILLUP  024450            2879    2895    2912#
$INTAG  001135             178#   2651#   2682    2795
$ITEMB  001114             168#
$LF     001162             192#   2479    2778    2788
$LPADR  001106             165#
$LPERR  001110             166#
$MAIL = ****** U           349     358    2432
$MNEW   024115            2657    2793#
$MSWR   024104            2654    2791#
$NULL   001154             186#   2450    2479
$OCNT   022732            2511#   2540#   2553#
$OMODE  022734            2506#   2510#   2515    2518#   2529#   2555#
$PASS   001100             161#   1129#   1134
$POWER  024456            2910    2915#
$PWRON  024310             331    2879#   2907
$PWRMG  024444            2910#
$PWRUP  024362            2889    2895#
$QUES   001160             190#    422    2479    2700    2771    2788
```

```
$RDDEC= ****** U        2875
$RDLIN  023602          2736#   2873
$RDOCT  024126          2805#   2874
$RDSZ = 000030          2729#
$R2A  = ****** U        2875
$SAVRE= ****** U        2875
$SAVR6  024454          2888#   2896    2897#   2898#   2914#
$SETUP= 000114           314#    328     329     331     333     354     355     2591    2596    2597    2627    2795
$STUP = 177777           314#
$SVPC = 000222           147#    152
$SWR  = 160000            11      12#     190     2911
$TKB    001146           183#   2559    2580    2589    2608    2636    2663
$TKCNT  022736          2560#   2575#   2597    2614#   2720    2722#
$TKINT  022746           349    2575#   2649
$TKQEN= 022745          2564#   2622    2725
$TKQIN  022740          2561#   2576#   2577    2620#   2621#   2622    2624#
$TKQOU  022742          2562#   2577#   2723    2724#   2725    2727#
$TKQSR  022744          2563#   2576    2624    2727
$TKS    001144           182#   2559    2581#   2604#   2606    2612#   2634    2650#   2660    2684#
$TKSRV  023016          2578    2589#
$TN   = 000001            11#
$TPB    001152           185#   2468#   2479
$TPFLG  001157           189#   2426    2479
$TPS    001150           184#   2466    2479
$TRAP   024230           329    2841#
$TRAP2  024252          2852#   2863
$TRP  = 000012          2856#   2865#   2866#   2867#   2868#   2869    2870#   2871    2872#   2873#   2874#   2875#
$TRPAD  024264          2846    2863#
$TSTNM  001102           162#
$TTYIN  024036          2738    2739    2751    2769    2783    2787#
$TYPBN= ****** U        2868
$TYPOS= ****** U        2868
$TYPE   022270          2426#   2856    2864
$TYPEC  022440          2447    2454    2461    2466#   2467    2686
$TYPEX  022506          2472    2474    2477#
$TYPOC  022534          2509#   2865
$TYPON  022550          2508    2511#   2867
$TYPOS  022510          2504#   2866
$OFILL  022733          2505*   2509*   2519    2554#
.     = 024466           131#    135#    140#    147     148#    150#    152#    159#    193     196#    207#    208#    226#
                         248#    326     366#    378#    382#    396#    390#    394#    398#    402#    406#    410#    447#
                         451#    564#    572#    620#    717#    7??#    890#   1033#   1052#   1098#   1137#   1158#   1234
                        1243#   131?#   1381#   1466#   1497#   1533#   1562#   1600#   1616#   1641#   1649#   1654#   1658#
                        1670#   1709#   1718#   1755#   1765#   1779#   1812#   1826#   1901#   2027#   2151#   2193#   2259
                        2300#   2323    2336    2354#   2362    2371#   2373    2376    2384    2391#   2479    2559    2563#
```

```
COMMEN      1#    129#
ENDCOM      1#    129#
ERROR      23#
ESCAPE      1#    129#
GETPRI      1#    129#
GETSWR      1#    129#    355#
MORETA    153#    194
MULT        1#    129#
NEWTST      1#    129#
POP         1#    129#   2828    2900    2901
PUSH        1#    129#   2807    2881    2887
REPORT      1#    129#
SCOPE      24#
SETPRI      1#    129#   2716
SETTRA   2856#   2865    2866    2867    2869    2871    2872    2873    2874
SETUP       1#    129#    321
SKIP        1#    129#
SLASH       1#    129#
SPACE     129#
STARS       1#    129#    145     155     193     308     312    2411    2481    2558    2627    2642    2705    2729    2797
          2835    2877    2893
SWRSU       1#    129#    333#
TRMTRP   2856#
TYPBIN      1#    129#
TYPDEC      1#    129#
TYPNAM      1#    129#    350
TYPNUM      1#    129#
TYPOCS      1#    129#    710    1601
TYPOCT      1#    129#   2655
TYPTXT      1#    129#    375     379     383     387     391     395     399     403     407     411     443     448     476
          489     496     513     550     560     568     578     617     661     706     714     718     742     749     756
          775     887     981     986     991    1021    1030    1034    1043    1049    1086    1090    1095    1103    1118
         1145    1154    1183    1187    1208    1212    1216    1220    1240    1306    1311    1377    1462    1493    1570
         1575    1597    1605    1609    1613    1619    1625    1637    1642    1646    1651    1655    1667    1671    1677
         1687    1693    1697    1702    1706    1711    1715    1719    1723    1752    1762    1776    1786    1804    1809
         1817    1823    1898    2023    2065    2182    2186    2190    2351    2368    2388
$$CMRE    153#
$$CMTM    153#
$$ESCA      1#    129#
$$NEWT      1#    129#
$$SET    2856#   2865    2866    2867    2869    2871    2872    2873    2874
$$SKIP      1#    129#
.EQUAT      1#     19
.HEADE      1#
.KT11       1#
.SETUP      1#    314
.SWRHI      1#
.$ACTI      1#    143
.$APTB      1#
.$APTH      1#
.$APTY      1#
.$ASTA      1#
.$CATC      1#    129
.$CMTA      1#    153
.$DB2D      1#
```

```
MAINDEC-11-DZRKI-E      MACY11 30A(1052)  24-MAR-78  09:23  PAGE 68
DZRKIF.P11    24-MAR-78 09:20          CROSS REFERENCE TABLE -- MACRO NAMES                                    SEQ 0086

.$DIV        1#
.$EOP        1#
.$ERRO       1#
.$ERRT       1#
.$MULT       1#
.$POWE       1#    2875
.$RAND       1#
.$RDDE       1#
.$RDOC       1#    2795
.$READ       1#    2556
.$R2AZ       1#
.$SAVE       1#
.$SB2D       1#
.$SB2O       1#
.$SCOP       1#
.$SIZE       1#
.$SUPR       1#
.$TRAP       1#    2833
.$TYPB       1#
.$TYPD       1#
.$TYPE       1#    2409
.$TYPO       1#    2479
.$40CA       1#
.1170        1#

. ABS.   024466      000

 ERRORS DETECTED:  0

 DZRKIF.BIN,DZRKIF.LST/CRF/SOL=DZRKKE.SML,DZRKIF.P11
 RUN-TIME:  12 16 1 SECONDS
 RUN-TIME RATIO: 102/31=3.3
 CORE USED:  33K  (65 PAGES)
```

J07