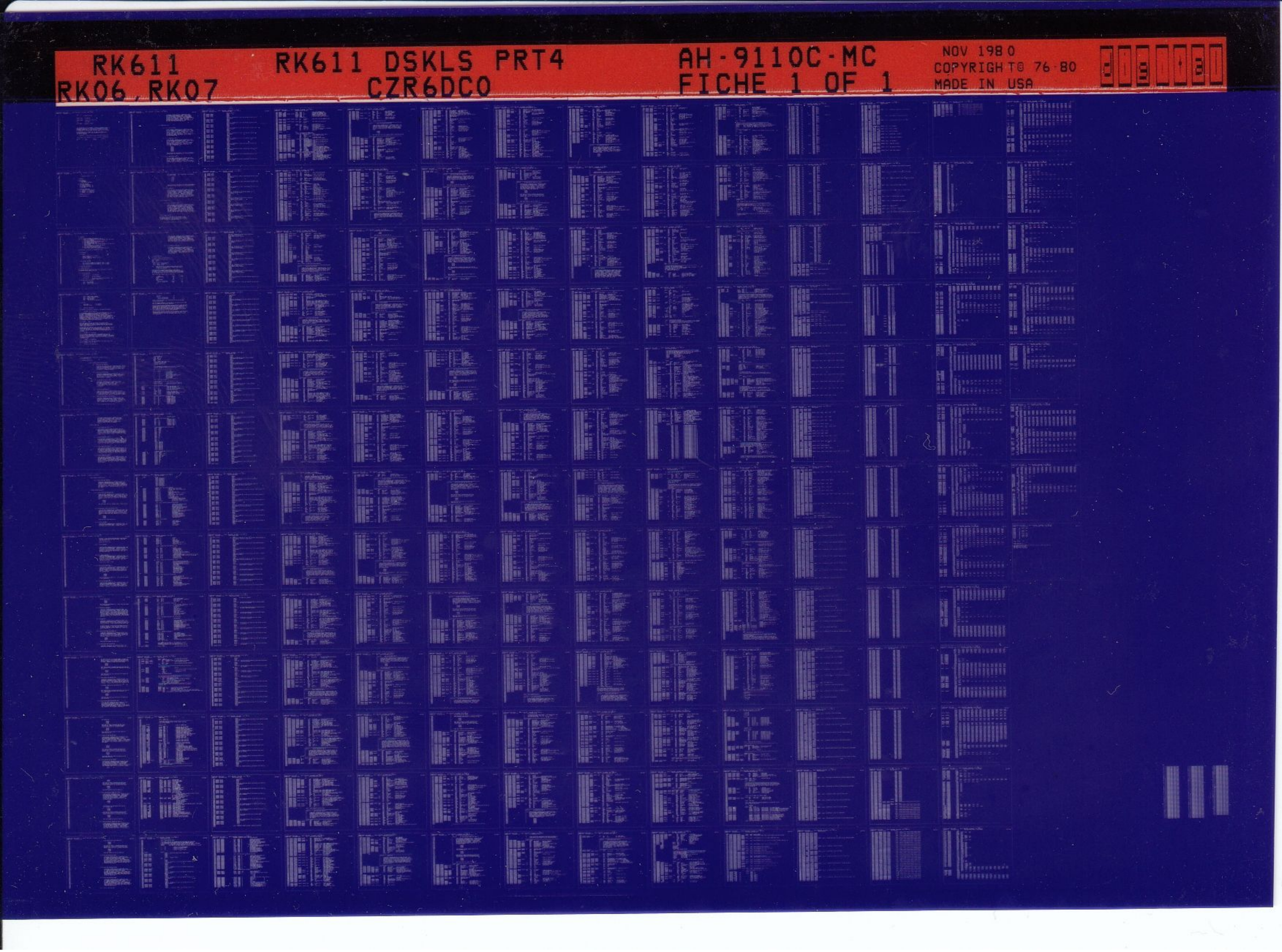
RK611 RK611 DSKLS PRT4 AH-9110C-MC
RK06,RK07 CZR6DC0 FICHE 1 OF 1



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.REM    %
                        IDENTIFICATION


PRODUCT CODE:    AC-9108C-MC

PRODUCT NAME:    CZR6DC0 RK611 DSKLS PRT4

DATE:            JUNE,1980

MAINTAINER:      DIAGNOSTIC GROUP



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                                1.0 ABSTRACT

                                THE RK611 DISKLESS CONTROLLER DIAGNOSTIC: PART 4
                                        A. TESTS THE LOADING OF THE DRIVE BUS MESSAGE SHIFT REGISTERS
                                           FOR CLASS C COMMANDS.
                                        B. TESTS HEADER GENERATION FOR SEARCH OPERATIONS.
                                        C. TESTS WRITE DATA NPR TRANSFERS TO SILO.
                                        D. TESTS HEADER RECOGNITION.
                                        E. TESTS CYLINDER, TRACK, AND SECTOR INCREMENT AFTER SUCCESSFUL
                                           HEADER SEARCH.
                                        F. TESTS DETECTION OF ALL HEADER TYPE ERRORS.
                                        G. TESTS ECC GENERATION AND WRITING.
                                        H. TESTS PARTIAL SECTOR WRITE (ZERO FILL).
                                        I. TESTS 18 BIT FORMAT ECC GENERATION AND DATA WRITE.

                                NO RK06 DRIVE IS REQUIRED FOR PROGRAM EXECUTION.


                                2.0 REQUIREMENTS

                                2.1 EQUIPMENT

                                        PDP-11 SYSTEM (16K CORE MEMORY)
                                        CONSOLE TERMINAL
                                        DECTAPE, PAPER TAPE READER, OR DECDISK
                                        RK611 CONTROLLER


                                2.2 PRELIMINARY PROGRAMS

                                        RK611 DISKLESS CONTROLLER DIAGNOSTIC: PART 1 (CZR6A)
                                        RK611 DISKLESS CONTROLLER DIAGNOSTIC: PART 2 (CZR6B)
                                        RK611 DISKLESS CONTROLLER DIAGNOSTIC: PART 3 (CZR6C)

                                3.0 OPERATING PROCEDURES

                                3.1 LOADING PROCEDURE

                                THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING ABSOLUTE LOADER
                                OR FROM XXDP MEDIA SUPPORTED BY XXDP.


                                3.2 STARTING PROCEDURE

                                        LOCATION 200    - START PROGRAM

                                        LOCATION 204    - RESTART PROGRAM

                                        LOCATION 214    - REQUEST BUS ADDRESS, VECTOR ADDRESS, AND
                                                          PRIORITY MODIFICATION
                                3.3 OPTIONAL SWITCH SETTINGS

                                        SW15 -  HALT PROGRAM
                                        SW14 -  LOOP ON TEST
                                        SW13 -  INHIBIT ERROR TYPE OUT
```

```
                        SW12 -  ABORT AFTER 20 ERRORS
                        SW11 -  INHIBIT ITERATION COUNT
                        SW10 -  BELL ON ERROR
                        SW9  -  LOOP ON ERROR
                        SW8  -  LOOP ON TEST IN SWITCHES 0-7


                3.4 RUN TIME

                        FIRST PASS              :25 MINUTES
                        SUBSEQUENT PASSES       3:15 MINUTES


                4.0     OPERATING PROCEDURES

                THE PROGRAM IS EXECUTED BY STARTING AT THE APPROPIATE ADDRESS.

                4.1     'SOFTWARE' SWITCH REGISTER

                IF THE PROGRAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E., AN 11/04
                OR 11/34) THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH
                REGISTER IS NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH
                REGISTER.  THE SETTINGS OF THE 'SOFTWARE' SWITCHES ARE CONTROLLED
                THROUGH A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING 'CONTROL G'.  THE
                PROGRAM WILL RECOGNIZE THE 'CONTROL G' AT ANY TIME EXCEPT WHEN THE
                PROGRAM IS AT A HIGHER PRIORITY PROCESSING AN RK06 INTERRUPT.  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 SETTINGS ARE ENTERED, THE ENTIRE SWITCH
                REGISTER IMAGE MUST BE ENTERED.  LEADING ZEROES ARE NOT REQUIRED.
                'RUBOUT' AND 'CONTROL U' 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.

                4.2     CONTROL C (^C) OPERATION

                IF ^C IS TYPED AT ANY TIME DURING THE PROGRAM EXECUTION THE
                PROGRAM IS HALTED IMMEDIATELY. IF A MONITOR IS PRESENT (XXDP CHAIN,
                ACT, APT) THE PROGRAM RETURNS CONTROL TO THE MONITOR. IF NO MONITOR
                IS PRESENT, THE CPU IS HALTED. DEPRESSING THE CONTINUE KEY WILL DO
                A PROGRAM RESTART.

                4.3     CONTROL S (^S) OPERATION

                IF ^S IS TYPED AT ANY TIME THE PROGRAM WILL GO INTO A STALL LOOP
                UNTIL A CONTROL Q (^Q) IS TYPED.

                4.4     CONTROL Q (^Q) OPERATION
```

IF A ^S HAS BEEN TYPED, TYPING THE ^Q CANCELS THE STALL
INITIATED BY THE ^S.

5.0 PROGRAM DESCRIPTION

**TYPE C INSTRUCTION'S DRIVE MESSAGES

TEST 1 READ DATA SEEK MESSAGE

CLEAR THE RK06 SUBSYSTEM WITH A SUBSYSTEM CLEAR. PUT TH
CONTROLLER IN DIAGNOSTIC MODE. ISSUE A READ DATA TO AN
RK06, IN 24 SECTOR FORMAT, CYLINDER 1777, HEAD 7, DRIVE
7, WORD COUNT 177777. CLOCK IN THE SEEK MESSAGE AND
MAKE SURE IT IS GENERATED PROPERLY.

TEST 2 WRITE DATA SEEK MESSAGE

CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR. PUT
CONTROLLER IN MAINTENANCE MODE. ISSUE A WRITE DATA OF
ONE WORD TO AN RK06 IN 24 SECTOR FORMAT, CYLINDER 1777,
TRACK 7, DRIVE 7. CLOCK IN SEEK MESSAGE. CHECK IF
PROPER MESSAGE IS ASSEMBLED.

TEST 3 SEEK MESSAGE FOR WRITE CHECK

CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
PUT CONTROLLER IN DIAGNOSTIC MODE. ISSUE A WRITE CHECK
OF 1 WORD TO AN RK06 IN 24 SECTOR FORMAT,
CYLINDER 1777, HEAD 7, DRIVE 7. CLOCK
IN SEEK COMMAND. MAKE SURE CORRECT MESSAGE
IS ASSEMBLED.

TEST 4 READ DATA CLEAR MESSAGE

CLEAR THE RK611 WITH A CONTROLLER CLEAR. PUT THE
CONTROLLER ON DIAGNOSTIC MODE. ISSUE A READ DATA TO AN
RK06, IN 24 SECTOR FORMAT, CYLINDER 1777, HEAD 7, DRIVE
7, WORD COUNT 177777. CLOCK IN THE SEEK MESSAGE AND TH
CLEAR MESSAGE AND MAKE SURE THE CLEAR MESSAGE IS CORRECT

TEST 5 WRITE DATA AND DRIVE CLEAR MESSAGE

CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR. PUT
CONTROLLER IN MAINTENANCE MODE. ISSUE A WRITE DATA OF
ONE WORD TO AN RK06 IN 24 SECTOR FORMAT, CYLINDER 1777,
TRACK 7, DRIVE 7. CLOCK IN SEEK MESSAGE AND DRIVE CLEAR
CHECK IF PROPER DRIVE CLEAR MESSAGE IS ASSEMBLED.

TEST 6 DRIVE CLEAR MESSAGE FOR WRITE CHECK

```
                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        CHECK OF 1 WORD TO AN RK06 IN 24 SECTOR FORMAT,
                        CYLINDER 1777, HEAD 7, DRIVE 7.  CLOCK
                        THROUGH SEEK MESSAGE AND CLOCK IN DRIVE CLEAR.
                        MAKE SURE CORRECT MESSAGE IS ASSEMBLED.


                **HEADER GENERATION


                TEST 7  HEADER GENERATION (PART 1)

                        CLEAR THE RK611 WITH A CONTROLLER CLEAR.  PUT THE
                        CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF 1
                        WORD FOR AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0
                        SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGES.
                        CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE REGISTER 3
                        TO MAKE THAT THE HEADER IS CORRECT.  REPEAT FOR CYLINDER
                        1-1777.


                TEST 10 HEADER GENERATION (PART 2)

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                        THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF
                        1 WORD FOR AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD
                        0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGE
                        CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE REGISTER 3
                        TO MAKE THAT THE HEADER IS CORRECT.  REPEAT FOR HEADS 1-


              TEST 11 HEADER GENERATION (PART 3)

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                        THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF
                        ONE WORD FOR AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HE
                        0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGE
                        CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE REGISTER 3
                        TO MAKE SURE HEADER IS CORRECT.  REPEAT FOR SECTORS 1-25


              TEST 12 HEADER GENERATION (PART 4)

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                        THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF
                        ONE WORD FOR AND RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
                        HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR
                        MESSAGES, CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE
                        REGISTER 3 TO MAKE SURE HEADER IS CORRECT.  REPEAT FOR 2
                        SECTOR FORMAT.
```

```
                                        **NPR TRANSFER FOR WRITE DATA


                                                TEST 13 WRITE DATA NPR TRANSFER

                                                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                        CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                                        67 WORDS, TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
                                                        TRACK 0, DRIVE 0.  CLOCK IN SEEK AND DRIVE CLEAR MESSAGE
                                                        GIVE ENOUGH CLOCK PULSE FOR 68 SILO WORDS. MAKE SURE DAT
                                                        LATE DOES NOT OCCUR.  READ BACK 66 WORDS AND VERIFY THEY
                                                        ARE CORRECT.


                                        **HEADER RECOGNITION TESTS


                                                TEST 14 WRITE DATA HEADER RECOGNITION

                                                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                        CONTROLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF ON
                                                        WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
                                                        SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
                                                        SIMULATE A SECTOR PULSE AND A HEADER WITH THE FOLLOWING
                                                        DATA:

                                                                000000
                                                                140000
                                                                140000

                                                        MAKE SURE WRITE GATE SETS SHOWING CORRECT HEADER RECOGNI



                                                TEST 15 SECTOR PULSE DETECTION FOR WRITE DATA

                                                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                        CONTROLLER IN MAINTENANCE MODE ISSUE A WRITE DATA OF ONE
                                                        WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
                                                        SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
                                                        SIMULATE AN INDEX PULSE AND A HEADER WITH THE FOLLOWING
                                                        DATA:

                                                                000000
                                                                140000
                                                                140000

                                                        MAKE SURE WRITE GATE DOES NOT SET.


                                                TEST 16 SECTOR INCREMENT

                                                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                        CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF 0
                                                        TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
```

```
                                                                SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
                                                                SIMULATE SECTOR PULSE AND PROPER HEADER,  MAKE SURE
                                                                THAT WRITE GATE SETS,

                                                                REPEAT FOR SECTOR 1-24.



                                                        TEST 17 TRACK INCREMENT


                                                                CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF 0
                                                                TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
                                                                SECTOR 25.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
                                                                SIMULATE SECTOR PULSE AND PROPER HEADER,  MAKE SURE
                                                                THAT WRITE GATE SETS.



                                                        TEST 20 CYLINDER INCREMENT
                                                                CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF 0
                                                                TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 2,
                                                                SECTOR 25.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
                                                                SIMULATE SECTOR PULSE AND PROPER HEADER,  MAKE SURE
                                                                THAT WRITE GATE SETS.

                                                                REPEAT FOR CYLINDER = 1-632.



                                                        TEST 21 BAD SECTOR ERROR (PART 1)

                                                                CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                                                ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
                                                                HEAD 0, SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
                                                                MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER WITH
                                                                THE FOLLOWING DATA:


                                                                        000000
                                                                        040000
                                                                        040000

                                                                MAKE SURE BAD SECTOR ERROR SETS.  CHECK THAN DISK ADDRES
                                                                IS NOT INCREMENTED.


                                                        TEST 22 BAD SECTOR ERROR (PART 2)

                                                                CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                                                ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
                                                                HEAD 0, SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
                                                                MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER WITH
```

```
                                                                THE FOLLOWING DATA:

                                                                        000000
                                                                        100000
                                                                        100000

                                                                MAKE SURE BAD SECTOR ERROR SETS.  CHECK THAT DISK ADDRES
                                                                IS NOT INCREMENTED.


                                                        TEST 23 OPERATION INCOMPLETE

                                                                CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                                                ONE WORD TO AN RK06 IN 24 SECTOR FORMAT, CYLINDER 1253,
                                                                HEAD 2, SECTOR 23.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
                                                                MESSAGES.  SIMULATE A SECTOR PULSE AND 32 SECTORS WITH
                                                                1 BIT DIFFERENT IN 30 BITS OF OPI DETERMININATION. ALL
                                                                SIMULATED HEADERS, HAVE GOOD HEADER VRC.  MAKE SURE ONLY
                                                                OPERATION INCOMPLETE AND CONTROLLER ARE THE ONLY ERRORS
                                                                THAT SET.


                                                        TEST 24 HEADER VRC

                                                                CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                                                ONE WORD WITH CDT SET IN 24 SECTOR FORMAT, CYLINDER 1253
                                                                HEAD 2, SECTOR 23.  CLOCK IN BOTH SEEK AND DRIVE CLEAR


                                                                MESSAGES SIMULATE A SECTOR PULSE AND HEADER WITH BIT 0
                                                                OF THE VRC INCORRECT.  MAKE SURE ONLY HEADER VRC AND
                                                                CONTROLLER ERROR ARE THE ONLY ERRORS SET.  REPEAT FOR
                                                                BITS 1-15 OF VRC.


                                                        TEST 25 BAD SECTOR ERROR AND HEADER VRC

                                                                CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                                                ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 300.
                                                                HEAD 1, SECTOR 17, CLOCK IN BOTH SEEK AND DRIVE CLEAR
                                                                MESSAGES.  SIMULATE THE FOLLOWING HEADER:

                                                                        000300
                                                                        040057
                                                                        040356

                                                                MAKE SURE ONLY HEADER VRC ERROR SETS.


                                                        TEST 26 GOOD HEADER AND PREVIOUS BSE

                                                                CLEAR RK611 CONTROLLER WITH CONTROLLER CLEAR.  PUT
                                                                CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA OF
```

```
                        ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 100,
                        HEAD 0, SECTOR 1.  CLOCK THROUGH SEEK AND DRIVE CLEAR
                        MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER OF THE
                        FOLLOWING 3 WORDS WITH A BAD SECTOR INDICATION:

                                000100
                                040000
                                040100

                        MAKE SURE NO ERROR IS REPORTED AND WRITE GATE DOES NOT
                        SET.  SIMULATE A SECTOR PULSE AND A HEADER OF THE FOLLOW
                        3 WORDS:

                                000100
                                140001
                                140101

                        MAKE SURE WRITE GATE SETS INDICATING THAT HEADER HAS
                        BEEN RECOGNIZED.


                TEST 27 GOOD HEADER AND PREVIOUS HVRC

                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                        CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA OF
                        ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 200,
                        HEAD 0, SECTOR 1.  CLOCK THROUGH SEEK AND DRIVE CLEAR
                        MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER OF THE


                        FOLLOWING 3 WORDS WITH A BAD HEADER VRC:

                                000200
                                140000
                                140000

                        MAKE SURE NO ERROR IS REPORTED AND WRITE GATE DOES NOT
                        SET.  SIMULATE A SECTOR PULSE AND A HEADER OF THE
                        FOLLOWING 3 WORDS:

                                000200
                                140001
                                140201

                        MAKE SURE WRITE GATE SEES INDICATING THAT HEADER HAS
                        BEEN RECOGNIZED.


                TEST 30 BAD SECTOR ERROR AND PREVIOUS HVRC

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A
                        WRITE DATA OF ONE WORD TO AN RK06 IN 26 SECTOR
                        FORMAT, CYLINDER 400, HEAD 0, SECTOR 1.  CLOCK THROUGH
                        SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                        AND A HEADER OF THE FOLLOWING 3 WORDS WITH A
```

```
                                                                BAD HEADER VRC:

                                                                        000400
                                                                        140000
                                                                        140000

                                                                MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                                                DOES NOT SET.  SIMULATE A SECTOR PULSE AND A
                                                                HEADER CONSISTING OF THE FOLLOWING 3 WORDS:

                                                                        000400
                                                                        040001
                                                                        040401

                                                                MAKE SURE BAD SECTOR ERROR SETS AND HEADER VRC
                                                                ERROR DOES NOT SET.


                                                        TEST 31 HEADER VRC AND PREVIOUS BSE

                                                                CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                                                PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A
                                                                WRITE DATA OR ONE WORD TO AN RK06 IN 26 SECTOR
                                                                FORMAT, CYLINDER 140, HEAD 0, SECTOR 1.  CLOCK THROUGH
                                                                SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                                                                AND A HEADER OF THE FOLLOWING 3 WORDS WITH A HEADER
                                                                VRC ERROR:



                                                                        000140
                                                                        040000
                                                                        040140

                                                                MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                                                DOES NOT SET.  STIMULATE A SECTOR PULSE AND A
                                                                HEADER CONSISTING OF THE FOLLOWING THREE WORDS:

                                                                        000140
                                                                        140001
                                                                        140101

                                                                MAKE SURE HEADER VRC ERROR SETS AND BAD SECTOR
                                                                ERROR DOES NOT SET.


                                                        TEST 32 OPI AND HVRC ON LAST HEADER

                                                                CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                                                PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                                                                DATA OF ONE WORD TO AN RK06 IN 26 SECTOR FORMAT,
                                                                CYLINDER 240, HEAD 0, SECTOR 1.  CLOCK THROUGH
                                                                SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                                                                AND 30 HEADERS CONSISTING OF THE FOLLOWING 3 WORDS:

                                                                        000240
```

```
                                                    140000
                                                    140240

                                        MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                        DOES NOT SET.  SIMULATE A SECTOR PULSE AND A
                                        HEADER CONSISTING OF THE FOLLOWING THREE WORDS:

                                                    000240
                                                    140000
                                                    140040

                                        MAKE SURE HEADER VRC AND OPI ERROR SET.


                                TEST 33 OPI AND PREVIOUS HEADER VRC (PART 1)

                                        CLEAR THE RK611 CONTROLLER WITH A  CONTROLLER CLEAR.
                                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                                        DATA OF ONE WORD TO AN RK06 IN 26 SECTOR FORMAT,
                                        CYLINDER 300, HEAD 0, SECTOR 1.  CLOCK THROUGH
                                        SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A
                                        SECTOR PULSE AND 30 HEADERS CONSISTING OF THE
                                        FOLLOWING 3 WORDS:

                                                    0C0300
                                                    140000
                                                    140300


                                        THEN SIMULATE A 3 WORD HEADER CONSISTING ON
                                        THE FOLLOWING DATA:

                                                    000300
                                                    140000
                                                    140200

                                        MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                        DOES NOT SET.  SIMULATE A SECTOR PULSE AND A
                                        HEADER CONSISTING OF THE FOLLOWING THREE WORDS:

                                                    000300
                                                    140000
                                                    140300

                                        MAKE SURE HEADER VRC AND OPI ERRORS SET.


                                TEST 34 OPI AND PREVIOUS HEADER VRC (PART 2)

                                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                                        DATA OF ONE WORD TO AN RK06 IN 26 SECTOR FORMAT,
                                        CYLINDER 40, HEAD 0, SECTOR 1.  CLOCK THROUGH
                                        SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR
                                        PULSE AND A HEADER CONSISTING OF THE FOLLOWING
```

```
                        THREE WORDS HAVING A BAD HEADER VRC:

                                000040
                                140000
                                140000

                        MAKE SURE NO ERROR IS  REPORTED AND WRITE GATE
                        DOES NOT SET.  SIMULATE A SECTOR PULSE AND 31
                        HEADERS CONSISTING OF THE FOLLOWING THREE WORDS:

                                000040
                                140000
                                140040

                        MAKE SURE HEADER VRC AND OPI ERRORS SET.


                TEST 35 BSE AND CONTROLLER ERROR

                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
                        OF 1 WORD TO AN RK06 IN 26 SECTOR FORMAT,
                        CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                        AND A HEADER WITH A BSE ERROR.  MAKE SURE CONTROLLER
                        ERROR AND HVRC SET. CLEAR CONTROLLER AND MAKE SURE
                        CONTROLLER ERROR RESETS.



                TEST 36 HVRC AND CONTROLLER ERROR

                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
                        OF 1 WORD TO AN RK06 IN 26 SECTOR FORMAT,
                        CYLINDER 300, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                        AND A HEADER WITH A HVRC ERROR.  MAKE SURE CONTROLLER
                        ERROR AND HVRC SET. CLEAR CONTROLLER AND MAKE SURE
                        CONTROLLER ERROR RESETS.


                TEST 37 READ DATA AND HVRC ERROR

                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA
                        OF 1 WORD TO AN RK06 IN 26 SECTOR FORMAT,
                        CYLINDER 300, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                        AND A HEADER WITH A HVRC ERROR.  MAKE SURE CONTROLLER
                        ERROR AND HVRC SET. CLEAR CONTROLLER AND MAKE SURE
                        CONTROLLER ERROR RESETS.


                TEST 40 WRITE CHECK AND HVRC
```

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                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        CHECK OF 400 WORDS TO AN RK06 IN 26 SECTOR FORMAT,
                        CYLINDER 300, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE AND
                        A HEADER WITH A HEADER VRC ERROR.  MAKE SURE
                        HVRC AND CONTROLLER ERROR ARE SET. CLEAR CONTROLLER
                        AND MAKE SURE CONTROLLER ERROR RESETS.



                **ECC GENERATION TESTS


                    TEST 41 ECC INITIALIZATION

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        DATA OF 10 WORDS TO AN RK06, IN 26 SECTOR
                        FORMAT, CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH
                        SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE
                        A SECTOR PULSE AND A GOOD HEADER.  CLOCK THROUGH ONLY FO
                        DATA WORDS OF ZEROES.  MAKE SURE THE ECC PATTERN
                        REGISTER REMAINS ZERO.


                TEST 42 ECC GENERATION (PART 1)

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        DATA OF 12 WORDS TO AN RK06, IN 26 SECTOR
                        FORMAT, CYLINER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH
                        SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR
                        PULSE AND A GOOD HEADER.  CLOCK THROUGH ONLY THE
                        FOLLOWING SIX WORDS OF DATA:

                                005001
                                040040
                                020004
                                000064
                                000000
                                000000

                        CLOCK IN EACH BIT INDIVIDUALLY AND CHECK FOR PROPER ECC
                        GENERATION AS SEEN THROUGH THE ECC PATTERN REGISTER.


                TEST 43 ECC GENERATION (PART 2)

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        DATA OF 12 WORDS TO AN RK06, IN 26 SECTOR
                        FORMAT, CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH
                        SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
```

```
                        AND A GOOD HEADER.  CLOCK THROUGH ONLY THE FOLLOWING
                        SIX WORDS OF DATA:

                                177777
                                177777
                                177777
                                177777
                                177777
                                177777



                        CLOCK IN EACH BIT INDIVIDUALLY AND CHECK FOR PROPER ECC
                        GENERATION AS SEEN THROUGH THE ECC PATTERN REGISTER.


                TEST 44 ECC WRITING

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        DATA OF 400 WORDS.  TO AN RK06 IN 26 SECTOR FORMAT,
                        CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        AND DRIVE CLEAR MESSAGE.  SIMULATE A SECTOR PULSE
                        AND A GOOD HEADER.  CLOCK THROUGH ALL 400 WORDS
                        AND THE TWO ECC WORDS.  MAKE SURE THE TWO ECC WORDS
                        ARE CORRECT AND WRITTEN PROPERLY.  CHECK BUS ADDRESS,
                        WORD COUNT, CYLINDER, TRACK, AND SECTOR.



        **PARTIAL WRITE DATA


                TEST 45 ZERO FILL ON WRITE DATA

                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                        DATA OF 103 WORDS TO AN RK06 IN 26 SECTOR FORMAT,
                        CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                        AND A GOOD HEADER.  CLOCK THROUGH ALL 400 WORDS AND
                        THE TWO ECC WORDS.  CHECK THE SECTOR FOR ZERO FILL
                        AND MAKE SURE THE TWO ECC WORDS ARE WRITTEN PROPERLY.
                        CHECK BUS ADDRESS, WORD COUNT, CYLINDER, TRACK, AND SECT



        **18 BIT FORMAT WRITES

        NOTE:SINCE 18 BIT FUNCTIONALITY OF THE RK611 IS NOT
        UTILIZED ON THE PDP-11, THE FOLLOWING TESTS, INTENDED
        FOR MANUFACTURING USE, WILL NOT BE RUN UNLESS LOCATION
        "SEC24" IS PATCHED TO A NON-ZERO VALUE.


                TEST 46 18 BIT WRITE DATA (PART 1)
```

```
                                        CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
                                        OF 400 WORDS TO AN RK06 IN 24 SECTOR FORMAT,
                                        CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                                        AND A GOOD HEADER.  CLOCK THROUGH 6 WORDS OF 177777.
                                        VERIFY THAT TWO ZERO BITS ARE PRESENT FOR EACH WORD.



                                TEST 47 18 BIT WRITE DATA (PART 2)

                                        CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                        PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
                                        OF 400 WORDS TO AN RK06 IN 24 SECTOR FORMAT,
                                        CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                                        AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                                        AND A GOOD HEADER.  CLOCK THROUGH 400 18 BIT WORDS
                                        AND THE 32 BIT ECC.  VERIFY THAT THE ECC IS
                                        WRITTEN CORRECTLY.


                        6.0 ERROR REPORTING

                        THE GENERAL FORMAT OF ERROR REPORTS IS:

                        OPERATION DESCRIPTION AND ERROR DESCRIPTION
                        TEST    ERROR
                        NUM     PC
                        XXXXXX  YYYYYY
                          EXPECT  ACTUAL  OTHER PERTENANT
                          REG     REG     INFORMATION
                          ZZZZZZ  WWWWWW  AAAAAA

                        NOTE:   MORE THAN ONE SET OF EXPECT/ACTUAL REGISTERS MAY BE
                                PRINTED OUT. OTHER PERTENANT INFORMATION MAY CONSIST
                                OF MORE THAN ONE WORD.

                        OTHER PERTINENT INFORMATION MAY CONTAIN A WORD LABELED
                        "BIT COUNT". THIS COUNT IS REPORTED WHEN THE OPERATION BEING
                        PERFORMED INVOLVES CLOCKING THE CONTROLLER THROUGH ONE OR MORE
                        OF THE VARIOUS FIELDS THAT MAKE UP THE PHYSICAL SECTOR FORMAT.

                        THESE FIELDS (ALL VALUES GIVEN IN OCTAL) ARE:

                                   FIELD                        BITS          WORDS
                                HEADER PREAMBLE                  400            20
                                HEADER                            60             3
                                GAP                              100             4
                                DATA PREAMBLE                    400            20
                                DATA
                                  (22(10) SECTOR/TRACK)        10000           400
                                  (20(10) SECTOR/TRACK)        11000           400
                                ECC                               40             2
```

```
                                        POSTAMBLE                       20              1
                                        GAP
                                          (22(10) SECTOR/TRACK)         160             7
                                          (20(10) SECTOR/TRACK)         140             6

                                REFER TO THE RK06 UNIBUS DISK SUBSYSTEM SPECIFICATION FOR MORE
                                DETAILED DESCRIPTION.

                                THE 'BIT COUNT" REPORTED IS INITIALIZED AT THE START OF EACH FIELD
                                AND IS INCREMENTED FOR EACH BIT PROCESSED.

                                WHEN THE OPERATION BEING PERFORMED INVOLVES WRITING, OTHER PERTINENT
                                INFORMATION MAY CONTAIN WORDS LABELED PRESENT BIT, PRESENT BIT -1,
                                PRESENT BIT -2, AND PRESENT BIT +1. THESE BITS ARE PRESENTED IN THIS
                                WAY TO SHOW THE WRITE DATA STREAM IN THE SAME MANNER THAT THE
                                RK611 LOOKS AT THE DATA STREAM TO COMPUTE PRECOMPENSATION ADVANCE
                                AND PRECOMPENSATION DELAY IN THE WRITE OPERATION.

                                WHEN THE OPERATION BEING PERFORMED INVOLVES READING, OTHER PERTINENT
                                INFORMATION MAY CONTAIN PREVIOUS BIT AND PRESENT BIT WORDS. THESE
                                BITS RELATE TO RK611 LOGIC THAT DETERMINES WHEN THE BIT IS VALID
                                FROM THE DECODER.
                                        %
```

```
                        ; *** REV 003 ***
                        .NLIST  CND,MD,MC
                        .LIST   ME
                        .ENABL  ABS,AMA
167400                  $SWR=   167400
000001                  $TN=    1
                        .TITLE  CZR6DC0 RK611 DSKLS PRT4
                        ;*COPYRIGHT (C) 1976,1980
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*
                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        12            ABORT PROGRAM AFTER 20 ERRORS
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            LOOP ON TEST IN SWR<7:0>
                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,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
```

```
                        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
000240                  PR5=    240             ;;PRIORITY LEVEL 5
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                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
```

```
                        BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .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
000210                  AVECT1= 210                     ;DEFINE RK611 VECTOR ADDRESS
000240                  APRIOR= PR5                     ;DEFINE RK611 PRIORITY
177440                  ABASE=  177440                  ;DEFINE BASE OF RK611 REGISTERS

                        .SBTTL  RK611 CONTROLLER REGISTER DEFINITION

000000                  RKCS1=  0                       ;CONTROL AND STATUS REGISTER 1
000002                  RKWC=   2                       ;WORD COUNT REGISTER
000004                  RKBA=   4                       ;BUS ADDRESS REGISTER
000006                  RKDA=   6                       ;DESIRED TRACK SECTOR REGISTER
000010                  RKCS2=  10                      ;CONTROL AND STATUS REGISTER 2
000012                  RKDS=   12                      ;DRIVE STATUS REGISTER
000014                  RKER=   14                      ;ERROR REGISTER
000016                  RKASOF= 16                      ;ATTENTION SUMMARY AND OFFSET REGISTER
000020                  RKDCYL= 20                      ;DESIRED CYLINDER REGISTER
000024                  RKDB=   24                      ;DATA BUFFER
000026                  RKMR1=  26                      ;MAINTENANCE REGISTER 1
000034                  RKMR2=  34                      ;MAINTENANCE REGISTER 2
000036                  RKMR3=  36                      ;MAINTENANCE REGISTER 3
000030                  RKECPS= 30                      ;ECC POSITION INFORMATION
000032                  RKECPT= 32                      ;ECC PATTERN INFORMATION
000022                  RKSPAR= 22                      ;SPARE REGISTER

                        .SBTTL  DRIVE COMMANDS

000001                  SELDRV= 01                      ;SELECT DRIVE
000003                  PACK=   03                      ;PACK ACKNOWLEDGE
000005                  CLEAR=  05                      ;DRIVE CLEAR
000007                  UNLOAD= 07                      ;UNLOAD
000011                  SRTSPL= 11                      ;START SPINDLE
000013                  RECAL=  13                      ;RECALIBRATE
```

```
                        OFFSET= 15                      ;OFFSET
                        SEEK=   17                      ;SEEK
                        RDDATA= 21                      ;READ DATA
                        WRDATA= 23                      ;WRITE DATA
                        RDHEAD= 25                      ;READ HEADER
                        WRHEAD= 27                      ;WRITE HEADER AND DATA
                        WRTCHK= 31                      ;WRITE CHECK
                        INTR=   300                     ;GENERATE INTERRUPT TO CPU

                        .SBTTL  CONTROL AND STATUS REGISTER 1 BITS

                        CO=     BIT0                    ;GO BIT
                        IE=     BIT6                    ;INTERRUPT ENABLE
                        RDY=    BIT7                    ;CONTROLLER READY
                        BA16=   BIT8                    ;BUS ADDRESS BIT 16
                        BA17=   BIT9                    ;BUS ADDRESS BIT 17
                        CDT=    BIT10                   ;CONTROLLER DRIVE TYPE (0=RK06)
                        CTO=    BIT11                   ;CONTROLLER TIMED OUT WAITING FOR
                                                        ;  DRIVE RESPONSE
                        CFMT=   BIT12                   ;CONTROLLER DRIVE FORMAT (0=26 SECTOR, 1=24 SECTOR)
                        SPAR=   BIT13                   ;DRIVE BUS PARITY ERROR DETECTED BY CONTROLLER
                        DI=     BIT14                   ;DRIVE INTERRUPT
                        CERR=   BIT15                   ;CONTROLLER ERROR
                        CCLR=   BIT15                   ;CONTROLLER CLEAR

                        .SBTTL  CONTROL AND STATUS REGISTER 2 BITS

                        DRVMSK= 7                       ;MASK FOR DRIVE SELECTION CODE
                        RLS=    BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
                        BAI=    BIT4                    ;BUS ADDRESS INCREMENT INHIBIT
                        SCLR=   BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
                        IR=     BIT6                    ;INPUT READY
                        OR=     BIT7                    ;OUTPUT READY
                        UFE=    BIT8                    ;UNIT FIELD ERROR
                        MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
                        PGE=    BIT10                   ;PROGRAMMING ERROR
                        NEM=    BIT11                   ;NON-EXISTENT MEMORY
                        NED=    BIT12                   ;NON-EXISTENT DRIVE
                        UPE=    BIT13                   ;UNIBUS PARITY ERROR
                        WCE=    BIT14                   ;WRITE CHECK ERROR
                        DLT=    BIT15                   ;DATA LATE ERROR

                        .SBTTL  ERROR REGISTER BIT DEFINITION

                        ILF=    BIT0                    ;ILLEGAL FUNCTION CODE
                        SKI=    BIT1                    ;SEEK INCOMPLETE
                        NXF=    BIT2                    ;NON-EXECUTABLE DRIVE FUNCTION
                        DRPAR=  BIT3                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
                        FMTE=   BIT4                    ;FORMAT ERROR
                        DTYE=   BIT5                    ;DRIVE TYPE ERROR
                        ECH=    BIT6                    ;ECC HARD
                        BSE=    BIT7                    ;BAD SECTOR ERROR
                        HVRC=   BIT8                    ;HEADER VRC ERRROR
                        COE=    BIT9                    ;CYLINDER ADDRESS OVERFLOW ERROR
                        IDAE=   BIT10                   ;INVALID DISK ADDRESS ERROR
                        WLE=    BIT11                   ;WRITE LOCK ERROR
```

```
                        DTE=    BIT12                   ;DRIVE TIMING ERROR
                        OPI=    BIT13                   ;OPERATION (SEARCH) INCOMPLETE
                        UNS=    BIT14                   ;DRIVE UNSAFE
                        DCK=    BIT15                   ;DATA CHECK

                        .SBTTL  STATUS REGISTER BIT DEFINITION

                        DRA=    BIT0                    ;DRIVE AVAILABLE (CONTROLLER IS SET IF
                                                        ;  THIS BIT IS RESET)
                        OFST=   BIT2                    ;DRIVE OFFSET
                        ACLO=   BIT3                    ;AC LOW
                        SPDLSS= BIT4                    ;SPEED LOSS
                        DROT=   BIT5                    ;DRIVE OFF TRACK
                        VV=     BIT6                    ;VOLUME VALID
                        DRDY=   BIT7                    ;DRIVE READY
                        DDT=    BIT8                    ;DRIVE TYPE (0=RK06)
                        WRL=    BIT11                   ;WRITE LOCK
                        PIP=    BIT13                   ;POSITIONING IN PROGRESS
                        DSC=    BIT14                   ;DRIVE STATUS CHANGE
                        SVAL=   BIT15                   ;STATUS VALID

                        .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION

                        MESMSK= 17                      ;MESSAGE MASK

                        PAT=    BIT4                    ;FORCE EVEN PARITY ON DRIVE MESSAGE LINES
                        DMD=    BIT5                    ;DIAGNOSTIC MODE
                        MSP=    BIT6                    ;MAINTENANCE SECTOR PULSE
                        MIND=   BIT7                    ;MAINTENANCE INDEX
                        MCLK=   BIT8                    ;MAINTENANCE CLOCK
                        MERD=   BIT9                    ;MAINTENANCE ENCODED READ DATA
                        MEWD=   BIT10                   ;MAINTENACNE ENCODED WRITE DATA
                        PCA=    BIT11                   ;PRECOMPENSATION ADVANCE
                        PCD=    BIT12                   ;PRECOMPENSATION DELAY
                        ECCW=   BIT13                   ;ECC WORD IS BEING READ OR WRITTEN
                        WRTGAT= BIT14                   ;WRITE GATE
                        RDGATE= BIT15                   ;READ GATE

                        .SBTTL  TRANSMITTED MESSAGE A

                        S.SEEK= BIT4                    ;SEEK COMMAND
                        S.RECL= BIT5                    ;RECALIBRATE COMMAND
                        S.STSP= BIT6                    ;START SPINDLE COMMAND
                        S.RTC=  BIT7                    ;DRIVE RETURN TO CENTERLINE COMMAND
                        S.CLR=  BIT8                    ;CLEAR ERROR AND DSC
                        S.FMT=  BIT9                    ;FORMAT
                        S.UNLD= BIT10                   ;UNLOAD
                        S.PACK= BIT11                   ;SET VOLUME VALID (PACK ACKNOWNLEDGE)
                        .SBTTL  TRAP CATCHER

                                .=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
                                .=174
000174  000000  DISPREG: .WORD  0                       ;;SOFTWARE DISPLAY REGISTER
```

```
1143  000176  000000                  SWREG:   .WORD  0                ;;SOFTWARE SWITCH REGISTER
1144                                  .SBTTL  STARTING ADDRESS(ES)
1145  000200  000137  003336                  JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
1146  000204  000137  003326                  JMP     RESTRT           ;JUMP TO RESTART ROUTINE
1147           000214                         .=214
1148  000214  000137  003316                  JMP     PARM             ;JUMP TO OPERATOR ASSIGNED PARMETERS
1149                                  .SBTTL  ACT11 HOOKS
1150
1151                                  ;;*****************************************************************
1152                                  ;HOOKS REQUIRED BY ACT11
1153           000220                         $SVPC=.                  ;SAVE PC
1154           000046                         .=46
1155  000046  033150                          $ENDAD                   ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
1156           000052                         .=52
1157  000052  000000                          .WORD   0                ;;2)SET LOC.52 TO ZERO
1158           000220                         .=$SVPC                  ;; RESTORE PC
1159           001000                         .=1000
1160                                  .SBTTL  APT PARAMETER BLOCK
1161
1162                                  ;;*****************************************************************
1163                                  ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
1164                                  ;;*****************************************************************
1165           001000                         .$X=.    ;;SAVE CURRENT LOCATION
1166           000024                         .=24     ;;SET POWER FAIL TO POINT TO START OF PROGRAM
1167  000024   000200                        200      ;;FOR APT START UP
1168           000044                         .=44     ;;POINT TO APT INDIRECT ADDRESS PNTR.
1169  000044   001000                        $APTHDR  ;;POINT TO APT HEADER BLOCK
1170           001000                         .=.$X    ;;RESET LOCATION COUNTER
1171                                  ;;*****************************************************************
1172                                  ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
1173                                  ;INTERFACE SPEC.
1174
1175  001000                          $APTHD:
1176  001000  000000                 $HIBTS: .WORD   0        ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
1177  001002  001214                 $MBADR: .WORD   $MAIL    ;;ADDRESS OF APT MAILBOX (BITS 0-15)
1178  001004  000000                 $TSTM:  .WORD            ;;RUN TIM OF LONGEST TEST
1179  001006  000000                 $PASTM: .WORD            ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
1180  001010  000000                 $UNITM: .WORD            ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
1181  001012  000032                         .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
                                .SBTTL  COMMON TAGS

                                ;;*****************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
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  000000                  $TMP0:  .WORD   0       ;;USER DEFINED
001162  000000                  $TMP1:  .WORD   0       ;;USER DEFINED
001164  000000                  $TMP2:  .WORD   0       ;;USER DEFINED
001166  000000                  $TMP3:  .WORD   0       ;;USER DEFINED
001170  000000                  $TMP4:  .WORD   0       ;;USER DEFINED
001172  000000                  $TMP5:  .WORD   0       ;;USER DEFINED
001174  000000                  $TMP6:  .WORD   0       ;;USER DEFINED
001176  000000                  $TMP7:  .WORD   0       ;;USER DEFINED
001200  000000                  $TIMES: 0               ;;MAX. NUMBER OF ITERATIONS
001202  000000                  $ESCAPE:0               ;;ESCAPE ON ERROR ADDRESS
001204  177607  000377        $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001210  077                     $QUES:  .ASCII  /?/     ;;QUESTION MARK
001211  015                     $CRLF:  .ASCII  <15>    ;;CARRIAGE RETURN
001212  000012                  $LF:    .ASCIZ  <12>    ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                .EVEN
```

```
1238  001214                    $MAIL:                          ;;APT MAILBOX
1239  001214  000000            $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
1240  001216  000000            $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
1241  001220  000000            $TESTN: .WORD   ATESTN          ;;TEST NUMBER
1242  001222  000000            $PASS:  .WORD   APASS           ;;PASS COUNT
1243  001224  000000            $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
1244  001226  000000            $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
1245  001230  000000            $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
1246  001232  000000            $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
1247  001234                    $ETABLE:                        ;;APT ENVIRONMENT TABLE
1248  001234     000            $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
1249  001235     000            $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
1250  001236  000000            $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
1251  001240  000000            $USWR:  .WORD   AUSWR           ;;USER SWITCHES
1252  001242  000000            $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
1253                            ;*                              BITS 15-11=CPU TYPE
1254                            ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
1255                            ;*                                      11/70=06,PDQ=07,Q=10
1256                            ;*                              BIT 10=REAL TIME CLOCK
1257                            ;*                              BIT  9=FLOATING POINT PROCESSOR
1258                            ;*                              BIT  8=MEMORY MANAGEMENT
1259  001244     000            $MAMS1: .BYTE   AMAMS1          ;;HIGH ADDRESS,M.S. BYTE
1260  001245     000            $MTYP1: .BYTE   AMTYP1          ;;MEM. TYPE,BLK#1
1261                            ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
1262                            ;*                                      900 NSEC CORE=001
1263                            ;*                                      300 NSEC BIPOLAR=002
1264                            ;*                                      500 NSEC MOS=003
1265  001246  000000            $MADR1: .WORD   AMADR1          ;;HIGH ADDRESS,BLK#1
1266                            ;*                                MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
1267  001250     000            $MAMS2: .BYTE   AMAMS2          ;;HIGH ADDRESS,M.S. BYTE
1268  001251     000            $MTYP2: .BYTE   AMTYP2          ;;MEM.TYPE,BLK#2
1269  001252  000000            $MADR2: .WORD   AMADR2          ;;MEM.LAST ADDRESS,BLK#2
1270  001254     000            $MAMS3: .BYTE   AMAMS3          ;;HIGH ADDRESS,M.S.BYTE
1271  001255     000            $MTYP3: .BYTE   AMTYP3          ;;MEM.TYPE,BLK#3
1272  001256  000000            $MADR3: .WORD   AMADR3          ;;MEM.LAST ADDRESS,BLK#3
1273  001260     000            $MAMS4: .BYTE   AMAMS4          ;;HIGH ADDRESS,M.S.BYTE
1274  001261     000            $MTYP4: .BYTE   AMTYP4          ;;MEM.TYPE,BLK#4
1275  001262  000000            $MADR4: .WORD   AMADR4          ;;MEM.LAST ADDRESS,BLK#4
1276  001264  000210            $VECT1: .WORD   AVECT1          ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
1277  001266  000000            $VECT2: .WORD   AVECT2          ;;INTERRUPT VECTOR#2BUS PRIORITY#2
1278  001270  177440            $BASE:  .WORD   ABASE           ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
1279  001272  000000            $DEVM:  .WORD   ADEVM           ;;DEVICE MAP
1280  001274  000000            $CDW1:  .WORD   ACDW1           ;;CONTROLLER DESCRIPTION WORD#1
1281  001276  000000            $CDW2:  .WORD   ACDW2           ;;CONTROLLER DESCRIPTION WORD#2
1282  001300                    $ETEND:
1283                            .MEXIT
```

```
1284                                    .SBTTL  ERROR POINTER TABLE
1285
1286                                    ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
1287                                    ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
1288                                    ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
1289                                    ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
1290                                    ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
1291
1292                                    ;*      EM              ;;POINTS TO THE ERROR MESSAGE
1293                                    ;*      DH              ;;POINTS TO THE DATA HEADER
1294                                    ;*      DT              ;;POINTS TO THE DATA
1295                                    ;*      DF              ;;POINTS TO THE DATA FORMAT
1296
1297
1298  001300                            $ERRTB:
1299                                    ;       ERROR 1:  UNEXPECTED MEMORY PARTIY ENABLE TRAP
1300  001300  044501                            EM000
1301  001302  042506                            DH000C
1302  001304  041046                            DT000
1303  001306  041402                            DF000
1304                                    ;       ERROR 2:  WRITE BIT ERROR
1305  001310  000000                    EMW:    0
1306  001312  000000                            0
1307  001314  041052                            DT002
1308  001316  041406                            DF002
1309                                    ;       ERROR 3:  ATTEMPTING TO CHECK SEEK MESSAGE FOR READ DATA
1310                                    ;       CS1 INCORRECT
1311  001320  044546                            EM300
1312  001322  050442                            EM4000
1313  001324  041074                            DT003
1314  001326  041432                            DF003
1315                                    ;       ERROR 4:  ATTEMPTING TO CHECK SEEK MESSAGE FOR READ DATA
1316                                    ;       MESS A INCORRECT
1317  001330  044546                            EM300
1318  001332  050460                            EM4001
1319  001334  041074                            DT003
1320  001336  041432                            DF003
1321                                    ;       ERROR 5:  ATTEMPTING TO CHECK SEEK MESSAGE FOR READ DATA
1322                                    ;       MESS B INCORRECT
1323  001340  044546                            EM300
1324  001342  050501                            EM4002
1325  001344  041074                            DT003
1326  001346  041432                            DF003
1327                                    ;       ERROR 6:  ATTEMPTING TO CHECK SEEK MESSAGE FOR WRITE DATA
1328                                    ;       CS1 INCORRECT
1329  001350  044623                            EM301
1330  001352  050442                            EM4000
1331  001354  041074                            DT003
1332  001356  041432                            DF003
1333                                    ;       ERROR 7:  ATTEMPTING TO CHECK SEEK MESSAGE FOR WRITE DATA
1334                                    ;       MESS A INCORRECT
1335  001360  044623                            EM301
1336  001362  050460                            EM4001
1337  001364  041074                            DT003
1338  001366  041432                            DF003
1339                                    ;       ERROR 10:  ATTEMPTING TO CHECK SEEK MESSAGE FOR WRITE DATA
```

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1340                                    ;       MESS B INCORRECT
1341  001370  044623                           EM301
1342  001372  050501                           EM4002
1343  001374  041074                           DT003
1344  001376  041432                           DF003
1345                                    ;       ERROR 11:  ATTEMPTING TO CHECK SEEK MESSAGE FOR WRITE CHECK
1346                                    ;       CS1 INCORRECT
1347  001400  044701                           EM302
1348  001402  050442                           EM4000
1349  001404  041074                           DT003
1350  001406  041432                           DF003
1351                                    ;       ERROR 12:  ATTEMPTING TO CHECK SEEK MESSAGE FOR WRITE CHECK
1352                                    ;       MESS A INCORRECT
1353  001410  044701                           EM302
1354  001412  050460                           EM4001
1355  001414  041074                           DT003
1356  001416  041432                           DF003
1357                                    ;       ERROR 13:  ATTEMPTING TO CHECK SEEK MESSAGE FOR WRITE CHECK
1358                                    ;       MESS B INCORRECT
1359  001420  044701                           EM302
1360  001422  050501                           EM4002
1361  001424  041074                           DT003
1362  001426  041432                           DF003
1363                                    ;       ERROR 14:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR READ DATA
1364                                    ;       CS1 INCORRECT
1365  001430  044760                           EM303
1366  001432  050442                           EM4000
1367  001434  041074                           DT003
1368  001436  041432                           DF003
1369                                    ;       ERROR 15:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR READ DATA
1370                                    ;       MESS A INCORRECT
1371  001440  044760                           EM303
1372  001442  050460                           EM4001
1373  001444  041074                           DT003
1374  001446  041432                           DF003
1375                                    ;       ERROR 16:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR READ DATA
1376                                    ;       MESS B INCORRECT
1377  001450  044760                           EM303
1378  001452  050501                           EM4002
1379  001454  041074                           DT003
1380  001456  041432                           DF003
1381                                    ;       ERROR 17:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR WRITE DATA
1382                                    ;       CS1 INCORRECT
1383  001460  045036                           EM304
1384  001462  050442                           EM4000
1385  001464  041074                           DT003
1386  001466  041432                           DF003
1387                                    ;       ERROR 20:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR WRITE DATA
1388                                    ;       MESS A INCORRECT
1389  001470  045036                           EM304
1390  001472  050460                           EM4001
1391  001474  041074                           DT003
1392  001476  041432                           DF003
1393                                    ;       ERROR 21:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR WRITE DATA
1394                                    ;       MESS B INCORRECT
1395  001500  045036                           EM304
```

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1396  001502  050501                        EM4002
1397  001504  041074                        DT003
1398  001506  041432                        DF003
1399                              ;         ERROR 22:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR WRITE CHECK
1400                              ;         CS1 INCORRECT
1401  001510  045115                        EM305
1402  001512  050442                        EM4000
1403  001514  041074                        DT003
1404  001516  041432                        DF003
1405                              ;         ERROR 23:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR WRITE CHECK
1406                              ;         MESS A INCORRECT
1407  001520  045115                        EM305
1408  001522  050460                        EM4001
1409  001524  041074                        DT003
1410  001526  041432                        DF003
1411                              ;         ERROR 24:  ATTEMPTING TO CHECK CLEAR MESSAGE FOR WRITE CHECK
1412                              ;         MESS B INCORRECT
1413  001530  045115                        EM305
1414  001532  050501                        EM4002
1415  001534  041074                        DT003
1416  001536  041432                        DF003
1417                              ;         ERROR 25:  ATTEMPTING TO CHECK HEADER GENERATION
1418                              ;         WITH VARIOUS CYLINDER VALUES
1419                              ;         CS1 INCORRECT
1420  001540  045175                        EM306
1421  001542  050442                        EM4000
1422  001544  041074                        DT003
1423  001546  041456                        DF025
1424                              ;         ERROR 26:  ATTEMPTING TO CHECK HEADER GENERATION
1425                              ;         WITH VARIOUS CYLINDER VALUES
1426                              ;         FIRST WORD OF HEADER INCORRECT
1427  001550  045175                        EM306
1428  001552  050522                        EM4003
1429  001554  041074                        DT003
1430  001556  041456                        DF025
1431                              ;         ERROR 27:  ATTEMPTING TO CHECK HEADER GENERATION
1432                              ;         WITH VARIOUS CYLINDER VALUES
1433                              ;         SECOND WORD OF HEADER INCORRECT
1434  001560  045175                        EM306
1435  001562  050552                        EM4004
1436  001564  041074                        DT003
1437  001566  041456                        DF025
1438                              ;         ERROR 30:  ATTEMPTING TO CHECK HEADER GENFRATION
1439                              ;         WITH VARIOUS TRACK VALUES
1440                              ;         CS1 INCORRECT
1441  001570  045277                        EM307
1442  001572  050442                        EM4000
1443  001574  041074                        DT003
1444  001576  041456                        DF025
1445                              ;         ERROR 31:  ATTEMPTING TO CHECK HEADER GENERATION
1446                              ;         WITH VARIOUS TRACK VALUES
1447                              ;         FIRST WORD OF HEADER INCORRECT
1448  001600  045277                        EM307
1449  001602  050522                        EM4003
1450  001604  041074                        DT003
1451  001606  041456                        DF025
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1452                                    ;       ERROR 32:  ATTEMPTING TO CHECK HEADER GENERATION
1453                                    ;       WITH VARIOUS TRACK VALUES
1454                                    ;       SECOND WORD OF HEADER INCORRECT
1455  001610  045277                           EM307
1456  001612  050552                           EM4004
1457  001614  041074                           DT003
1458  001616  041456                           DF025
1459                                    ;       ERROR 33:  ATTEMPTING TO CHECK HEADER GENERATION
1460                                    ;       WITH VARIOUS SECTOR VALUES
1461                                    ;       CS1 INCORRECT
1462  001620  045376                           EM308
1463  001622  050442                           EM4000
1464  001624  041074                           DT003
1465  001626  041456                           DF025
1466                                    ;       ERROR 34:  ATTEMPTING TO CHECK HEADER GENERATION
1467                                    ;       WITH VARIOUS SECTOR VALUES
1468                                    ;       FIRST WORD OF HEADER INCORRECT
1469  001630  045376                           EM308
1470  001632  050522                           EM4003
1471  001634  041074                           DT003
1472  001636  041456                           DF025
1473                                    ;       ERROR 35:  ATTEMPTING TO CHECK HEADER GENERATION
1474                                    ;       WITH VARIOUS SECTOR VALUES
1475                                    ;       SECOND WORD OF HEADER INCORRECT
1476  001640  045376                           EM308
1477  001642  050552                           EM4004
1478  001644  041074                           DT003
1479  001646  041456                           DF025
1480                                    ;       ERROR 36:  ATTEMPTING TO CHECK HEADER GENERATION
1481                                    ;       WITH VARIOUS FORMAT VALUES
1482                                    ;       CS1 INCORRECT
1483  001650  045476                           EM309
1484  001652  050442                           EM4000
1485  001654  041074                           DT003
1486  001656  041456                           DF025
1487                                    ;       ERROR 37:  ATTEMPTING TO CHECK HEADER GENERATION
1488                                    ;       WITH VARIOUS FORMAT VALUES
1489                                    ;       FIRST WORD OF HEADER INCORRECT
1490  001660  045476                           EM309
1491  001662  050522                           EM4003
1492  001664  041074                           DT003
1493  001666  041456                           DF025
1494                                    ;       ERROR 40:  ATTEMPTING TO CHECK HEADER GENERATION
1495                                    ;       WITH VARIOUS FORMAT VALUES
1496                                    ;       SECOND WORD OF HEADER INCORRECT
1497  001670  045476                           EM309
1498  001672  050552                           EM4004
1499  001674  041074                           DT003
1500  001676  041456                           DF025
1501                                    ;       ERROR 41:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1502                                    ;       CS1 INCORRECT
1503  001700  045576                           EM310
1504  001702  050442                           EM4000
1505  001704  041114                           DT041
1506  001706  041502                           DF041
1507                                    ;       ERROR 42:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
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1508                                    ;       CS2 INCORRECT
1509  001710  045576                            EM310
1510  001712  050602                            EM4005
1511  001714  041114                            DT041
1512  001716  041502                            DF041
1513                                    ;       ERROR 43:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1514                                    ;       ERROR REGISTER INCORRECT
1515  001720  045576                            EM310
1516  001722  050620                            EM4006
1517  001724  041114                            DT041
1518  001726  041502                            DF041
1519                                    ;       ERROR 44:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1520                                    ;       BUS ADD INCORRECT
1521  001730  045576                            EM310
1522  001732  050644                            EM4007
1523  001734  041114                            DT041
1524  001736  041502                            DF041
1525                                    ;       ERROR 45:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1526                                    ;       WORD COUNT INCORRECT
1527  001740  045576                            EM310
1528  001742  050672                            EM4008
1529  001744  041114                            DT041
1530  001746  041502                            DF041
1531                                    ;       ERROR 46:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1532                                    ;       CS1 INCORRECT AFTER READING DATA BUFFER
1533  001750  045576                            EM310
1534  001752  050717                            EM4009
1535  001754  041144                            DT046
1536  001756  041536                            DF046
1537                                    ;       ERROR 47:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1538                                    ;       CS2 INCORRECT AFTER READING DATA BUFFER
1539  001760  045576                            EM310
1540  001762  050767                            EM4010
1541  001764  041144                            DT046
1542  001766  041536                            DF046
1543                                    ;       ERROR 50:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1544                                    ;       ERROR REG INCORRECT AFTER READING DATA BUFFER
1545  001770  045576                            EM310
1546  001772  051037                            EM4011
1547  001774  041144                            DT046
1548  001776  041536                            DF046
1549                                    ;       ERROR 51:  ATTEMPTING TO CHECK NPR TRANSFER FOR WRITE DATA
1550                                    ;       DATA READ FROM MEMORY INCORRECT
1551  002000  045576                            EM310
1552  002002  051115                            EM4012
1553  002004  041164                            DT051
1554  002006  041562                            DF051
1555                                    ;       ERROR 52: ATTEMPTING TO CHECK HEADER RECOGNITION
1556                                    ;       CS1 INCORRECT
1557  002010  045663                            EM311
1558  002012  050442                            EM4000
1559  002014  041176                            DT052
1560  002016  041606                            DF052
1561                                    ;       ERROR 53: ATTEMPTING TO CHECK HEADER RECOGNITION
1562                                    ;       MR1 INCORRECT AFTER GAP IN WRITE DATA
1563  002020  045663                            EM311
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1564  002022  051155                    EM4013
1565  002024  041212                    DT053
1566  002026  041632                    DF053
1567                          ;         ERROR 54: ATTEMPTING TO CHECK SECTOR INCREMENT
1568                          ;         DISK ADDRESS REG INCORRECT
1569  002030  045732                    EM312
1570  002032  051223                    EM4014
1571  002034  041222                    DT054
1572  002036  041656                    DF054
1573                          ;         ERROR 55: ATTEMPTING TO CHECK SECTOR INCREMENT
1574                          ;         CYLINDER ADDRESS INCORRECT
1575  002040  045732                    EM312
1576  002042  051257                    EM4015
1577  002044  041222                    DT054
1578  002046  041656                    DF054
1579                          ;         ERROR 56: ATTEMPTING TO CHECK TRACK INCREMENT
1580                          ;         DISK ADDRESS REG INCORRECT
1581  002050  045777                    EM313
1582  002052  051223                    EM4014
1583  002054  041222                    DT054
1584  002056  041656                    DF054
1585                          ;         ERROR 57: ATTEMPTING TO CHECK TRACK INCREMENT
1586                          ;         CYLINDER ADDRESS INCORRECT
1587  002060  045777                    EM313
1588  002062  051257                    EM4015
1589  002064  041222                    DT054
1590  002066  041656                    DF054
1591                          ;         ERROR 60: ATTEMPTING TO CHECK CYLINDER INCREMENT
1592                          ;         DISK ADDRESS INCORRECT
1593  002070  046043                    EM314
1594  002072  051223                    EM4014
1595  002074  041222                    DT054
1596  002076  041656                    DF054
1597                          ;         ERROR 61: ATTEMPTING TO CHECK CYLINDER INCREMENT
1598                          ;         CYLINDER ADDRESS INCORRECT
1599  002100  046043                    EM314
1600  002102  051257                    EM4015
1601  002104  041222                    DT054
1602  002106  041656                    DF054
1603                          ;         ERROR 62: ATTEMPTING TO CHECK SECTOR PULSE DETECTION WITH
1604                          ;                   WRITE DATA
1605                          ;         MAINT. REG. 1 INCORRECT
1606  002110  046112                    EM315
1607  002112  051317                    EM4016
1608  002114  041212                    DT053
1609  002116  041632                    DF053
1610                          ;         ERROR 63: ATTEMPTING TO FORCE BAD SECTOR ERROR
1611                          ;         CS1 INCORRECT
1612  002120  046206                    EM316
1613  002122  050442                    EM4000
1614  002124  041144                    DT046
1615  002126  041536                    DF046
1616                          ;         ERROR 64: ATTEMPTING TO FORCE BAD SECTOR ERROR
1617                          ;         CS2 INCORRECT
1618  002130  046206                    EM316
1619  002132  050602                    EM4005
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1620  002134  041144                    DT046
1621  002136  041536                    DF046
1622                          ;         ERROR 65: ATTEMPTING TO FORCE BAD SECTOR ERROR
1623                          ;         ERROR REG INCORRECT
1624  002140  046206                    EM316
1625  002142  050620                    EM4006
1626  002144  041144                    DT046
1627  002146  041536                    DF046
1628                          ;         ERROR 66: ATTEMPTING TO FORCE HEADER VRC ERROR
1629                          ;         WHEN BAD SECTOR PRESENT
1630                          ;         CS1 INCORRECT
1631  002150  046253                    EM317
1632  002152  050442                    EM4000
1633  002154  041144                    DT046
1634  002156  041536                    DF046
1635                          ;         ERROR 67: ATTEMPTING TO FORCE HEADER VRC ERROR
1636                          ;         WHEN BAD SECTOR PRESENT
1637                          ;         CS2 INCORRECT
1638  002160  046253                    EM317
1639  002162  050602                    EM4005
1640  002164  041144                    DT046
1641  002166  041536                    DF046
1642                          ;         ERROR 70: ATTEMPTING TO FORCE HEADER VRC ERROR
1643                          ;         WHEN BAD SECTOR PRESENT
1644                          ;         ERROR REG INCORRECT
1645  002170  046253                    EM317
1646  002172  050620                    EM4006
1647  002174  041144                    DT046
1648  002176  041536                    DF046
1649                          ;         ERROR 71: ATTEMPTING TO FORCE HVRC ERROR
1650                          ;         CS1 INCORRECT
1651  002200  046351                    EM318
1652  002202  050442                    EM4000
1653  002204  041236                    DT071
1654  002206  041702                    DF071
1655                          ;         ERROR 72: ATTEMPTING TO FORCE HVRC ERROR
1656                          ;         CS2 INCORRECT
1657  002210  046351                    EM318
1658  002212  050602                    EM4005
1659  002214  041236                    DT071
1660  002216  041702                    DF071
1661                          ;         ERROR 73: ATTEMPTING TO FORCE HVRC ERROR
1662                          ;         ERROR REG INCORRECT
1663  002220  046351                    EM318
1664  002222  050620                    EM4006
1665  002224  041236                    DT071
1666  002226  041702                    DF071
1667                          ;         ERROR 74: ATTEMPTING TO FORCE OPERATION INCOMPLETE
1668                          ;         CS1 INCORRECT
1669  002230  046410                    EM319
1670  002232  050442                    EM4000
1671  002234  041264                    DT074
1672  002236  041736                    DF074
1673                          ;         ERROR 75: ATTEMPTING TO FORCE OPERATION INCOMPLETE
1674                          ;         CS2 INCORRECT
1675  002240  046410                    EM319
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1676  002242  050602                    EM4005
1677  002244  041264                    DT074
1678  002246  041736                    DF074
1679                          ;         ERROR 76: ATTEMPTING TO FORCE OPERATION INCOMPLETE
1680                          ;         ERROR REG INCORRECT
1681  002250  046410                    EM319
1682  002252  050620                    EM4006
1683  002254  041264                    DT074
1684  002256  041736                    DF074
1685                          ;         ERROR 77: ATTEMPTING TO FORCE OPERATION INCOMPLETE
1686                          ;         MR1 INCORRECT AFTER GAP IN WRITE DATA
1687  002260  046410                    EM319
1688  002262  051155                    EM4013
1689  002264  041306                    DT077
1690  002266  041762                    DF077
1691                          ;         ERROR 100: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 37
1692                          ;         CS1 INCORRECT
1693  002270  046461                    EM320
1694  002272  050442                    EM4000
1695  002274  041264                    DT074
1696  002276  041736                    DF074
1697                          ;         ERROR 101: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 37
1698                          ;         CS2 INCORRECT
1699  002300  046461                    EM320
1700  002302  050602                    EM4005
1701  002304  041264                    DT074
1702  002306  041736                    DF074
1703                          ;         ERROR 102: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 37
1704                          ;         ERROR REG INCORRECT
1705  002310  046461                    EM320
1706  002312  050620                    EM4006
1707  002314  041264                    DT074
1708  002316  041736                    DF074
1709                          ;         ERROR 103: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 37
1710                          ;         MR1 INCORRECT AFTER GAP IN WRITE DATA
1711  002320  046461                    EM320
1712  002322  051155                    EM4013
1713  002324  041306                    DT077
1714  002326  041762                    DF077
1715                          ;         ERROR 104: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 36
1716                          ;         CS1 INCORRECT
1717  002330  046545                    EM321
1718  002332  050442                    EM4000
1719  002334  041264                    DT074
1720  002336  041736                    DF074
1721                          ;         ERROR 105: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 36
1722                          ;         CS2 INCORRECT
1723  002340  046545                    EM321
1724  002342  050602                    EM4005
1725  002344  041264                    DT074
1726  002346  041736                    DF074
1727                          ;         ERROR 106: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 36
1728                          ;         ERROR REG INCORRECT
1729  002350  046545                    EM321
1730  002352  050620                    EM4006
1731  002354  041264                    DT074
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 1732  002356  041736                        DF074
 1733                                ;       ERROR 107: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 36
 1734                                ;       MR1 INCORRECT AFTER GAP IN WRITE DATA
 1735  002360  046545                        EM321
 1736  002362  051155                        EM4013
 1737  002364  041306                        DT077
 1738  002366  041762                        DF077
 1739                                ;       ERROR 110: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 0
 1740                                ;       CS1 INCORRECT
 1741  002370  046631                        EM322
 1742  002372  050442                        EM4000
 1743  002374  041264                        DT074
 1744  002376  041736                        DF074
 1745                                ;       ERROR 111: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 0
 1746                                ;       CS2 INCORRECT
 1747  002400  046631                        EM322
 1748  002402  050602                        EM4005
 1749  002404  041264                        DT074
 1750  002406  041736                        DF074
 1751                                ;       ERROR 112: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 0
 1752                                ;       ERROR REG INCORRECT
 1753  002410  046631                        EM322
 1754  002412  050620                        EM4006
 1755  002414  041264                        DT074
 1756  002416  041736                        DF074
 1757                                ;       ERROR 113: ATTEMPTING TO FORCE OPI WITH HVRC ERROR ON HEADER 0
 1758                                ;       MR1 INCORRECT AFTER GAP IN WRITE DATA
 1759  002420  046631                        EM322
 1760  002422  051155                        EM4013
 1761  002424  041306                        DT077
 1762  002426  041762                        DF077
 1763                                ;       ERROR 114.  CHECKING HEADER RECOGINTION WITH PREVIOUS BAD
 1764                                ;                   SECTOR ERROR CS1 INCORRECT
 1765  002430  046714                        EM323
 1766  002432  050442                        EM4000
 1767  002434  041264                        DT074
 1768  002436  041736                        DF074
 1769                                ;       ERROR 115:  CHECKING HEADER RECOGNITION WITH PREVIOUS BAD
 1770                                ;                   SECTOR ERROR CS2 INCORRECT
 1771  002440  046714                        EM323
 1772  002442  050602                        EM4005
 1773  002444  041264                        DT074
 1774  002446  041736                        DF074
 1775                                ;       ERROR 116:  CHECKING HEADER RECOGNITION WITH PREVIOUS BAD
 1776                                ;                   SECTOR ERROR  ERROR INCORRECT
 1777  002450  046714                        EM323
 1778  002452  050620                        EM4006
 1779  002454  041264                        DT074
 1780  002456  041736                        DF074
 1781                                ;       ERROR 117:  CHECKING HEADER RECOGNITION WITH PREVIOUS BAD
 1782                                ;                   SECTOR ERROR MR1 INCORRECT
 1783  002460  046714                        EM323
 1784  002462  051155                        EM4013
 1785  002464  041306                        DT077
 1786  002466  041762                        DF077
 1787                                ;       ERROR 120: CHECKING HEADER RECOGNITION WITH PREVIOUS HEADER
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1788                                    ;                       VRC ERROR CS1 INCORRECT
1789  002470  047007                                   EM324
1790  002472  050442                                   EM4000
1791  002474  041264                                   DT074
1792  002476  041736                                   DF074
1793                                    ;       ERROR 121:  CHECKING HEADER RECOGNITION WITH PREVIOUS HEADER
1794                                    ;                   VRC ERROR CS2 INCORRECT
1795  002500  047007                                   EM324
1796  002502  050602                                   EM4005
1797  002504  041264                                   DT074
1798  002506  041736                                   DF074
1799                                    ;       ERROR 122:  CHECKING HEADER RECOGNITION WITH PREVIOUS HEADER
1800                                    ;                   VRC ERROR  ERROR REG INCORRECT
1801  002510  047007                                   EM324
1802  002512  050620                                   EM4006
1803  002514  041264                                   DT074
1804  002516  041736                                   DF074
1805                                    ;       ERROR 123:  CHECKING HEADER RECOGNITION WITH PREVIOUS HEADER
1806                                    ;                   VRC ERROR MR1 INCORRECT
1807  002520  047007                                   EM324
1808  002522  051155                                   EM4013
1809  002524  041306                                   DT077
1810  002526  041762                                   DF077
1811                                    ;       ERROR 124:  FORCING BAD SECTOR ERROR WITH PREV HEADER
1812                                    ;                   VRC ERROR CS1 INCORRECT
1813  002530  047102                                   EM325
1814  002532  050442                                   EM4000
1815  002534  041264                                   DT074
1816  002536  041736                                   DF074
1817                                    ;       ERROR 125:  FORCING BAD SECTOR ERROR WITH PREV HEADER VRC ERROR
1818                                    ;                   CS2 INCORRECT
1819  002540  047102                                   EM325
1820  002542  050602                                   EM4005
1821  002544  041264                                   DT074
1822  002546  041736                                   DF074
1823                                    ;       ERROR 126:  FORCING BAD SECTOR ERROR WITH PREV HEADER VRC ERROR
1824                                    ;                   ERROR REG INCORRECT
1825  002550  047102                                   EM325
1826  002552  050620                                   EM4006
1827  002554  041264                                   DT074
1828  002556  041736                                   DF074
1829                                    ;       ERROR 127:  FORCING BAD SECTOR ERRCR WITH PREV HEADER VRC ERROR
1830                                    ;                   MR1 INCORRECT
1831  002560  047102                                   EM325
1832  002562  051155                                   EM4013
1833  002564  041306                                   DT077
1834  002566  041762                                   DF077
1835                                    ;       ERRROR 130:  FORCING HEADER VRC ERROR WITH PREV BAD SECTOR ERROR
1836                                    ;                    CS1 INCORRECT
1837  002570  047172                                   EM326
1838  002572  050442                                   EM4000
1839  002574  041264                                   DT074
1840  002576  041736                                   DF074
1841                                    ;       ERROR 131:  FORCING HEADER VRC ERROR WITH PREV BAD SECTOR ERROR
1842                                    ;                   CS2 INCORRECT
1843  002600  047172                                   EM326
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1844  002602  050602                  EM4005
1845  002604  041264                  DT074
1846  002606  041736                  DF074
1847                          ;       ERROR 132:  FORCING HEADER VRC ERROR WITH PREV BAD SECTOR ERROR
1848                          ;                   ERROR REG INCORRECT
1849  002610  047172                  EM326
1850  002612  050620                  EM4006
1851  002614  041264                  DT074
1852  002616  041736                  DF074
1853                          ;       ERROR 133:  FORCING HEADER VRC ERROR WITH PREV BAD SECTOR ERROR
1854                          ;                   MR1 INCORRECT
1855  002620  047172                  EM326
1856  002622  051155                  EM4013
1857  002624  041306                  DT077
1858  002626  041762                  DF077
1859                          ;       ERROR 134:  ATTEMPTING TO CHECK ECC PATTERN CLEARING
1860                          ;                   ECC PATTERN INCORRECT
1861  002630  047411                  EM329
1862  002632  051335                  EM4017
1863  002634  041320                  DT134
1864  002636  042006                  DF134
1865                          ;       ERROR 135:  ATTEMPTING TO CHECK ECC GENERATION
1866                          ;                   ECC PATTERN INCORRECT
1867  002640  047462                  EM330
1868  002642  051335                  EM4017
1869  002644  041320                  DT134
1870  002646  042006                  DF134
1871                          ;       ERROR 136: ATTEMPTING BAD SECTOR ERROR SETTING CONTROLLER ERROR
1872                          ;       CS1 INCORRECT
1873  002650  047525                  EM331
1874  002652  050442                  EM4000
1875  002654  041144                  DT046
1876  002656  041536                  DF046
1877                          ;       ERROR 137: ATTEMPTING BAD SECTOR ERROR SETTING CONTROLLER ERROR
1878                          ;       CS2 INCORRECT
1879  002660  047525                  EM331
1880  002662  050602                  EM4005
1881  002664  041144                  DT046
1882  002666  041536                  DF046
1883                          ;       ERROR 140: ATTEMPTING BAD SECTOR ERROR SETTING CONTROLLER ERROR
1884                          ;       ERROR REG. INCORRECT
1885  002670  047525                  EM331
1886  002672  050620                  EM4006
1887  002674  041144                  DT046
1888  002676  041536                  DF046
1889                          ;       ERROR 141: ATTEMPTING HEADER VRC ERROR SETTING CONTROLLER ERROR
1890                          ;       CS1 INCORRECT
1891  002700  047612                  EM332
1892  002702  050442                  EM4000
1893  002704  041144                  DT046
1894  002706  041536                  DF046
1895                          ;       ERROR 142: ATTEMPTING HEADER VRC ERROR SETTING CONTROLLER ERROR
1896                          ;       CS2 INCORRECT
1897  002710  047612                  EM332
1898  002712  050602                  EM4005
1899  002714  041144                  DT046
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1900  002716  041536                    DF046
1901                              ;     ERROR 143: ATTEMPTING HEADER VRC ERROR SETTING CONTROLLER ERROR
1902                              ;     ERROR REG. INCORRECT
1903  002720  047612                    EM332
1904  002722  050620                    EM4006
1905  002724  041144                    DT046
1906  002726  041536                    DF046
1907                              ;     ERROR 144: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1908                              ;     CS1 INCORRECT
1909  002730  047773                    EM335
1910  002732  050442                    EM4000
1911  002734  041332                    DT144
1912  002736  042032                    DF144
1913                              ;     ERROR 145: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1914                              ;     CS2 INCORRECT
1915  002740  047773                    EM335
1916  002742  050602                    EM4005
1917  002744  041332                    DT144
1918  002746  042032                    DF144
1919                              ;     ERROR 146: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1920                              ;     ERROR REG. INCORRECT
1921  002750  047773                    EM335
1922  002752  050620                    EM4006
1923  002754  041332                    DT144
1924  002756  042032                    DF144
1925                              ;     ERROR 147: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1926                              ;     BUS ADDRESS INCORRECT
1927  002760  047773                    EM335
1928  002762  050644                    EM4007
1929  002764  041332                    DT144
1930  002766  042032                    DF144
1931                              ;     ERROR 150: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1932                              ;     WORD COUNT INCORRECT
1933  002770  047773                    EM335
1934  002772  050672                    EM4008
1935  002774  041332                    DT144
1936  002776  042032                    DF144
1937                              .     ERROR 151: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1938                              .     CYLINDER ADD INCORRECT
1939  003000  047773                    EM335
1940  003002  051257                    EM4015
1941  003004  041332                    DT144
1942  003006  042032                    DF144
1943                              ;     ERROR 152: ATTEMPTING COMPLETE EXECUTION OF WRITE DATA
1944                              ;     DISK ADDRESS INCORRECT
1945  003010  047773                    EM335
1946  003012  051223                    EM4014
1947  003014  041332                    DT144
1948  003016  042032                    DF144
1949                              .     ERROR 153: ATTEMPTING ERROR CLEAR WITH CONTROLLER CLEAR
1950                              .     CS1 INCORRECT
1951  003020  050047                    EM336
1952  003022  050442                    EM4000
1953  003024  041176                    DT052
1954  003026  041606                    DF052
1955                              .     ERROR 154: ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL
```

```
1956                                    ;       CS1 INCORRECT
1957  003030  050124                            EM337
1958  003032  050442                            EM4000
1959  003034  041332                            DT144
1960  003036  042032                            DF144
1961                                    ;       ERROR 155: ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL
1962                                    ;       CS2 INCORRECT
1963  003040  050124                            EM337
1964  003042  050602                            EM4005
1965  003044  041332                            DT144
1966  003046  042032                            DF144
1967                                    ;       ERROR 156: ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL
1968                                    ;       ERROR REGISTER INCORRECT
1969  003050  050124                            EM337
1970  003052  050620                            EM4006
1971  003054  041332                            DT144
1972  003056  042032                            DF144
1973                                    ;       ERROR 157: ATTEMPTIN PARTIAL SECTOR WRITE WITH ZERO FILL
1974                                    ;       BUS ADDRESS INCORRECT
1975  003060  050124                            EM337
1976  003062  050644                            EM4007
1977  003064  041332                            DT144
1978  003066  042032                            DF144
1979                                    ;       ERROR 160: ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL
1980                                    ;       WORD COUNT INCORRECT
1981  003070  050124                            EM337
1982  003072  050672                            EM4008
1983  003074  041332                            DT144
1984  003076  042032                            DF144
1985                                    ;       ERROR 161: ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL
1986                                    ;       CYLINDER ADDRESS INCORRECT
1987  003100  050124                            EM337
1988  003102  051257                            EM4015
1989  003104  041332                            DT144
1990  003106  042032                            DF144
1991                                    ;       ERROR 162: ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL
1992                                    ;       DISK ADDRESS INCORRECT
1993  003110  050124                            EM337
1994  003112  051223                            EM4014
1995  003114  041332                            DT144
1996  003116  042032                            DF144
1997                                    ;       ERROR 163: ATTEMPTING WRITE DATA IN 18 BIT MODE
1998                                    ;       RKECPT INCORRECT
1999  003120  050375                            EM340
2000  003122  051335                            EM4017
2001  003124  041372                            DT151
2002  003126  042066                            DF151
2003                                    ;       ERROR 164: ATTEMPTING WRITE DATA IN 18 BIT MODE
2004                                    ;       RKECPT INCORRECT
2005  003130  050375                            EM340
2006  003132  051335                            EM4017
2007  003134  041320                            DT134
2008  003136  042006                            DF134
2009
2010                                    .SBTTL  TEMPORARY STORAGE FOR RK611 CONTROLLER REGISTER
2011
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```
2012  003140  000000                  T.CS1:   .WORD   0              ;CONTROL AND STATUS REGISTER 1
2013  003142  000000                  T.WC:    .WORD   0              ;WORD COUNT REGISTER
2014  003144  000000                  T.BA:    .WORD   0              ;BUS ADDRESS REGISTER
2015  003146  000000                  T.DA:    .WORD   0              ;DESIRED TRACK SECTOR REGISTER
2016  003150  000000                  T.CS2:   .WORD   0              ;CONTROL AND STATUS REGISTER 2
2017  003152  000000                  T.DS:    .WORD   0              ;DRIVE STATUS REGISTER
2018  003154  000000                  T.ER:    .WORD   0              ;ERROR REGISTER
2019  003156  000000                  T.ASOF:  .WORD   0              ;ATTENTION SUMMARY AND OFFSET REGISTER
2020  003160  000000                  T.DCYL:  .WORD   0              ;DESIRED CYLINDER REGISTER
2021  003162  000000                  T.DB:    .WORD   0              ;DATA BUFFER
2022  003164  000000                  T.MR1:   .WORD   0              ;MAINTENANCE REGISTER 1
2023  003166  000000                  T.MR2:   .WORD   0              ;MAINTENANCE REGISTER 2
2024  003170  000000                  T.MR3:   .WORD   0              ;MAINTENANCE REGISTER 3
2025  003172  000000                  T.ECPS:  .WORD   0              ;ECC POSITION INFORMATION
2026  003174  000000                  T.ECPT:  .WORD   0              ;ECC PATTERN INFORMATION
2027  003176  000000                  T.SPAR:  .WORD   0              ;SPARE REGISTER
2028
2029                                  .SBTTL  EXPECTED RK611 CONTROLLER REGISTERS
2030
2031  003200  000000                  E.CS1:   .WORD   0              ;CONTROL AND STATUS REGISTER 1
2032  003202  000000                  E.WC:    .WORD   0              ;WORD COUNT REGISTER
2033  003204  000000                  E.BA:    .WORD   0              ;BUS ADDRESS REGISTER
2034  003206  000000                  E.DA:    .WORD   0              ;DESIRED TRACK SECTOR REGISTER
2035  003210  000000                  E.CS2:   .WORD   0              ;CONTROL AND STATUS REGISTER 2
2036  003212  000000                  E.DS:    .WORD   0              ;DRIVE STATUS REGISTER
2037  003214  000000                  E.ER:    .WORD   0              ;ERROR REGISTER
2038  003216  000000                  E.ASOF:  .WORD   0              ;ATTENTION SUMMARY AND OFFSET REGISTER
2039  003220  000000                  E.DCYL:  .WORD   0              ;DESIRED CYLINDER REGISTER
2040  003222  000000                  E.DB:    .WORD   0              ;DATA BUFFER
2041  003224  000000                  E.MR1:   .WORD   0              ;MAINTENANCE REGISTER 1
2042  003226  000000                  E.MR2:   .WORD   0              ;MAINTENANCE REGISTER 2
2043  003230  000000                  E.MR3:   .WORD   0              ;MAINTENANCE REGISTER 3
2044  003232  000000                  E.ECPS:  .WORD   0              ;ECC POSITION INFORMATION
2045  003234  000000                  E.ECPT:  .WORD   0              ;ECC PATTERN INFORMATION
2046  003236  000000                  E.SPAR:  .WORD   0              ;SPARE REGISTER
2047                                  .SBTTL  PROGRAM DEFINED VARIABLES
2048
2049  003240  000214                  RKVEC:   .WORD   214            ;RK611 VECTOR ADDESS
2050  003242  000240                  RKPRI:   .WORD   PR5            ;RK611 PRIORITY
2051  003244  000000                  TRAPPC:  .WORD   0              ;TRAP PC FOR MEMORTY PARITY OPTION
2052  003246  000000                  SRTFLG:  .WORD   0              ;START FLAG
2053                                                                  ;   0 = 200
2054                                                                  ;   1 = 214
2055                                                                  ;  -1 = 204
2056  003250  000000                  ERRCNT:  .WORD   0              ;ERROR COUNT FOR ABORT ERROR THRESHOLD
2057  003252  000000                  P1.BIT:  .WORD   0              ;NEXT BIT
2058  003254  000000                  PR.BIT:  .WORD   0              ;PRESENT BIT
2059  003256  000000                  M1.BIT:  .WORD   0              ;BIT-1
2060  003260  000000                  M2.BIT:  .WORD   0              ;BIT-2
2061  003262  000000                  BITCNT:  .WORD   0              ;BIT COUNT
2062  003264  000000                  WRDCNT:  .WORD   0              ;WORD COUNT FOR NPR TRANSFERS
2063  003266  000000                  ECCHI:   .WORD   0              ;16 MOST SIGNIFICANT BIT OF ECC
2064  003270  000000                  ECCLO:   .WORD   0              ;16 LEAST SIGNIFICANT BIT OF ECC
2065  003272  000000                  ECCXOR:  .WORD   0              ;FLAG FOR ECC GENERATION
2066  003274  000000                  MEMPAR:  .WORD   0              ;FLAG FOR MEMORY PARITY OPTION
2067  003276     000                  SECTOR:  .BYTE   0              ;SECTOR FOR INCREMENT TEST
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2068  003277  000                     TRACK:  .BYTE   0               ;TRACK FOR INCREMENT TEST
2069  003300  000000                  CYLN:   .WORD   0               ;CYLINDER FOR INCREMENT TEST
2070  003302  000000  000000  000000  HEADER: .WORD   0,0,0           ;EXPECTED FOR INCREMENT TEST
2071  003310  000000                  HDRCNT: .WORD   0               ;NUMBER OF HEADERS FOR OPI'S
2072  003312  000000                  SAVSWR: .WORD   0               ;STORAGE FOR SWITCH REGISTER
2073  003314  000000                  SEC24:  .WORD   0               ;FLAG FOR 18-BIT WRITE DATA TESTS
2074                                  .SBTTL  PROGRAM SETUP
2075
2076  003316  012737  000001  003246  PARM:   MOV     #1,SRTFLG       ;LOAD START FLAG FOR PARMETER START
2077  003324  000406                  BR      START1
2078
2079  003326  012737  177777  003246  RESTRT: MOV     #-1,SRTFLG      ;LOAD START FLAG FOR RESTART
2080  003334  000402                  BR      START1
2081
2082  003336  005037  003246          START:  CLR     SRTFLG          ;CLEAR START FLAG
2083  003342  000005                  START1: RESET                   ;RESET THE WHOLE SYSTEM
2084  003344  105037  001103                  CLRB    $ERFLG          ;CLEAR ERROR FLAG
2085  003350  012706  001100                  MOV     #STACK,SP       ;INITIALIZE STACK POINTER
2086  003354  004737  037144                  JSR     PC,$TKINT       ;INIT KEYBOARD
2087  003360  012746  000340                  MOV     #PR7,-(SP)      ;LOAD STACK TO LOCK OUT ALL INTERRUPTS
2088  003364  012746  003372                  MOV     #1$,-(SP)       ;LOAD START OF PROGRAM
2089  003370  000002                  RTI                             ;LOAD PSW
2090
2091  003372                          1$:
2092                                  .SBTTL  INITIALIZE THE COMMON TAGS
2093                                  ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
2094  003372  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
2095  003376  005026                  CLR     (R6)+                   ;;CLEAR MEMORY LOCATION
2096  003400  022706  001140                  CMP     #SWR,R6 ;;DONE?
2097  003404  001374                  BNE     .-6                     ;;LOOP BACK IF NO
2098  003406  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
2099                                  ;;INITIALIZE A FEW VECTORS
2100  003412  012737  033246  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
2101  003420  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
2102  003426  012737  036000  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
2103  003434  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
2104  003442  012737  040756  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
2105  003450  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
2106  003456  012737  040626  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
2107  003464  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
2108  003472  013737  033014  033006          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
2109  003500  005037  001200                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
2110  003504  005037  001202                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
2111  003510  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
2112  003516  012737  003516  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
2113  003524  012737  003524  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
2114                                  ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
2115                                  ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
2116  003532  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
2117  003536  012737  003572  000004          MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
2118  003544  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
2119  003552  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
2120  003560  022777  177777  175352          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
2121  003566  001012                  BNE     66$                     ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
2122                                                                  ;;AND  THE HARDWARE SWR IS NOT = -1
2123  003570  000403                  BR      65$                     ;;BRANCH IF NO TIMEOUT
```

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2124  003572  012716  003600          64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
2125  003576  000002                          RTI
2126  003600  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
2127  003606  012737  000174  001142          MOV     #DISPREG,DISPLAY
2128  003614  012637  000004          66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
2129
2130  003620  005037  001222                  CLR     $PASS           ;;CLEAR PASS COUNT
2131  003624  132737  000200  001235          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
2132  003632  001403                          BEQ     67$             ;;YES,USE NON-APT SWITCH
2133  003634  012737  001236  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
2134  003642                          67$:
2135  003642  005037  003250                  CLR     ERRCNT
2136                                  .SBTTL  TYPE PROGRAM NAME
2137                                  ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
2138  003646  005227  177777                  INC     #-1             ;;FIRST TIME?
2139  003652  001045                          BNE     68$             ;;BRANCH IF NO
2140  003654  022737  033150  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
2141  003662  001441                          BEQ     68$             ;;BRANCH IF YES
2142  003664  104401  003732                  TYPE    ,69$            ;;TYPE ASCIZ STRING
2143                                  .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
2144  003670  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
2145  003674  001012                          BNE     70$             ;;BRANCH IF YES
2146  003676  123727  001234  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
2147  003704  001406                          BEQ     70$             ;;BRANCH IF YES
2148  003706  023727  001140  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
2149  003714  001005                          BNE     71$             ;;BRANCH IF NO
2150  003716  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
2151  003720  000403                          BR      71$
2152  003722  112737  000001  001134  70$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
2153  003730                          71$:
2154  003730  000416                          BR      68$             ;;GET OVER THE ASCIZ
2155                                  ;;69$:  .ASCIZ  <CRLF>/CZR6DC0 RK611 DSKLS PRT4/<CRLF>
2156  003766                          68$:
2157  003766  005227  177777                  INC     #-1             ;TYPE RUN TIME MESSAGE FIRST PASS ONLY
2158  003772  001002                          BNE     2$
2159  003774  104401  042261                  TYPE    ,OPR006
2160  004000  022737  000001  003246  2$:     CMP     #1,SRTFLG       ;CHECK IF PARAMETER START
2161  004006  001117                          BNE     15$             ;NO, CONTINUE SETUP
2162  004010  104401  042112          5$:     TYPE    ,OPR001         ;TYPE 'RK611 BUS ADDRESS (  ) ='
2163  004014  013746  001270                  MOV     $BASE,-(SP)     ;;SAVE $BASE FOR TYPEOUT
2164  004020  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2165  004022  104401  042141                  TYPE    ,OPR002
2166  004026  104412                          RDOCT                   ;GET VALUE
2167  004030  012637  001160                  MOV     (SP)+,$TMP0
2168  004034  001407                          BEQ     7$              ;CHECK IF <CR>
2169  004036  022737  160000  001160          CMP     #160000,$TMP0   ;CHECK IF IN I/O PAGE
2170  004044  101361                          BHI     5$
2171  004046  013737  001160  001270          MOV     $TMP0,$BASE     ;LOAD NEW BUS ADDRESS
2172  004054  104401  042147          7$:     TYPE    ,OPR003         ;TYPE 'RK611 VECTOR ADDRESS (  ) -'
2173  004060  013746  001264                  MOV     $VECT1,-(SP)    ;GET VECTOR ADDRESS FOR TYPE OUT
2174  004064  042716  160000                  BIC     #160000,(SP)    ;CLEAR PRIORITY BITS
2175  004070  104402                          TYPOC
2176  004072  104401  042141                  TYPE    ,OPR002
2177  004076  104412                          RDOCT                   ;GET VALUE
2178  004100  012637  001160                  MOV     (SP)+,$TMP0
2179  004104  001407                          BEQ     10$             ;CHECK IF <CR>
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2180  004106  022737  001000  001160          CMP     #1000,$TMP0     ;CHECK IF LEGAL
2181  004114  101757                          BLOS    7$
2182  004116  013737  001160  001264          MOV     $TMP0,$VECT1    ;LOAD NEW VECTOR ADDRESS
2183  004124  104401  042177          10$:    TYPE    ,OPR004         ;TYPE 'RK611 PRIORITY (   ) ='
2184  004130  005046                          CLR     -(SP)           ;MAKE ROOM ON THE STACK
2185  004132  113716  001265                  MOVB    $VECT1+1,(SP)   ;GET PRIORITY
2186  004136  006216                          ASR     (SP)            ;SHIF RIGH 5 BITS
2187  004140  006216                          ASR     (SP)
2188  004142  006216                          ASR     (SP)
2189  004144  006216                          ASR     (SP)
2190  004146  006216                          ASR     (SP)
2191  004150  104402                          TYPOC
2192  004152  104401  042141                  TYPE    ,OPR002
2193  004156  104412                          RDOCT                   ;GET VALUE
2194  004160  012637  001160                  MOV     (SP)+,$TMP0
2195  004164  001430                          BEQ     15$             ;CHECK FOR DEFAULT
2196  004166  022737  000007  001160          CMP     #7,$TMP0        ;CHECK IF LEGAL
2197  004174  103753                          BLO     10$
2198  004176  022737  000004  001160          CMP     #4,$TMP0
2199  004204  101347                          BHI     10$
2200  004206  006337  001160                  ASL     $TMP0           ;SHIFT 5 BITS LEFT
2201  004212  006337  001160                  ASL     $TMP0
2202  004216  006337  001160                  ASL     $TMP0
2203  004222  006337  001160                  ASL     $TMP0
2204  004226  006337  001160                  ASL     $TMP0
2205  004232  042737  160000  001264          BIC     #160000,$VECT1  ;GET PRIORITY BITS
2206  004240  153737  001160  001265          BISB    $TMP0,$VECT1+1
2207  004246  013737  001264  003240  15$:    MOV     $VECT1,RKVEC
2208  004254  042737  160000  003240          BIC     #160000,RKVEC   ;GET VECTOR
2209  004262  113737  001265  003242          MOVB    $VECT1+1,RKPRI  ;GET PRIORITY
2210  004270  013702  001270                  MOV     $BASE,R2        ;SET '611 BASE
2211  004274  005037  001202                  CLR     $ESCAPE         ;CLEAR ESCAPE
2212  004300  012746  000000          NEWPAS: MOV     #PR0,-(SP)      ;LOCK OUT INTERRUPTS
2213  004304  012746  004312                  MOV     #TST1,-(SP)
2214  004310  000002                          RTI
2215                                  .SBTTL  **TYPE C INSTRUCTION'S DRIVE MESSAGES
2216
2217                                  ;;*******************************************************************
2218                                  ;*TEST 1         READ DATA SEEK MESSAGE
2219                                  ;*
2220                                  ;*      CLEAR THE RK06 SUBSYSTEM WITH A SUBSYSTEM CLEAR.  PUT THE
2221                                  ;*      CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA TO AN
2222                                  ;*      RK06, IN 24 SECTOR FORMAT, CYLINDER 1777, HEAD 7, DRIVE
2223                                  ;*      7, WORD COUNT 177777.  CLOCK IN THE SEEK MESSAGE AND.
2224                                  ;*      MAKE SURE IT IS GENERATED PROPERLY.
2225                                  ;*
2226                                  ;;*******************************************************************
2227  004312  000004                  TST1:   SCOPE
2228  004314  012737  000062  001200          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
2229  004322  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2230  004326  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2231  004334  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
2232  004342  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2233  004350  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2234  004356  012762  001777  000020          MOV     #1777,RKDCYL(R2)  ;LOAD CYLINDER ADDRESS REG.
2235  004364  012762  003400  000006          MOV     #3400,RKDA(R2)  ;LOAD TRACK
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 2236  004372  012762  000007  000010          MOV     #7,RKCS2(R2)     ;LOAD DRIVE NUM.
 2237  004400  012762  012021  000000          MOV     #CDT!CFMT!RDDATA,RKCS1(R2)  ;ISSUE RDDATA WITH CDT SET IN
 2238                                                                    ;  24 SECTOR FORMAT
 2239  004406  012700  000016                  MOV     #3*4+2,R0        ;CLOCK IN DRIVE MESSAGE
 2240  004412  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
 2241  004420  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 2242  004426  005300                          DEC     R0
 2243  004430  001370                          BNE     1$
 2244  004432  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND STATUS REG. 1
 2245  004440  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE MAINT REG. 2 (MESS A)
 2246  004446  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE MAINT REG. 3 (MESS B)
 2247  004454  012737  012021  003200          MOV     #CDT!CFMT!RDDATA,E.CS1  ;LOAD EXPECTED CS1
 2248  004462  012737  071027  003226          MOV     #S.SEEK!S.FMT!70007,E.MR2  ;LOAD EXPECTED MR2
 2249  004470  012737  037760  003230          MOV     #37760,E.MR3     ;LOAD EXPECTED MR3
 2250  004476  023737  003200  003140          CMP     E.CS1,T.CS1      ;CHECK COMMAND AND STATUS REG. 1 CORRECT
 2251  004504  001405                          BEQ     2$               ;YES, CHECK MESSAGE A
 2252  004506  104003                          ERROR   3                ;CS1 INCORRECT
 2253  004510  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
 2254  004516  000412                          BR      TST2             ;;GO TO NEXT TEST
 2255
 2256  004520  023737  003226  003166  2$:     CMP     E.MR2,T.MR2      ;CHECK MESS A CORRECT
 2257  004526  001401                          BEQ     3$               ;YES, CHECK MESSAGE B
 2258  004530  104004                          ERROR   4                ;MESS A INCORRECT
 2259  004532  023737  003230  003170  3$:     CMP     E.MR3,T.MR3      ;CHECK MESS B CORRECT
 2260  004540  001401                          BEQ     TST2             ;;YES, GO ON TO NEXT TEST
 2261  004542  104005                          ERROR   5                ;MESS B INCORRECT
 2262
 2263                                  ;;*****************************************************************
 2264                                  ;*TEST 2        WRITE DATA SEEK MESSAGE
 2265                                  ;*
 2266                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
 2267                                  ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
 2268                                  ;*      ONE WORD TO AN RK06 IN 24 SECTOR FORMAT, CYLINDER 1777,
 2269                                  ;*      TRACK 7, DRIVE 7.  CLOCK IN SEEK MESSAGE.  CHECK IF
 2270                                  ;*      PROPER MESSAGE IS ASSEMBLED.
 2271                                  ;*
 2272                                  ;*****************************************************************
 2273  004544  000004                  TST2:   SCOPE
 2274  004546  012737  000062  001200          MOV     #50.,$TIMES      ;;DO 50. ITERATIONS
 2275  004554  013702  001270                  MOV     $BASE,R2         ;LOAD RK611 BASE
 2276  004560  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
 2277  004566  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
 2278  004574  012762  177777  000002          MOV     #-1,RKWC(R2)     ;LOAD WORD COUNT
 2279  004602  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
 2280  004610  012762  001777  000020          MOV     #1777,RKDCYL(R2)  ;LOAD CYLINDER ADDRESS REG.
 2281  004616  012762  003400  000006          MOV     #3400,RKDA(R2)  ;LOAD TRACK
 2282  004624  012762  000007  000010          MOV     #7,RKCS2(R2)     ;LOAD DRIVE NUM.
 2283  004632  012762  012023  000000          MOV     #CDT!CFMT!WRDATA,RKCS1(R2)  ;ISSUE WRDATA WITH CDT SET IN
 2284                                                                    ;  24 SECTOR FORMAT
 2285  004640  012700  000016                  MOV     #3*4+2,R0        ;CLOCK IN DRIVE MESSAGE
 2286  004644  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
 2287  004652  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 2288  004660  005300                          DEC     R0
 2289  004662  001370                          BNE     1$
 2290  004664  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND STATUS REG. 1
 2291  004672  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE MAINT REG. 2 (MESS A)
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2292  004700  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE MAINT REG. 3 (MESS B)
2293  004706  012737  012023  003200          MOV     #CDT!CFMT!WRDATA,E.CS1  ;LOAD EXPECTED CS1
2294  004714  012737  071227  003226          MOV     #S.SEEK!S.RTC!S.FMT!70007,E.MR2  ;LOAD EXPECTED MR2
2295  004722  012737  037760  003230          MOV     #37760,E.MR3    ;LOAD EXPECTED MR3
2296  004730  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATUS REG. 1 CORRECT
2297  004736  001405                          BEQ     2$              ;YES, CHECK MESSAGE A
2298  004740  104006                          ERROR   6               ;CS1 INCORRECT
2299  004742  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2300  004750  000412                          BR      TST3            ;;GO TO NEXT TEST
2301
2302  004752  023737  003226  003166  2$:     CMP     E.MR2,T.MR2     ;CHECK MESS A CORRECT
2303  004760  001401                          BEQ     3$              ;YES, CHECK MESSAGE B
2304  004762  104007                          ERROR   7               ;MESS A INCORRECT
2305  004764  023737  003230  003170  3$:     CMP     E.MR3,T.MR3     ;CHECK MESS B CORRECT
2306  004772  001401                          BEQ     TST3            ;;YES, GO ON TO NEXT TEST
2307  004774  104010                          ERROR   10              ;MESS B INCORRECT
2308
2309                                  ;;**********************************************************************
2310                                  ;*TEST 3        SEEK MESSAGE FOR WRITE CHECK
2311                                  ;*
2312                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
2313                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE CHECK
2314                                  ;*      OF 1 WORD TO AN RK06 IN 24 SECTOR FORMAT,
2315                                  ;*      CYLINDER 1777, HEAD 7, DRIVE 7.  CLOCK
2316                                  ;*      IN SEEK COMMAND.  MAKE SURE CORRECT MESSAGE
2317                                  ;*      IS ASSEMBLED.
2318                                  ;*
2319                                  ;;**********************************************************************
2320  004776  000004                  TST3:   SCOPE
2321  005000  012737  000050  001200          MOV     #50,$TIMES      ;;DO 50 ITERATIONS
2322  005006  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2323  005012  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2324  005020  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
2325  005026  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2326  005034  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2327  005042  012762  001777  000020          MOV     #1777,RKDCYL(R2)  ;LOAD CYLINDER ADDRESS REG.
2328  005050  012762  003400  000006          MOV     #3400,RKDA(R2)  ;LOAD TRACK
2329  005056  012762  000007  000010          MOV     #7,RKCS2(R2)    ;LOAD DRIVE NUM.
2330  005064  012762  012031  000000          MOV     #CDT!CFMT!WRTCHK,RKCS1(R2)  ;ISSUE WRTCHK WITH CDT SET IN
2331                                                                  ;  24 SECTOR FORMAT
2332  005072  012700  000016                  MOV     #3*4+2,R0       ;CLOCK IN DRIVE MESSAGE
2333  005076  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
2334  005104  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2335  005112  005300                          DEC     R0
2336  005114  001370                          BNE     1$
2337  005116  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND STATUS REG. 1
2338  005124  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE MAINT REG. 2 (MESS A)
2339  005132  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE MAINT REG. 3 (MESS B)
2340  005140  012737  012031  003200          MOV     #CDT!CFMT!WRTCHK,E.CS1  ;LOAD EXPECTED CS1
2341  005146  012737  071027  003226          MOV     #S.SEEK!S.FMT!70007,E.MR2  ;LOAD EXPECTED MR2
2342  005154  012737  037760  003230          MOV     #37760,E.MR3    ;LOAD EXPECTED MR3
2343  005162  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATUS REG. 1 CORRECT
2344  005170  001405                          BEQ     2$              ;YES, CHECK MESSAGE A
2345  005172  104011                          ERROR   11              ;CS1 INCORRECT
2346  005174  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2347  005202  000412                          BR      TST4            ;;GO TO NEXT TEST
```

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                                                ;;*****************************************************************
                                                ;*TEST 4         READ DATA CLEAR MESSAGE
                                                ;*
                                                ;*       CLEAR THE RK611 WITH A CONTROLLER CLEAR.  PUT THE
                                                ;*       CONTROLLER ON DIAGNOSTIC MODE.  ISSUE A READ DATA TO AN
                                                ;*       RK06, IN 24 SECTOR FORMAT, CYLINDER 1777, HEAD 7, DRIVE
                                                ;*       7,  WORD COUNT 177777.  CLOCK IN THE SEEK MESSAGE AND THE
                                                ;*       CLEAR MESSAGE AND MAKE SURE THE CLEAR MESSAGE IS CORRECT.
                                                ;*
                                                ;;*****************************************************************
005230  000004                                  TST4:   SCOPE
005232  012737  000062  001200                          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
005240  013702  001270                          MOV     $BASE,R2        ;LOAD RK611 BASE
005244  012762  100000  000000                  MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
005252  012762  000040  000026                  MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
005260  012762  177777  000002                  MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
005266  012762  053606  000004                  MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
005274  012762  001777  000020                  MOV     #1777,RKDCYL(R2)  ;LOAD CYLINDER ADDRESS REG.
005302  012762  003400  000006                  MOV     #3400,RKDA(R2)  ;LOAD TRACK
005310  012762  000007  000010                  MOV     #7,RKCS2(R2)    ;LOAD DRIVE NUMBER
005316  012762  012021  000000                  MOV     #CDT!CFMT!RDDATA,RKCS1(R2)  ;ISSUE COMMAND WITH CDT SET IN
                                                                        ;  24 SECTOR FORMAT
005324  012700  000156                          MOV     #27.*4+2,R0     ;LOAD COUNT TO LOAD DRIVE CLEAR
005330  012762  000440  000026  1$:      MOV     #DMD!MCLK,RKMR1(R2)
005336  012762  000040  000026                  MOV     #DMD,RKMR1(R2)
005344  005300                                  DEC     R0
005346  001370                                  BNE     1$
005350  016237  000000  003140                  MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG. 1
005356  016237  000034  003166                  MOV     RKMR2(R2),T.MR2 ;STORE MAINT. REG. 2 (MESS A)
005364  016237  000036  003170                  MOV     RKMR3(R2),T.MR3 ;STORE MAINT. REG. 3 (MESS B)
005372  012737  012021  003200                  MOV     #CDT!CFMT!RDDATA,E.CS1  ;LOAD EXPECTED CS1
005400  012737  071407  003226                  MOV     #S.CLR!S.FMT!70007,E.MR2  ;LOAD EXPECTED MAINT REG. 2
005406  005037  003230                          CLR     E.MR3           ;LOAD EXPECTED MAINT REG.
005412  023737  003200  003140                  CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATUS REG 1 CORRECT
005420  001405                                  BEQ     2$              ;YES, CHECK MESSB
005422  104014                                  ERROR   14              ;CS1 INCORRECT
005424  012762  100000  000000                  MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
005432  000412                                  BR      TST5            ;;GO TO NEXT TEST

005434  023737  003226  003166  2$:      CMP     E.MR2,T.MR2     ;CHECK MESS A CORRECT
005442  001401                                  BEQ     3$              ;YES, CHECK MESS B
005444  104015                                  ERROR   15              ;MESS A INCORRECT
005446  023737  003230  003170  3$:      CMP     E.MR3,T.MR3     ;CHECK MESS B CORRECT
005454  001401                                  BEQ     TST5            ;;YES, GO ON TO NEXT TEST
005456  104016                                  ERROR   16              ;MESS B INCORRECT

                                                ;;*****************************************************************
                                                ;*TEST 5         WRITE DATA AND DRIVE CLEAR MESSAGE
```

```
                                        ;*
                                        ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                        ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                        ;*      ONE WORD TO AN RK06 IN 24 SECTOR FORMAT,  CYLINDER 1777,
                                        ;*      TRACK 7, DRIVE 7.  CLOCK IN SEEK MESSAGE AND DRIVE CLEAR.
                                        ;*      CHECK IF PROPER DRIVE CLEAR MESSAGE IS ASSEMBLED.
                                        ;*
                                        ;;*****************************************************************
005460  000004                  TST5:   SCOPE
005462  012737  000062  001200          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
005470  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
005474  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
005502  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
005510  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
005516  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
005524  012762  001777  000020          MOV     #1777,RKDCYL(R2)  ;LOAD CYLINDER ADDRESS REG.
005532  012762  003400  000006          MOV     #3400,RKDA(R2)  ;LOAD TRACK
005540  012762  000007  000010          MOV     #7,RKCS2(R2)    ;LOAD DRIVE NUMBER
005546  012762  012023  000000          MOV     #CDT!CFMT!WRDATA,RKCS1(R2)  ;ISSUE COMMAND WITH CDT SET IN
                                                                ;  24 SECTOR FORMAT
005554  012700  000156                  MOV     #27.*4+2,R0     ;LOAD COUNT TO LOAD DRIVE CLEAR
005560  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
005566  012762  000040  000026          MOV     #DMD,RKMR1(R2)
005574  005300                          DEC     R0
005576  001370                          BNE     1$
005600  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG. 1
005606  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE MAINT. REG. 2 (MESS A)
005614  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE MAINT. REG. 3 (MESS B)
005622  012737  012023  003200          MOV     #CDT!CFMT!WRDATA,E.CS1  ;LOAD EXPECTED CS1
005630  012737  071407  003226          MOV     #S.CLR!S.FMT!70007,E.MR2  ;LOAD EXPECTED MAINT REG. 2
005636  005037  003230                  CLR     E.MR3           ;LOAD EXPECTED MAINT REG.
005642  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATUS REG 1 CORRECT
005650  001405                          BEQ     2$              ;YES, CHECK MESSB
005652  104017                          ERROR   17              ;CS1 INCORRECT
005654  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
005662  000412                          BR      TST6            ;;GO TO NEXT TEST

005664  023737  003226  003166  2$:     CMP     E.MR2,T.MR2     ;CHECK MESS A CORRECT
005672  001401                          BEQ     3$              ;YES, CHECK MESS B
005674  104020                          ERROR   20              ;MESS A INCORRECT
005676  023737  003230  003170  3$:     CMP     E.MR3,T.MR3     ;CHECK MESS B CORRECT
005704  001401                          BEQ     1ST6            ;;YES, GO ON TO NEXT TEST
005706  104021                          ERROR   21              ;MESS B INCORRECT

                                ;;*****************************************************************
                                ;*TEST 6         DRIVE CLEAR MESSAGE FOR WRITE CHECK
                                ;*
                                ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                                ;*      CHECK OF 1 WORD TO AN RK06 IN 24 SECTOR FORMAT,
                                ;*      CYLINDER 1777, HEAD 7, DRIVE 7.  CLOCK
                                ;*      THROUGH SEEK MESSAGE AND CLOCK IN DRIVE CLEAR.
                                ;*      MAKE SURE CORRECT MESSAGE IS ASSEMBLED.
                                ;*
                                ;;*****************************************************************
005710  000004                  TST6:   SCOPE
```

```
2460  005712  012737  000062  001200          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
2461  005720  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2462  005724  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2463  005732  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
2464  005740  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2465  005746  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2466  005754  012762  001777  000020          MOV     #1777,RKDCYL(R2)  ;LOAD CYLINDER ADDRESS REG.
2467  005762  012762  003400  000006          MOV     #3400,RKDA(R2)  ;LOAD TRACK
2468  005770  012762  000007  000010          MOV     #7,RKCS2(R2)    ;LOAD DRIVE NUMBER
2469  005776  012762  012031  00000C          MOV     #CDT!CFMT!WRTCHK,RKCS1(R2)  ;ISSUE COMMAND WITH CDT SET IN
2470                                                                  ;  24 SECTOR FORMAT
2471  006004  012700  000156                  MOV     #27.*4+2,R0     ;LOAD COUNT TO LOAD DRIVE CLEAR
2472  006010  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
2473  006016  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2474  006024  005300                          DEC     R0
2475  006026  001370                          BNE     1$
2476  006030  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG. 1
2477  006036  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE MAINT. REG. 2 (MESS A)
2478  006044  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE MAINT. REG. 3 (MESS B)
2479  006052  012737  012031  003200          MOV     #CDT!CFMT!WRTCHK,E.CS1  ;LOAD EXPECTED CS1
2480  006060  012737  071407  003226          MOV     #S.CLR!S.FMT!70007,E.MR2  ;LOAD EXPECTED MAINT REG. 2
2481  006066  005037  003230                  CLR     E.MR3           ;LOAD EXPECTED MAINT REG.
2482  006072  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATUS REG 1 CORRECT
2483  006100  001405                          BEQ     2$              ;YES, CHECK MESSB
2484  006102  104022                          ERROR   22              ;CS1 INCORRECT
2485  006104  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2486  006112  000412                          BR      TST7            ;;GO TO NEXT TEST
2487
2488  006114  023737  003226  003166  2$:     CMP     E.MR2,T.MR2     ;CHECK MESS A CORRECT
2489  006122  001401                          BEQ     3$              ;YES, CHECK MESS B
2490  006124  104023                          ERROR   23              ;MESS A INCORRECT
2491  006126  023737  003230  003170  3$:     CMP     E.MR3,T.MR3     ;CHECK MESS B CORRECT
2492  006134  001401                          BEQ     TST7            ;;YES, GO ON TO NEXT TEST
2493  006136  104024                          ERROR   24              ;MESS B INCORRECT
2494
2495                                  .SBTTL  **HEADER GENERATION
2496
2497                                  ;;*******************************************************************
2498                                  ;*TEST 7        HEADER GENERATION (PART 1)
2499                                  ;*
2500                                  ;*      CLEAR THE RK611 WITH A CONTRULLER CLEAR.  PUT THE
2501                                  ;*      CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF 1
2502                                  ;*      WORD FOR AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
2503                                  ;*      SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGES.
2504                                  ;*      CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE REGISTER 3
2505                                  ;*      TO MAKE THAT THE HEADER IS CORRECT.  REPEAT FOR CYLINDERS
2506                                  ;*      1-1777.
2507                                  ;*
2508                                  ;*******************************************************************
2509  006140  000004                  TST7:   SCOPE
2510  006142  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
2511  006150  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2512  006154  005037  003220                  CLR     E.DCYL          ;INITIALIZE CYLINDER ADD
2513  006160  005037  003206                  CLR     E.DA            ;INITIALIZE TRACK AND SECTOR
2514  006164  012737  000021  003200          MOV     #RDDATA,E.CS1   ;INITIALIZE FORMAT
2515  006172  012737  006200  001110          MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
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2516                                                    ;  SUBTEST LOOP
2517
2518  006200                            1$:
2519  006200  004737  034402                    JSR     PC,CALHDR       ;CALULATE EXPECTED HEADER
2520  006204  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2521  006212  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IM MAINTENANCE MODE
2522  006220  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2523  006226  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2524  006234  013762  003220  000020          MOV     E.DCYL,RKDCYL(R2) ;LOAD CYLINDER NUMBER
2525  006242  013762  003206  000006          MOV     E.DA,RKDA(R2)   ;LOAD TRACK AND SECTOR
2526  006250  013762  003200  000000          MOV     E.CS1,RKCS1(R2) ;LOAD COMMAND AND FORMAT
2527  006256  012700  000426                  MOV     #69.*4+2,R0     ;LOAD COUNT UNTIL HEADER GENERATION
2528  006262  012762  000440  000026  5$:     MOV     #DMD!MCLK,RKMR1(R2)
2529  006270  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2530  006276  005300                          DEC     R0
2531  006300  001370                          BNE     5$
2532  006302  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG 1
2533  006310  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE FIRST HEADER WORD
2534  006316  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE SECOND WORD
2535  006324  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATRUS REG 1 CORRECT
2536  006332  001405                          BEQ     6$              ;YES, CHECK FIRST LINE OF HEADER
2537  006334  104025                          ERROR   25              ;CS1 INCORRECT
2538  006336  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
2539  006344  000412                          BR      15$             ;YES, CHECK SECOND WORD OF HEADER
2540
2541  006346  023737  003226  003166  6$:     CMP     E.MR2,T.MR2     ;CHECK IF FIRST WORD OF HEADER CORRECT
2542  006354  001401                          BEQ     7$              ;YES, CHECK IF SECOND WORD OF HEADER CORRECT
2543  006356  104026                          ERROR   26              ;FIRST WORD OF HEADER INCORRECT
2544  006360  023737  003230  003170  7$:     CMP     E.MR3,T.MR3     ;CHECK IF SECOND WORD OF HEADER CORRECT
2545  006366  001401                          BEQ     15$             ;YES,CHECK IF LOOP ON ERROR
2546  006370  104027                          ERROR   27              ;SECOND WORD INCORRECT
2547  006372  104415                  15$:    SCOP1                   ;LOOP ON ERROR
2548  006374  005237  003220                  INC     E.DCYL          ;INCREMENT EXPECTED CYLINDER
2549  006400  022737  000633  003220          CMP     #633,E.DCYL     ;CHECK IF VALUE OF CYLINDER OVERFLOW DETECTION
2550  006406  001002                          BNE     16$             ;NO, CONTINUE
2551  006410  005237  003220                  INC     E.DCYL          ;USE 634
2552  006414  022737  001777  003220  16$:    CMP     #1777,E.DCYL    ;CHECK IF FINISHED
2553  006422  103266                          BHIS    1$              ;NO, GO TO NEXT CONFIGURATION
2554
2555                                  ;;*****************************************************************
2556                                  ;*TEST 10       HEADER GENERATION (PART 2)
2557                                  ;*
2558                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2559                                  ;*      THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF
2560                                  ;*      1 WORD FOR AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD
2561                                  ;*      0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGE.
2562                                  ;*      CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE REGISTER 3
2563                                  ;*      TO MAKE THAT THE HEADER IS CORRECT.  REPEAT FOR HEADS 1-7.
2564                                  ;*
2565                                  ;;*****************************************************************
2566  006424  000004                  TST10:  SCOPE
2567  006426  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
2568  006434  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2569  006440  005037  003220                  CLR     E.DCYL          ;INITIALIZE CYLINDER ADD
2570  006444  005037  003206                  CLR     E.DA            ;INITIALIZE TRACK AND SECTOR
2571  006450  012737  000021  003200          MOV     #RDDATA,E.CS1   ;INITIALIZE FORMAT
```

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2572  006456  012737  006464  001110          MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
2573                                                                    ;  SUBTEST LOOP
2574
2575  006464                          1$:
2576  006464  004737  034402                  JSR     PC,CALHDR       ;CALULATE EXPECTED HEADER
2577  006470  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2578  006476  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IM MAINTENANCE MODE
2579  006504  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2580  006512  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2581  006520  013762  003220  000020          MOV     E.DCYL,RKDCYL(R2) ;LOAD CYLINDER NUMBER
2582  006526  013762  003206  000006          MOV     E.DA,RKDA(R2)   ;LOAD TRACK AND SECTOR
2583  006534  013762  003200  000000          MOV     E.CS1,RKCS1(R2) ;LOAD COMMAND AND FORMAT
2584  006542  012700  000426                  MOV     #69.*4+2,R0     ;LOAD COUNT UNTIL HEADER GENERATION
2585  006546  012762  000440  000026  5$:     MOV     #DMD!MCLK,RKMR1(R2)
2586  006554  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2587  006562  005300                          DEC     R0
2588  006564  001370                          BNE     5$
2589  006566  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG 1
2590  006574  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE FIRST HEADER WORD
2591  006602  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE SECOND WORD
2592  006610  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATRUS REG 1 CORRECT
2593  006616  001405                          BEQ     6$              ;YES, CHECK FIRST LINE OF HEADER
2594  006620  104030                          ERROR   30              ;CS1 INCORRECT
2595  006622  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
2596  006630  000412                          BR      15$             ;YES, CHECK SECOND WORD OF HEADER
2597
2598  006632  023737  003226  003166  6$:     CMP     E.MR2,T.MR2     ;CHECK IF FIRST WORD OF HEADER CORRECT
2599  006640  001401                          BEQ     7$              ;YES, CHECK IF SECOND WORD OF HEADER CORRECT
2600  006642  104031                          ERROR   31              ;FIRST WORD OF HEADER INCORRECT
2601  006644  023737  003230  003170  7$:     CMP     E.MR3,T.MR3     ;CHECK IF SECOND WORD OF HEADER CORRECT
2602  006652  001401                          BEQ     15$             ;YES,CHECK IF LOOP ON ERROR
2603  006654  104032                          ERROR   32              ;SECOND WORD INCORRECT
2604  006656  104415                  15$:    SCOP1                   ;LOOP ON ERROR
2605  006660  105237  003207                  INCB    E.DA+1          ;INCREMENT TRACK
2606  006664  122737  000007  003207          CMPB    #7,E.DA+1       ;CHECK IF FINISHED
2607  006672  103274                          BHIS    1$              ;NO, GO TO NEXT CONFIGURATION
2608
2609                                  ;;*****************************************************************
2610                                  ;*TEST 11       HEADER GENERATION (PART 3)
2611                                  ;*
2612                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2613                                  ;*      THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF
2614                                  ;*      ONE WORD FOR AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD
2615                                  ;*      0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGES.
2616                                  ;*      CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE REGISTER 3
2617                                  ;*      TO MAKE SURE HEADER IS CORRECT.  REPEAT FOR SECTORS 1-25.
2618                                  ;*
2619                                  ;;*****************************************************************
2620  006674  000004                  TST11:  SCOPE
2621  006676  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
2622  006704  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2623  006710  005037  003220                  CLR     E.DCYL          ;INITIALIZE CYLINDER ADD
2624  006714  005037  003206                  CLR     E.DA            ;INITIALIZE TRACK AND SECTOR
2625  006720  012737  000021  003200          MOV     #RDDATA,E.CS1   ;INITIALIZE FORMAT
2626  006726  012737  006734  001110          MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
2627                                                                  ;  SUBTEST LOOP
```

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2628
2629  006734                          1$:
2630  006734  004737  034402                  JSR     PC,CALHDR       ;CALULATE EXPECTED HEADER
2631  006740  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2632  006746  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IM MAINTENANCE MODE
2633  006754  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2634  006762  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2635  006770  013762  003220  000020          MOV     E.DCYL,RKDCYL(R2) ;LOAD CYLINDER NUMBER
2636  006776  013762  003206  000006          MOV     E.DA,RKDA(R2)   ;LOAD TRACK AND SECTOR
2637  007004  013762  003200  000000          MOV     E.CS1,RKCS1(R2) ;LOAD COMMAND AND FORMAT
2638  007012  012700  000426                  MOV     #69.*4+2,R0     ;LOAD COUNT UNTIL HEADER GENERATION
2639  007016  012762  000440  000026  5$:     MOV     #DMD!MCLK,RKMR1(R2)
2640  007024  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2641  007032  005300                          DEC     R0
2642  007034  001370                          BNE     5$
2643  007036  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG 1
2644  007044  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE FIRST HEADER WORD
2645  007052  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE SECOND WORD
2646  007060  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATRUS REG 1 CORRECT
2647  007066  001405                          BEQ     6$              ;YES, CHECK FIRST LINE OF HEADER
2648  007070  104033                          ERROR   33              ;CS1 INCORRECT
2649  007072  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
2650  007100  000412                          BR      15$             ;YES, CHECK SECOND WORD OF HEADER
2651
2652  007102  023737  003226  003166  6$:     CMP     E.MR2,T.MR2     ;CHECK IF FIRST WORD OF HEADER CORRECT
2653  007110  001401                          BEQ     7$              ;YES, CHECK IF SECOND WORD OF HEADER CORRECT
2654  007112  104034                          ERROR   34              ;FIRST WORD OF HEADER INCORRECT
2655  007114  023737  003230  003170  7$:     CMP     E.MR3,T.MR3     ;CHECK IF SECOND WORD OF HEADER CORRECT
2656  007122  001401                          BEQ     15$             ;YES,CHECK IF LOOP ON ERROR
2657  007124  104035                          ERROR   35              ;SECOND WORD INCORRECT
2658  007126  104415                  15$:    SCOP1                   ;LOOP ON ERROR
2659  007130  105237  003206                  INCB    E.DA            ;INCREMENT SECTOR
2660  007134  122737  000025  003206          CMPB    #25,E.DA        ;CHECK IF FINISHED
2661  007142  103274                          BHIS    1$              ;NO, GO TO NEXT CONFIGURATION
2662
2663                                  ;;*****************************************************************
2664                                  ;*TEST 12       HEADER GENERATION (PART 4)
2665                                  ;*
2666                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2667                                  ;*      THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA OF
2668                                  ;*      ONE WORD FOR AND RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
2669                                  ;*      HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR
2670                                  ;*      MESSAGES, CHECK MAINTENANCE REGISTER 2 AND MAINTENANCE
2671                                  ;*      REGISTER 3 TO MAKE SURE HEADER IS CORRECT.  REPEAT FOR 24
2672                                  ;*      SECTOR FORMAT.
2673                                  ;*
2674                                  ;;*****************************************************************
2675  007144  000004                  TST12:  SCOPE
2676  007146  012737  000062  001200          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
2677  007154  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2678  007160  005037  003220                  CLR     E.DCYL          ;INITIALIZE CYLINDER ADD
2679  007164  005037  003206                  CLR     E.DA            ;INITIALIZE TRACK AND SECTOR
2680  007170  012737  000021  003200          MOV     #RDDATA,E.CS1   ;INITIALIZE FORMAT
2681  007176  012737  007204  001110          MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
2682                                                                  ;  SUBTEST LOOP
2683
```

```
2684  007204                          1$:
2685  007204  004737  034402                  JSR     PC,CALHDR       ;CALULATE EXPECTED HEADER
2686  007210  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2687  007216  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IM MAINTENANCE MODE
2688  007224  012762  177777  000002          MOV     #-1,RKWC(R2)    ;LOAD WORD COUNT
2689  007232  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2690  007240  013762  003220  000020          MOV     E.DCYL,RKDCYL(R2) ;LOAD CYLINDER NUMBER
2691  007246  013762  003206  000006          MOV     E.DA,RKDA(R2)   ;LOAD TRACK AND SECTOR
2692  007254  013762  003200  000000          MOV     E.CS1,RKCS1(R2) ;LOAD COMMAND AND FORMAT
2693  007262  012700  000426                  MOV     #69.*4+2,R0     ;LOAD COUNT UNTIL HEADER GENERATION
2694  007266  012762  000440  000026  5$:     MOV     #DMD!MCLK,RKMR1(R2)
2695  007274  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2696  007302  005300                          DEC     R0
2697  007304  001370                          BNE     5$
2698  007306  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG 1
2699  007314  016237  000034  003166          MOV     RKMR2(R2),T.MR2 ;STORE FIRST HEADER WORD
2700  007322  016237  000036  003170          MOV     RKMR3(R2),T.MR3 ;STORE SECOND WORD
2701  007330  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK COMMAND AND STATRUS REG 1 CORRECT
2702  007336  001405                          BEQ     6$              ;YES, CHECK FIRST LINE OF HEADER
2703  007340  104036                          ERROR   36              ;CS1 INCORRECT
2704  007342  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
2705  007350  000412                          BR      15$             ;YES, CHECK SECOND WORD OF HEADER
2706
2707  007352  023737  003226  003166  6$:     CMP     E.MR2,T.MR2     ;CHECK IF FIRST WORD OF HEADER CORRECT
2708  007360  001401                          BEQ     7$              ;YES, CHECK IF SECOND WORD OF HEADER CORRECT
2709  007362  104037                          ERROR   37              ;FIRST WORD OF HEADER INCORRECT
2710  007364  023737  003230  003170  7$:     CMP     E.MR3,T.MR3     ;CHECK IF SECOND WORD OF HEADER CORRECT
2711  007372  001401                          BEQ     15$             ;YES,CHECK IF LOOP ON ERROR
2712  007374  104040                          ERROR   40              ;SECOND WORD INCORRECT
2713  007376  104415                  15$:    SCOP1                   ;LOOP ON ERROR
2714  007400  032737  010000  003200          BIT     #CFMT,E.CS1     ;CHECK IF FINISHED
2715  007406  001004                          BNE     TST13           ;;YES, GO TO NEXT TEST
2716  007410  052737  010000  003200          BIS     #CFMT,E.CS1     ;USE 24 SECTOR FORMAT
2717  007416  000672                          BR      1$
2718
2719                                  .SBTTL  **NPR TRANSFER FOR WRITE DATA
2720
2721                                  ;;*******************************************************************
2722                                  ;*TEST 13       WRITE DATA NPR TRANSFER
2723                                  ;*
2724                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2725                                  ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
2726                                  ;*      67 WORDS, TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
2727                                  ;*      TRACK 0, DRIVE 0.  CLOCK IN SEEK AND DRIVE CLEAR MESSAGES.
2728                                  ;*      GIVE ENOUGH CLOCK PULSE FOR 68 SILO WORDS. MAKE SURE DATA
2729                                  ;*      LATE DOES NOT OCCUR.  READ BACK 66 WORDS AND VERIFY THEY
2730                                  ;*      ARE CORRECT.
2731                                  ;*
2732                                  ;;*******************************************************************
2733  007420  000004                  TST13:  SCOPE
2734  007422  012737  000062  001200          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
2735  007430  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2736  007434  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2737  007442  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
2738  007450  012762  177675  000002          MOV     #-67.,RKWC(R2)  ;WORD COUNT=67
2739  007456  012762  051544  000004          MOV     #NPRBUF,RKBA(R2)  ;LOAD BUFFER ADDRESS
```

```
2740  007464  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRDATA
2741  007472  012700  004724                  MOV     #68.*37.,R0        ;ISSUE ENOUGH CLOCKS FOR 68
2742  007476  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)  ;  NPR TRANSFERS
2743  007504  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2744  007512  005300                          DEC     R0
2745  007514  001370                          BNE     1$
2746  007516  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REG. 1
2747  007524  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;STORE COMMAND AND STATUS REG. 2
2748  007532  016237  000002  003142          MOV     RKWC(R2),T.WC   ;STORE WORD COUNT REG.
2749  007540  016237  000004  003144          MOV     RKBA(R2),T.BA   ;STORE BUS ADDRESS
2750  007546  016237  000014  003154          MOV     RKER(R2),T.ER   ;STORE ERROR REG.
2751  007554  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
2752  007562  012737  000200  003210          MOV     #OR,E.CS2       ;LOAD EXPECTED CS2
2753  007570  012737  177777  003202          MOV     #-1,E.WC        ;LOAD EXPECTED WORD COUNT
2754  007576  012737  051750  003204          MOV     #NPRBUF+<66.*2>,E.BA  ;LOAD EXPECTED BUS ADDRESS
2755  007604  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG
2756  007610  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
2757  007616  001405                          BEQ     5$              ;YES, CHECK CS2
2758  007620  104041                          ERROR   41              ;CS1 INCORRECT
2759  007622  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2760  007630  000517                          BR      TST14           ;;GO TO NEXT TEST
2761
2762  007632  023737  003210  003150  5$:     CMP     E.CS2,T.CS2     ;CHECK CS2
2763  007640  001401                          BEQ     6$              ;NO, CHECK BUS ADDRESS
2764  007642  104042                          ERROR   42              ;CS2 INCORRECT
2765  007644  023737  003204  003144  6$:     CMP     E.BA,T.BA       ;CHECK BUS ADDRESS
2766  007652  001401                          BEQ     7$              ;YES, CHECK WORD COUNT
2767  007654  104044                          ERROR   44              ;BUS ADDRESS INCORRECT
2768  007656  023737  003202  003142  7$:     CMP     E.WC,T.WC       ;CHECK WORD COUNT
2769  007664  001401                          BEQ     8$              ;YES, CONTINUE
2770  007666  104045                          ERROR   45              ;WORD COUNT INCORRECT
2771  007670  023737  003214  003154  8$:     CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
2772  007676  001401                          BEQ     10$             ;YES, CONTINUE
2773  007700  104043                          ERROR   43              ;ERROR REG INCORRECT
2774  007702  012703  051544          10$:    MOV     #NPRBUF,R3      ;LOAD ADDRESS OR START OF BUFFER
2775  007706  012701  000101                  MOV     #65.,R1         ;LOAD COUNT FOR SICO
2776  007712  005037  003264                  CLR     WRDCNT          ;INITIALIZE WORD COUNT
2777  007716  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
2778  007724  012337  003222          15$:    MOV     (R3)+,E.DB      ;LOAD EXPECTED DATA
2779  007730  016237  000024  003162          MOV     RKDB(R2),T.DB   ;GET DATA READ
2780  007736  012700  000020                  MOV     #20,R0          ;SET COUNT TO WAIT FOR SILO
2781  007742  005300                  16$:    DEC     R0              ;DEC COUNT
2782  007744  001376                          BNE     16$             ;WAIT FOR 0
2783  007746  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE CS1
2784  007754  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;STORE CS2
2785  007762  016237  000014  003154          MOV     RKER(R2),T.ER   ;STORE ERROR REG.
2786  007770  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
2787  007776  001405                          BEQ     20$             ;YES, CONTINUE
2788  010000  104046                          ERROR   46              ;CS1 INCORRECT
2789  010002  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2790  010010  000427                          BR      TST14           ;;GO ON TO NEXT TEST
2791
2792  010012  023737  003210  003150  20$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
2793  010020  001401                          BEQ     21$             ;YES, CONTINUE
2794  010022  104047                          ERROR   47              ;CS2 INCORRECT
2795  010024  023737  003214  003154  21$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
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2796  010032  001401                          BEQ     22$             ;YES, CONTINUE
2797  010034  104050                          ERROR   50              ;ERROR REG INCORRECT
2798  010036  023737  003222  003162  22$:    CMP     E.DB,T.DB       ;CHECK DATA CORRECT
2799  010044  001401                          BEQ     25$             ;YES, CONTINUE
2800  010046  104051                          ERROR   51              ;DATA INCORRECT
2801  010050  005237  003264          25$:    INC     WRDCNT          ;INCREMENT WORD COUNT
2802  010054  005301                          DEC     R1
2803  010056  001003                          BNE     26$             ;CHECK IF LAST WORD
2804  010060  012737  000100  003210          MOV     #IR,E.CS2       ;UPDATE EXPECTED CS2
2805  010066  100316                  26$:    BPL     15$             ;CHECK IF FINISHED
2806
2807                                  .SBTTL  **HEADER RECOGNITION TESTS
2808
2809                                  ;;*****************************************************************
2810                                  ;*TEST 14       WRITE DATA HEADER RECOGNITION
2811                                  ;*
2812                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2813                                  ;*      CONTROLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF ONE
2814                                  ;*      WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
2815                                  ;*      SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
2816                                  ;*      SIMULATE A SECTOR PULSE AND A HEADER WITH THE FOLLOWING
2817                                  ;*      DATA:
2818                                  ;*
2819                                  ;*              000000
2820                                  ;*              140000
2821                                  ;*              140000
2822                                  ;*
2823                                  ;*      MAKE SURE WRITE GATE SETS SHOWING CORRECT HEADER RECOGNITION.
2824                                  ;*
2825                                  ;;*****************************************************************
2826  010070  000004                  TST14:  SCOPE
2827  010072  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
2828  010100  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2829  010104  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
2830  010112  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
2831  010120  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
2832  010126  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
2833  010134  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
2834  010142  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNITL READY
2835                                                                  ;  FOR SECTOR PULSE
2836  010146  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
2837  010154  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2838  010162  005300                          DEC     R0
2839  010164  001370                          BNE     1$
2840  010166  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
2841  010174  012762  000040  000026          MOV     #DMD,RKMR1(R2)
2842  010202  012737  000023  003200          MOV     #WRDATA,E.CS1   ;STORE EXPECTED CS1
2843  010210  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
2844  010214  005037  003256                  CLR     M1.BIT
2845  010220  005037  003262                  CLR     BITCNT
2846  010224  012700  000377                  MOV     #255.,R0
2847  010230  004737  035422          5$:     JSR     PC,RDBIT
2848  010234  016237  000000  003140          MOV     RKCS1(R2),T.CS1
2849  010242  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
2850  010250  001112                          BNE     63$             ;NO, REPORT ERROR
2851  010252  005237  003262                  INC     BITCNT          ;INCREMENT BIT COUNT
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2852  010256  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
2853  010260  001363                          BNE     5$
2854  010262  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
2855  010270  004737  035422                  JSR     PC,RDBIT
2856  010274  016237  000000  003140          MOV     RKCS1(R2),T.CS1
2857  010302  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
2858  010310  001072                          BNE     63$             ;NO, REPORT CS1
2859  010312  005237  003262                  INC     BITCNT          ;INCREMENT BIT COUNT
2860  010316  012703  051754                  MOV     #HEAD1,R3       ;SIMULATE GOOD HEADER
2861  010322  012701  000003                  MOV     #3,R1
2862  010326  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
2863  010330  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
2864  010334  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
2865  010342  006004                          ROR     R4              ;GET NEXT BIT
2866  010344  103403                          BCS     17$
2867  010346  005037  003254                  CLR     PR.BIT
2868  010352  000403                          BR      18$
2869
2870  010354  012737  000001  003254  17$:    MOV     #1,PR.BIT
2871  010362  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
2872  010366  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
2873  010374  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
2874  010402  001035                          BNE     63$             ;NO, REPORT ERROR
2875  010404  005237  003262                  INC     BITCNT          ;INCREMENT BIT COUNT
2876  010410  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
2877  010412  001350                          BNE     15$             ;NO, CONTINUE
2878  010414  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEAD
2879  010416  001343                          BNE     12$             ;NO, CONTINUE
2880  010420  012700  000105                  MOV     #69.,R0         ;LOAD COUNT FOR GAP
2881  010424  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
2882  010432  005037  003254                  CLR     PR.BIT
2883  010436  004737  035422                  JSR     PC,RDBIT
2884  010442  005300                          DEC     R0
2885  010444  001367                          BNE     25$
2886  010446  016237  000026  003164          MOV     RKMR1(R2),T.MR1 ;GET MR1
2887  010454  012737  062040  003224          MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;LOAD EXPECTED MR1
2888  010462  023737  003224  003164          CMP     E.MR1,T.MR1     ;CHECK IF WRITE GATE SET
2889  010470  001411                          BEQ     TST15           ;;YES, GO ON TO NEXT TEST
2890  010472  104053                          ERROR   53
2891  010474  000407                          BR      TST15           ;;GO ON TO NEXT TEST
2892
2893  010476  016237  000010  003150  63$:    MOV     RKCS2(R2),T.CS2 ;STORE CS2 FOR PRINT OUT
2894  010504  016237  000014  003154          MOV     RKER(R2),T.ER   ;STORE ERROR REG FOR PRINT OUT
2895  010512  104052                          ERROR   52              ;REPORT ERROR
2896
2897                                  ;;*****************************************************************
2898                                  ;*TEST 15       SECTOR PULSE DETECTION FOR WRITE DATA
2899                                  ;*
2900                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2901                                  ;*      CONTROLLER IN MAINTENANCE MODE ISSUE A WRITE DATA OF ONE
2902                                  ;*      WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
2903                                  ;*      SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
2904                                  ;*      SIMULATE AN INDEX PULSE AND A HEADER WITH THE FOLLOWING
2905                                  ;*      DATA:
2906                                  ;*
2907                                  ;*              000000
```

```
                                        ;*              140000
                                        ;*              140000
                                        ;*
                                        ;*      MAKE SURE WRITE GATE DOES NOT SET.
                                        ;*
                                        ;;*****************************************************************
010514  000004                  TST15:  SCOPE
010516  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
010524  013702  001270          4$:     MOV     $BASE,R2        ;LOAD RK611 BASE
010530  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
010536  012700  000700                  MOV     #700,R0         ;SET STALL COUNT
010542  005300                          DEC     R0              ;DEC COUNT
010544  001376                          BNE     4$              ;LOOP UNTIL ZERO
010546  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
010554  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT = 1
010562  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
010570  012762  000023  000000          MOV     #WRDATA,RKCS1(R2) ;ISSUE WRITE DATA
010576  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTILL READY
                                                                ;  FOR SECTOR PULSE
010602  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
010610  012762  000040  000026          MOV     #DMD,RKMR1(R2)
010616  005300                          DEC     R0
010620  001370                          BNE     1$
010622  012700  000004                  MOV     #4,R0           ;SIMULATE INDEX PULSE
010626  012762  000240  000026          MOV     #DMD!MIND,RKMR1(R2)
010634  012762  000640  000026  2$:     MOV     #DMD!MIND!MCLK,RKMR1(R2)
010642  012762  000240  000026          MOV     #DMD!MIND,RKMR1(R2)
010650  005300                          DEC     R0
010652  001370                          BNE     2$
010654  012762  000040  000026          MOV     #DMD,RKMR1(R2)
010662  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
010666  005037  003256                  CLR     M1.BIT
010672  012700  000377                  MOV     #255.,R0
010676  004737  035422          5$:     JSR     PC,RDBIT
010702  005300                          DEC     R0
010704  001374                          BNE     5$
010706  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
010714  004737  035422                  JSR     PC,RDBIT
010720  012703  051754                  MOV     #HEAD1,R3       ;SIMULATE GOOD HEADER
010724  012701  000003                  MOV     #3,R1
010730  012304          12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
010732  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORDS
010736  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
010744  006004                          ROR     R4              ;GET NEXT BIT
010746  103403                          BCS     17$
010750  005037  003254                  CLR     PR.BIT
010754  000403                          BR      18$
                                        ;
010756  012737  000001  003254  17$:    MOV     #1,PR.BIT
010764  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
010770  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
010772  001361                          BNE     15$             ;NO,CONTINUE
010774  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
010776  001354                          BNE     12$             ;NO,CONTINUE
011000  012700  000100                  MOV     #64.,R0         ;LOAD COUNT FOR GAP
011004  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
```

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2964  011012  005037  003254                  CLR     PR.BIT
2965  011016  004737  035422                  JSR     PC,RDBIT
2966  011022  005300                          DEC     R0
2967  011024  001367                          BNE     25$
2968  011026  016237  000026  003164          MOV     RKMR1(R2),T.MR1 ;GET MR1
2969  011034  012737  022040  003224          MOV     #DMD!ECCW!MEWD,E.MR1 ;LOAD EXPECTDED MR1
2970  011042  023737  003164  003224          CMP     T.MR1,E.MR1     ;CHECK IF WRITE GATE DID NOT SET
2971  011050  001401                          BEQ     TST16           ;;YES, GO ON TO NEXT TEST
2972  011052  104053                          ERROR   53
2973
2974                                  ;;*****************************************************************
2975                                  ;*TEST 16       SECTOR INCREMENT
2976                                  ;*
2977                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
2978                                  ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF ONE WORD
2979                                  ;*      TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
2980                                  ;*      SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
2981                                  ;*      SIMULATE SECTOR PULSE AND PROPER HEADER.  MAKE SURE
2982                                  ;*      THAT WRITE GATE SETS,
2983                                  ;*
2984                                  ;*      REPEAT FOR SECTOR 1-24.
2985                                  ;*
2986                                  ;;*****************************************************************
2987  011054  000004                  TST16:  SCOPE
2988  011056  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
2989  011064  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
2990  011070  005037  003300                  CLR     CYLN            ;INITIALIZE CYLINDER
2991  011074  005037  003276                  CLR     SECTOR          ;INITIALIZE TRACK AND SECTOR
2992  011100  012737  011106  001110          MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
2993                                                                  ;  SUBTEST LOOP
2994
2995  011106                          1$:
2996  011106  004737  034220                  JSR     PC,INCHDR       ;GENERATE HEADER WORDS
2997  011112  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611 CONTROLLER
2998  011120  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
2999  011126  013762  003300  000020          MOV     CYLN,RKDCYL(R2) ;LOAD DESIRED CYLINDER
3000  011134  013762  003276  000006          MOV     SECTOR,RKDA(R2) ;LOAD DESIRED TRACK/SECTOR
3001  011142  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
3002  011150  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY ADDRESS
3003  011156  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3004  011164  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3005                                                                  ;  FOR SECTOR PULSE
3006  011170  012762  000440  000026  5$:     MOV     #DMD!MCLK,RKMR1(R2)
3007  011176  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3008  011204  005300                          DEC     R0
3009  011206  001370                          BNE     5$
3010  011210  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3011  011216  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3012  011224  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
3013  011230  005037  003256                  CLR     M1.BIT
3014  011234  012700  000377                  MOV     #255.,R0
3015  011240  004737  035422          10$:    JSR     PC,RDBIT
3016  011244  005300                          DEC     R0
3017  011246  001374                          BNE     10$
3018  011250  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
3019  011256  004737  035422                  JSR     PC,RDBIT
```

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3020  011262  012703  003302                    MOV     #HEADER,R3      ;SIMULATE HEADER
3021  011266  012701  000003                    MOV     #3,R1
3022  011272  012304                    12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
3023  011274  012700  000020                    MOV     #16.,R0         ;LOAD BITS PER WORD
3024  011300  013737  003254  003256    15$:    MOV     PR.BIT,M1.BIT
3025  011306  006004                            ROR     R4
3026  011310  103403                            BCS     17$
3027  011312  005037  003254                    CLR     PR.BIT
3028  011316  000403                            BR      18$
3029
3030  011320  012737  000001  003254    17$:    MOV     #1,PR.BIT
3031  011326  004737  035422            19$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
3032  011332  005300                            DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
3033  011334  001361                            BNE     15$             ;NO, CONTINUE
3034  011336  005301                            DEC     R1              ;CHECK IF FINISHED WITH HEADER
3035  011340  001354                            BNE     12$             ;NO, CONTINUE
3036  011342  012700  000100                    MOV     #64.,R0         ;LOAD COUNT FOR GAP
3037  011346  013737  003254  003256    25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
3038  011354  005037  003254                    CLR     PR.BIT
3039  011360  004737  035422                    JSR     PC,RDBIT
3040  011364  005300                            DEC     R0              ;CHECK IF GAP FINISHED
3041  011366  001367                            BNE     25$             ;NO, CONTINUE
3042  011370  016237  000006  003146            MOV     RKDA(R2),T.DA   ;GET DISK ADDRESS REG
3043  011376  016237  000020  003160            MOV     RKDCYL(R2),T.DCYL  ;GET CYLINDER ADD REG.
3044  011404  023737  003206  003146            CMP     E.DA,T.DA       ;CHECK DISK ADD CORRECT
3045  011412  001401                            BEQ     30$             ;YES, CONTINUE
3046  011414  104054                            ERROR   54              ;DISK ADDRESS INCORRECT
3047  011416  023737  003220  003160    30$:    CMP     E.DCYL,T.DCYL   ;CHECK IF CYLINDER ADD CORRECT
3048  011424  001401                            BEQ     32$             ;YES, CHECK IF LOOP ON ERROR
3049  011426  104002                            ERROR   R2              ;CYLINDER INCORRECT
3050  011430  104415                    32$:    SCOP1                   ;CHECK IF LOOP ON ERROR
3051  011432  105237  003276                    INCB    SECTOR          ;INCREMENT SECTOR
3052  011436  122737  000026  003276            CMPB    #26,SECTOR      ;CHECK IF ALL SECTOR TRIED
3053  011444  001220                            BNE     1$              ;NO, TRY NEXT VALUE
3054
3055                                    ;;*****************************************************************
3056                                    ;*TEST 17       TRACK INCREMENT
3057                                    ;*
3058                                    ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
3059                                    ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF ONE WORD
3060                                    ;*      TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 0,
3061                                    ;*      SECTOR 25.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
3062                                    ;*      SIMULATE SECTOR PULSE AND PROPER HEADER,  MAKE SURE
3063                                    ;*      THAT WRITE GATE SETS.
3064                                    ;*
3065                                    ;*      REPEAT FOR TRACK = 1.
3066                                    ;*
3067                                    ;;*****************************************************************
3068  011446  000004                    TST17:  SCOPE
3069  011450  012737  000012  001200            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3070  011456  013702  001270                    MOV     $BASE,R2        ;LOAD RK611 BASE
3071  011462  005037  003300                    CLR     CYLN            ;INITIALIZE CYLINDER
3072  011466  012737  000025  003276            MOV     #25,SECTOR      ;INITIALIZE TRACK AND SECTOR
3073  011474  012737  011502  001110            MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
3074                                                                    ;  SUBTEST LOOP
3075
```

```
3076  011502                          1$:
3077  011502  004737  034220                JSR     PC,INCHDR       ;GENERATE HEADER WORDS
3078  011506  012762  100000  000000        MOV     #CCLR,RKCS1(R2) ;CLEAR RK611 CONTROLLER
3079  011514  012762  000040  000026        MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
3080  011522  013762  003300  000020        MOV     CYLN,RKDCYL(R2) ;LOAD DESIRED CYLINDER
3081  011530  013762  003276  000006        MOV     SECTOR,RKDA(R2) ;LOAD DESIRED TRACK/SECTOR
3082  011536  012762  177777  000002        MOV     #-1,RKWC(R2)    ;WORD COUNT=1
3083  011544  012762  053606  000004        MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY ADDRESS
3084  011552  012762  000023  000000        MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3085  011560  012700  000426                MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3086                                                                  ;  FOR SECTOR PULSE
3087  011564  012762  000440  000026  5$:   MOV     #DMD!MCLK,RKMR1(R2)
3088  011572  012762  000040  000026        MOV     #DMD,RKMR1(R2)
3089  011600  005300                        DEC     R0
3090  011602  001370                        BNE     5$
3091  011604  012762  000140  000026        MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3092  011612  012762  000040  000026        MOV     #DMD,RKMR1(R2)
3093  011620  005037  003254                CLR     PR.BIT          ;GENERATE SYNCH
3094  011624  005037  003256                CLR     M1.BIT
3095  011630  012700  000377                MOV     #255.,R0
3096  011634  004737  035422          10$:  JSR     PC,RDBIT
3097  011640  005300                        DEC     R0
3098  011642  001374                        BNE     10$
3099  011644  012737  000001  003254        MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
3100  011652  004737  035422                JSR     PC,RDBIT
3101  011656  012703  003302                MOV     #HEADER,R3      ;SIMULATE HEADER
3102  011662  012701  000003                MOV     #3,R1
3103  011666  012304                  12$:  MOV     (R3)+,R4        ;GET NEXT HEADER WORD
3104  011670  012700  000020                MOV     #16.,R0         ;LOAD BITS PER WORD
3105  011674  013737  003254  003256  15$:  MOV     PR.BIT,M1.BIT
3106  011702  006004                        ROR     R4
3107  011704  103403                        BCS     17$
3108  011706  005037  003254                CLR     PR.BIT
3109  011712  000403                        BR      18$
3110
3111  011714  012737  000001  003254  17$:  MOV     #1,PR.BIT
3112  011722  004737  035422          18$:  JSR     PC,RDBIT        ;SIMULATE NEXT BIT
3113  011726  005300                        DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
3114  011730  001361                        BNE     15$             ;NO, CONTINUE
3115  011732  005301                        DEC     R1              ;CHECK IF FINISHED WITH HEADER
3116  011734  001354                        BNE     12$             ;NO, CONTINUE
3117  011736  012700  000100                MOV     #64.,R0         ;LOAD COUNT FOR GAP
3118  011742  013737  003254  003256  25$:  MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
3119  011750  005037  003254                CLR     PR.BIT
3120  011754  004737  035422                JSR     PC,RDBIT
3121  011760  005300                        DEC     R0              ;CHECK IF GAP FINISHED
3122  011762  001367                        BNE     25$             ;NO, CONTINUE
3123  011764  016237  000006  003146        MOV     RKDA(R2),T.DA   ;GET DISK ADDRESS REG
3124  011772  016237  000020  003160        MOV     RKDCYL(R2),T.DCYL  ;GET CYLINDER ADD REG.
3125  012000  023737  003206  003146        CMP     E.DA,T.DA       ;CHECK DISK ADD CORRECT
3126  012006  001401                        BEQ     30$             ;YES, CONTINUE
3127  012010  104056                        ERROR   56              ;DISK ADDRESS INCORRECT
3128  012012  023737  003220  003160  30$:  CMP     E.DCYL,T.DCYL   ;CHECK IF CYLINDER ADD CORRECT
3129  012020  001401                        BEQ     32$             ;YES, CHECK IF LOOP ON ERROR
3130  012022  104002                        ERROR   R2              ;CYLINDER INCORRECT
3131  012024  104415                  32$:  SCOP1                   ;CHECK IF LOOP ON ERROR
```

```
                                        ;;*****************************************************************
                                        ;*TEST 20       CYLINDER INCREMENT
                                        ;*
                                        ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                        ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF ONE WORD
                                        ;*      TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0, HEAD 2,
                                        ;*      SECTOR 25.  CLOCK IN BOTH SEEK AND DRIVE CLEAR MESSAGES.
                                        ;*      SIMULATE SECTOR PULSE AND PROPER HEADER,  MAKE SURE
                                        ;*      THAT WRITE GATE SETS.
                                        ;*
                                        ;*      REPEAT FOR CYLINDER = 1-632.
                                        ;*
                                        ;;*****************************************************************
012042  000004                  TST20:  SCOPE
012044  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
012052  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
012056  005037  003300                  CLR     CYLN            ;INITIALIZE CYLINDER
012062  012737  001025  003276          MOV     #1025,SECTOR    ;INITIALIZE TRACK AND SECTOR
012070  012737  012076  001110          MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
                                                                ;  SUBTEST LOOP
012076                          1$:
012076  004737  034220                  JSR     PC,INCHDR       ;GENERATE HEADER WORDS
012102  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611 CONTROLLER
012110  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
012116  013762  003300  000020          MOV     CYLN,RKDCYL(R2) ;LOAD DESIRED CYLINDER
012124  013762  003276  000006          MOV     SECTOR,RKDA(R2) ;LOAD DESIRED TRACK/SECTOR
012132  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
012140  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY ADDRESS
012146  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
012154  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
                                                                ;  FOR SECTOR PULSE
012160  012762  000440  000026  5$:     MOV     #DMD!MCLK,RKMR1(R2)
012166  012762  000040  000026          MOV     #DMD,RKMR1(R2)
012174  005300                          DEC     R0
012176  001370                          BNE     5$
012200  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
012206  012762  000040  000026          MOV     #DMD,RKMR1(R2)
012214  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
012220  005037  003256                  CLR     M1.BIT
012224  012700  000377                  MOV     #255.,R0
012230  004737  035422          10$:    JSR     PC,RDBIT
012234  005300                          DEC     R0
012236  001374                          BNE     10$
012240  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
012246  004737  035422                  JSR     PC,RDBIT
012252  012703  003302                  MOV     #HEADER,R3      ;SIMULATE HEADER
012256  012701  000003                  MOV     #3,R1
012262  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
012264  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
012270  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT
012276  006004                          ROR     R4
```

```
 3188  012300  103403                          BCS     17$
 3189  012302  005037  003254                  CLR     PR.BIT
 3190  012306  000403                          BR      18$
 3191
 3192  012310  012737  000001  003254  17$:    MOV     #1,PR.BIT
 3193  012316  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
 3194  012322  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
 3195  012324  001361                          BNE     15$             ;NO, CONTINUE
 3196  012326  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
 3197  012330  001354                          BNE     12$             ;NO, CONTINUE
 3198  012332  012700  000100                  MOV     #64.,R0         ;LOAD COUNT FOR GAP
 3199  012336  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 3200  012344  005037  003254                  CLR     PR.BIT
 3201  012350  004737  035422                  JSR     PC,RDBIT
 3202  012354  005300                          DEC     R0              ;CHECK IF GAP FINISHED
 3203  012356  001367                          BNE     25$             ;NO, CONTINUE
 3204  012360  016237  000006  003146          MOV     RKDA(R2),T.DA   ;GET DISK ADDRESS REG
 3205  012366  016237  000020  003160          MOV     RKDCYL(R2),T.DCYL  ;GET CYLINDER ADD REG.
 3206  012374  023737  003206  003146          CMP     E.DA,T.DA       ;CHECK DISK ADD CORRECT
 3207  012402  001401                          BEQ     30$             ;YES, CONTINUE
 3208  012404  104060                          ERROR   60              ;DISK ADDRESS INCORRECT
 3209  012406  023737  003220  003160  30$:    CMP     E.DCYL,T.DCYL   ;CHECK IF CYLINDER ADD CORRECT
 3210  012414  001401                          BEQ     32$             ;YES, CHECK IF LOOP ON ERROR
 3211  012416  104002                          ERROR   R2              ;CYLINDER INCORRECT
 3212  012420  104415                  32$:    SCOP1                   ;CHECK IF LOOP ON ERROR
 3213  012422  005237  003300                  INC     CYLN            ;INCREMENT CYLINDER
 3214  012426  022737  000633  003300          CMP     #633,CYLN       ;CHECK IF ALL CYLINDER TRIED
 3215  012434  001220                          BNE     1$              ;NO, TRY NEXT VALUE
 3216
 3217                                  ;;*****************************************************************
 3218                                  ;*TEST 21       BAD SECTOR ERROR (PART 1)
 3219                                  ;*
 3220                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
 3221                                  ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
 3222                                  ;*      ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
 3223                                  ;*      HEAD 0, SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
 3224                                  ;*      MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER WITH
 3225                                  ;*      THE FOLLOWING DATA:
 3226                                  ;*
 3227                                  ;*              000000
 3228                                  ;*              040000
 3229                                  ;*              040000
 3230                                  ;*
 3231                                  ;*      MAKE SURE BAD SECTOR ERROR SETS.  CHECK THAN DISK ADDRESS
 3232                                  ;*      IS NOT INCREMENTED.
 3233                                  ;*
 3234                                  ;;*****************************************************************
 3235  012436  000004                  TST21:  SCOPE
 3236  012440  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
 3237  012446  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
 3238  012452  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
 3239  012460  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
 3240  012466  012762  000000  000020          MOV     #0,RKDCYL(R2)  ;LOAD CYLINDER
 3241  012474  012762  000000  000006          MOV     #0,RKDA(R2)     ;LOAD TRACK AND SECTOR
 3242  012502  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
 3243  012510  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
```

```
3244  012516  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3245  012524  012700  000426                  MOV     #69.*4+2,R0        ;ISSUE ENOUGH CLOCKS UNTIL READY
3246                                                                     ;  FOR SECTOR PULSE
3247  012530  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
3248  012536  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3249  012544  005300                          DEC     R0
3250  012546  001370                          BNE     1$
3251  012550  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3252  012556  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3253  012564  005037  003254                  CLR     PR.BIT             ;GENERATE SYNCH
3254  012570  005037  003256                  CLR     M1.BIT
3255  012574  012700  000377                  MOV     #255.,R0
3256  012600  004737  035422          5$:     JSR     PC,RDBIT
3257  012604  005300                          DEC     R0                 ;CHECK IF SYNCH FINISHED
3258  012606  001374                          BNE     5$
3259  012610  012737  000001  003254          MOV     #1,PR.BIT          ;SIMULATE SYNCH BIT
3260  012616  004737  035422                  JSR     PC,RDBIT
3261  012622  012703  051762                  MOV     #HEAD2,R3          ;SIMULATE HEADER ERROR
3262  012626  012701  000003                  MOV     #3,R1
3263  012632  012304                  12$:    MOV     (R3)+,R4           ;GET NEXT HEADER WORD
3264  012634  012700  000020                  MOV     #16.,R0            ;LOAD BITS PER WORD
3265  012640  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT      ;STORE PREVIOUS BIT
3266  012646  006004                          ROR     R4                 ;GET NEXT BIT
3267  012650  103403                          BCS     17$
3268  012652  005037  003254                  CLR     PR.BIT
3269  012656  000403                          BR      18$
3270
3271  012660  012737  000001  003254  17$:    MOV     #1,PR.BIT
3272  012666  004737  035422          18$:    JSR     PC,RDBIT           ;SIMULATE NEXT BIT
3273  012672  005300                          DEC     R0                 ;CHECK IF READY FOR NEXT HEADER WORD
3274  012674  001361                          BNE     15$                ;NO, CONTINUE
3275  012676  005301                          DEC     R1                 ;CHECK IF FINISHED WITH HEAD2
3276  012700  001354                          BNE     12$                ;NO, CONTINUE
3277  012702  012700  000100                  MOV     #64.,R0            ;LOAD COUNT FOR GAP
3278  012706  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT      ;SIMULATE GAP
3279  012714  005037  003254                  CLR     PR.BIT
3280  012720  004737  035422                  JSR     PC,RDBIT
3281  012724  005300                          DEC     R0                 ;CHECK IF GAP FINISHED
3282  012726  001367                          BNE     25$                ;NO, CONTINUE
3283  012730  016237  000000  003140          MOV     RKCS1(R2),T.CS1    ;GET CS1
3284  012736  016237  000010  003150          MOV     RKCS2(R2),T.CS2    ;GET CS2
3285  012744  016237  000014  003154          MOV     RKER(R2),T.ER      ;GET ERROR REG
3286  012752  012737  000023  003200          MOV     #WRDATA,E.CS1      ;LOAD EXPECTED CS1
3287  012760  012737  000300  003210          MOV     #IR!OR,E.CS2       ;LOAD EXPECTED CS2
3288  012766  012737  000200  003214          MOV     #BSE,E.ER          ;LOAD EXPECTED ERROR REG.
3289  012774  023737  003200  003140          CMP     E.CS1,T.CS1        ;CHECK CS1 CORRECT
3290  013002  001401                          BEQ     30$                ;YES, CHECK CS2
3291  013004  104063                          ERROR   63                 ;CS1 INCORRECT
3292  013006  023737  003210  003150  30$:    CMP     E.CS2,T.CS2        ;CHECK CS2 CORRECT
3293  013014  001401                          BEQ     32$                ;YES, CHECK ERROR REG.
3294  013016  104064                          ERROR   64                 ;CS2 INCORRECT
3295  013020  023737  003214  003154  32$:    CMP     E.ER,T.ER          ;CHECK ERROR REG CORRECT
3296  013026  001401                          BEQ     TST22              ;;YES, GO ON TO NEXT TEST
3297  013030  104065                          ERROR   65                 ;ERROR REG INCORRECT
3298
3299                                  ;;*****************************************************************
```

```
                                ;*TEST 22       BAD SECTOR ERROR (PART 2)
                                ;*
                                ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                ;*      ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 0,
                                ;*      HEAD 0, SECTOR 0.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
                                ;*      MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER WITH
                                ;*      THE FOLLOWING DATA:
                                ;*
                                ;*              000000
                                ;*              100000
                                ;*              100000
                                ;*
                                ;*      MAKE SURE BAD SECTOR ERROR SETS.  CHECK THAT DISK ADDRESS
                                ;*      IS NOT INCREMENTED.
                                ;*
                                ;**************************************************************
013032  000004                  TST22:  SCOPE
013034  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
013042  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
013046  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
013054  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
013062  012762  000000  000020          MOV     #0,RKDCYL(R2)  ;LOAD CYLINDER
013070  012762  000000  000006          MOV     #0,RKDA(R2)     ;LOAD TRACK AND SECTOR
013076  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
013104  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
013112  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
013120  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
                                                                ;  FOR SECTOR PULSE
013124  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
013132  012762  000040  000026          MOV     #DMD,RKMR1(R2)
013140  005300                          DEC     R0
013142  001370                          BNE     1$
013144  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
013152  012762  000040  000026          MOV     #DMD,RKMR1(R2)
013160  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
013164  005037  003256                  CLR     M1.BIT
013170  012700  000377                  MOV     #255.,R0
013174  004737  035422          5$:     JSR     PC,RDBIT
013200  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
013202  001374                          BNE     5$
013204  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
013212  004737  035422                  JSR     PC,RDBIT
013216  012703  051770                  MOV     #HEAD3,R3       ;SIMULATE HEADER ERROR
013222  012701  000003                  MOV     #3,R1
013226  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
013230  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
013234  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
013242  006004                          ROR     R4              ;GET NEXT BIT
013244  103403                          BCS     17$
013246  005037  003254                  CLR     PR.BIT
013252  000403                          BR      18$
013254  012737  000001  003254  17$:    MOV     #1,PR.BIT
013262  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
013266  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
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```
3356  013270  001361                        BNE     15$             ;NO, CONTINUE
3357  013272  005301                        DEC     R1              ;CHECK IF FINISHED WITH HEAD3
3358  013274  001354                        BNE     12$             ;NO, CONTINUE
3359  013276  012700  000100                MOV     #64.,R0         ;LOAD COUNT FOR GAP
3360  013302  013737  003254  003256  25$:  MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
3361  013310  005037  003254                CLR     PR.BIT
3362  013314  004737  035422                JSR     PC,RDBIT
3363  013320  005300                        DEC     R0              ;CHECK IF GAP FINISHED
3364  013322  001367                        BNE     25$             ;NO, CONTINUE
3365  013324  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
3366  013332  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;GET CS2
3367  013340  016237  000014  003154        MOV     RKER(R2),T.ER   ;GET ERROR REG
3368  013346  012737  000023  003200        MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
3369  013354  012737  000300  003210        MOV     #IR OR,E.CS2    ;LOAD EXPECTED CS2
3370  013362  012737  000200  003214        MOV     #BSE,E.ER       ;LOAD EXPECTED ERROR REG.
3371  013370  023737  003200  003140        CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
3372  013376  001401                        BEQ     30$             ;YES, CHECK CS2
3373  013400  104063                        ERROR   63              ;CS1 INCORRECT
3374  013402  023737  003210  003150  30$:  CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
3375  013410  001401                        BEQ     32$             ;YES, CHECK ERROR REG.
3376  013412  104064                        ERROR   64              ;CS2 INCORRECT
3377  013414  023737  003214  003154  32$:  CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
3378  013422  001401                        BEQ     TST23           ;;YES, GO ON TO NEXT TEST
3379  013424  104065                        ERROR   65              ;ERROR REG INCORRECT
3380
3381                                  ;;*****************************************************************
3382                                  ;*TEST 23       OPERATION INCOMPLETE
3383                                  ;*
3384                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
3385                                  ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
3386                                  ;*      ONE WORD TO AN RK06 IN 24 SECTOR FORMAT, CYLINDER 1253,
3387                                  ;*      HEAD 2, SECTOR 23.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
3388                                  ;*      MESSAGES.  SIMULATE A SECTOR PULSE AND 32 SECTORS WITH
3389                                  ;*      1 BIT DIFFERENT IN 30 BITS OF OPI DETERMININATION. ALL
3390                                  ;*      SIMULATED HEADERS, HAVE GOOD HEADER VRC.  MAKE SURE ONLY
3391                                  ;*      OPERATION INCOMPLETE AND CONTROLLER ARE THE ONLY ERRORS
3392                                  ;*      THAT SET.
3393                                  ;*
3394                                  ;;*****************************************************************
3395  013426  000004                  TST23:  SCOPE
3396  013430  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3397  013436  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
3398  013442  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
3399  013450  012700  002500                  MOV     #2500,R0                ;SET COUNT FOR STALL
3400  013454  005300                  2$:     DEC     R0              ;DEC COUNT
3401  013456  001376                          BNE     2$              ;LOOP UNTIL 0
3402  013460  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
3403  013466  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUFFER ADDRESS
3404  013474  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT = 1
3405  013502  012762  001253  000020          MOV     #1253,RKDCYL(R2) ;LOAD CYLINDER
3406  013510  012762  001023  000006          MOV     #1023,RKDA(R2)  ;LOAD TRACK AND SECTOR
3407  013516  012762  010023  000000          MOV     #WRDATA!CFMT,RKCS1(R2) ;ISSUE WRITE DATA
3408  013524  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3409                                                                  ;  FOR SECTOR PULSE
3410  013530  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
3411  013536  012762  000040  000026          MOV     #DMD,RKMR1(R2)
```

```
 3412  013544  005300                          DEC     R0
 3413  013546  001370                          BNE     1$
 3414  013550  012705  000040                  MOV     #32.,R5         ;LOAD HEADER COUNT
 3415  013554  012703  052164                  MOV     #OPI1,R3        ;LOAD ADDRESS OF HEADERS
 3416  013560  012737  010023  003200          MOV     #WRDATA!CFMT,E.CS1      ;LOAD EXPECTED CS1
 3417  013566  012737  000300  0032'0          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
 3418  013574  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG
 3419  013600  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1 ;LOAD EXPECTED MR1
 3420  013606  005037  003310                  CLR     HDRCNT          ;INITIALIZE HEADER COUNT
 3421  013612  012762  00C'+0  000026  5$:     MOV     #DMD!MSP,RKMR1(R2) ;SIMULATE SECTOR PULSE
 3422  013620  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 3423  013626  022737  000037  003310          CMP     #31.,HDRCNT     ;CHECK IF ALL HEADERS DONE
 3424  013634  001460                          BEQ     26$             ;YES - SKIP TO ERROR TEST
 3425  013636  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
 3426  013642  005037  003256                  CLR     M1.BIT
 3427  013646  012700  000377                  MOV     #255.,R0
 3428  013652  004737  035422          10$:    JSR     PC,RDBIT
 3429  013656  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
 3430  013660  001374                          BNE     10$
 3431  013662  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
 3432  013670  004737  035422                  JSR     PC,RDBIT
 3433  013674  012701  000003                  MOV     #3,R1           ;SIMULATE OPI
 3434  013700  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
 3435  013702  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
 3436  013706  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
 3437  013714  006004                          ROR     R4              ;GET NEXT BIT
 3438  013716  103403                          BCS     17$
 3439  013720  005037  003254                  CLR     PR.BIT
 3440  013724  000403                          BR      18$
 3441
 3442  013726  012737  000001  003254  17$:    MOV     #1,PR.BIT
 3443  013734  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
 3444  013740  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
 3445  013742  001361                          BNE     15$             ;NO, CONTINUE
 3446  013744  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
 3447  013746  001354                          BNE     12$             ;NO,CONTINUE
 3448  013750  012700  000100                  MOV     #64.,R0         ;LOAD COUNT FOR GAP
 3449  013754  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 3450  013762  005037  003254                  CLR     PR.BIT
 3451  013766  004737  035422                  JSR     PC,RDBIT
 3452  013772  005300                          DEC     R0              ;CHECK IF GAP IS FINISHED
 3453  013774  001367                          BNE     25$             ;NO, CONTINUE
 3454  013776  016237  000000  003140  26$:    MOV     RKCS1(R2),T.CS1 ;GET CS1
 3455  014004  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
 3456  014012  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG.
 3457  014020  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
 3458  014026  001401                          BEQ     30$             ;YES, CONTINUE
 3459  014030  104074                          ERROR   74              ;CS1 INCORRECT
 3460  014032  023737  003210  003150  30$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
 3461  014040  001401                          BEQ     31$             ;YES, CONTINUE
 3462  014042  104075                          ERROR   75              ;CS2 INCORRECT
 3463  014044  023737  003214  003154  31$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
 3464  014052  001401                          BEQ     32$             ;YES, CONTINUE
 3465  014054  104076                          ERROR   76              ;ERROR REG INCORRECT
 3466  014056  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1 ;GET MR1
 3467  014064  023737  003224  003164          CMP     E.MR1,T.MR1     ;CHECK TO MAKE SURE WRITE GATE DID NOT SET
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                                                BEQ     34$             ;YES, CONTINUE
                                                ERROR   77              ;MR1 INCORRECT
                                        34$:    INC     HDRCNT          ;INCREMENT HEADER COUNT
                                                CMP     #31.,HDRCNT     ;CHECK IF LAST HEADER
                                                BNE     35$             ;NO, CHECK IF FINSHED
                                                MOV     #OPI,E.ER       ;LOAD ERROR BIT
                                                BIC     #GO,E.CS1       ;ADJUST E.CS1 FOR END OF OP CONTENTS
                                                BIS     #RDY!CERR,E.CS1
                                        35$:    DEC     R5              ;CHECK IF FINISHED
                                                BEQ     37$             ;YES - SKIP
                                                JMP     5$              ;DO NEXT SECTOR
                                        37$:    MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
                                                MOV     RKCS1(R2),T.CS1 ;GET CS1
                                                MOV     RKCS2(R2),T.CS2 ;    CS2
                                                MOV     RKER(R2),T.ER   ;    ER
                                                MOV     #RDY,E.CS1      ;SET EXPECTED CS1
                                                CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
                                                BEQ     TST24           ;;GO TO NEXT TEST
                                                ERROR   153

                                ;;*****************************************************************
                                ;*TEST 24       HEADER VRC
                                ;*
                                ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
                                ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
                                ;*      ONE WORD WITH CDT SET IN 24 SECTOR FORMAT, CYLINDER 1253,
                                ;*      HEAD 2, SECTOR 23.  CLOCK IN BOTH SEEK AND DRIVE CLEAR
                                ;*      MESSAGES SIMULATE A SECTOR PULSE AND HEADER WITH BIT 0
                                ;*      OF THE VRC INCORRECT.  MAKE SURE ONLY HEADER VRC AND
                                ;*      CONTROLLER ERROR ARE THE ONLY ERRORS SET.  REPEAT FOR
                                ;*      BITS 1-15 OF VRC.
                                ;*
                                ;;*****************************************************************
                                TST24:  SCOPE
                                        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
                                        MOV     $BASE,R2        ;LOAD RK611 BASE
                                        MOV     #CFMT!CDT!WRDATA,E.CS1 ;LOAD EXPECTED CS1
                                        MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
                                        MOV     #HVRC,E.ER      ;LOAD EXPECTED ERROR REGISTER
                                        MOV     #1,$TMP4        ;INITIALIZE BIT FOR VRC ERROR
                                        MOV     #1$,$LPERR      ;LOAD LOOP ON ERROR LOCATION FOR
                                                                ;  SUBTEST LOOP

                                1$:
                                        MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
                                        MOV     #2000,R0                ;SET COUNT FOR STALL
                                2$:     DEC     R0              ;DEC COUNT
                                        BNE     2$              ;LOOP UNTIL 0
                                        MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN MAINTENANCE MODE
                                        MOV     #140370,VRCHDR+4 ;LOAD VRC
                                        BIT     $TMP4,VRCHDR+4  ;MAKE ONE BIT BAD
                                        BEQ     3$
                                        BIC     $TMP4,VRCHDR+4
                                        BR      5$

                                3$:     BIS     $TMP4,VRCHDR+4
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3524  014346  012762  053606  000004  5$:     MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY ADDRESS
3525  014354  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT = 1
3526  014362  012762  001023  000006          MOV     #1023,RKDA(R2)  ;LOAD TRACK 2 SECTOR 23
3527  014370  012762  001253  000020          MOV     #1253,RKDCYL(R2) ;LOAD CYLINDER 1253
3528  014376  012762  012023  000000          MOV     #CFMT!CDT!WRDATA,RKCS1(R2) ;ISSUE COMMAND
3529  014404  012700  000426                  MOV     #69.*4+2,R0     ;LOAD COUNT UNTIL READY FOR SECTOR
3530  014410  012762  000440  000026  10$:    MOV     #DMD!MCLK,RKMR1(R2)
3531  014416  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3532  014424  005300                          DEC     R0
3533  014426  001370                          BNE     10$
3534  014430  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2) ;SIMULATE SECTOR PULSE
3535  014436  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3536  014444  005037  003254                  CLR     PR.BIT          ;INITIAL BITS
3537  014450  005037  003256                  CLR     M1.BIT
3538  014454  012700  000377                  MOV     #255.,R0        ;SIMULATE SYNCH
3539  014460  004737  035422          15$:    JSR     PC,RDBIT
3540  014464  005300                          DEC     R0
3541  014466  001374                          BNE     15$
3542  014470  012737  000001  003254          MOV     #1,PR.BIT       ;GENERATE SYNCH BIT
3543  014476  004737  035422                  JSR     PC,RDBIT        ;SIMULSTE SYNC 1 BIT
3544  014502  012703  053564                  MOV     #VRCHDR,R3      ;LOAD ADDRESS OF HEADER
3545  014506  012701  000003                  MOV     #3,R1           ;LOAD HEADER COUNT
3546  014512  012304          17$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
3547  014514  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
3548  014520  013737  003254  003256  20$:    MOV     PR.BIT,M1.BIT   ;SIMULATE NEXT BIT
3549  014526  006004                          RCR     R4
3550  014530  103403                          BCS     23$
3551  014532  005037  003254                  CLR     PR.BIT
3552  014536  000403                          BR      25$
3553
3554  014540  012737  000001  003254  23$:    MOV     #1,PR.BIT
3555  014546  004737  035422          25$:    JSR     PC,RDBIT
3556  014552  005300                          DEC     R0              ;CHECK IF FINISHED WITH WORD
3557  014554  001361                          BNE     20$             ;NO, CONTINUE
3558  014556  005301                          DEC     R1              ;CHECK IF HEADER FINISHED
3559  014560  001354                          BNE     17$             ;NO, CONTINUE
3560  014562  012700  000100                  MOV     #64.,R0         ;SIMULATE GAP
3561  014566  013737  003254  003256  30$:    MOV     PR.BIT,M1.BIT
3562  014574  005037  003254                  CLR     PR.BIT
3563  014600  004737  035422                  JSR     PC,RDBIT
3564  014604  005300                          DEC     R0
3565  014606  001367                          BNE     30$
3566  014610  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;STORE CS1
3567  014616  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;STORE CS2
3568  014624  016237  000014  003154          MOV     RKER(R2),T.ER   ;STORE ERROR REG
3569  014632  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
3570  014640  001401                          BEQ     35$             ;YES, CHECK CS2
3571  014642  104071                          ERROR   71              ;CS1 INCORRECT
3572  014644  023737  003210  003150  35$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
3573  014652  001401                          BEQ     37$             ;YES, CHECK ERROR REG
3574  014654  104072                          ERROR   72              ;CS2 INCORRECT
3575  014656  023737  003214  003154  37$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
3576  014664  001401                          BEQ     40$             ;YES, CHECK IF LOOP ON ERROR
3577  014666  104073                          ERROR   73              ;ERROR REG INCORRECT
3578  014670  104415          40$:    SCOP1                   ;CHECK IF LOOP ON ERROR
3579  014672  006337  001170                  ASL     $TMP4           ;GET NEXT PATTERN
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3580  014676  103402                        BCS     TST25           ;;CHECK IF FINISHED
3581  014700  000137  014266                JMP     1$              ;NO, CONTINUE
3582
3583                                  ;;*****************************************************************
3584                                  ;*TEST 25       BAD SECTOR ERROR AND HEADER VRC
3585                                  ;*
3586                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
3587                                  ;*      CONTROLLER IN MAINTENANCE MODE.  ISSUE A WRITE DATA OF
3588                                  ;*      ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 300.
3589                                  ;*      HEAD 1, SECTOR 17, CLOCK IN BOTH SEEK AND DRIVE CLEAR
3590                                  ;*      MESSAGES.  SIMULATE THE FOLLOWING HEADER:
3591                                  ;*
3592                                  ;*              000300
3593                                  ;*              040057
3594                                  ;*              040356
3595                                  ;*
3596                                  ;*      MAKE SURE ONLY HEADER VRC ERROR SETS.
3597                                  ;*
3598                                  ;*****************************************************************
3599  014704  000004                  TST25:  SCOPE
3600  014706  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3601  014714  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
3602  014720  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
3603  014726  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
3604  014734  012762  000300  000020          MOV     #300,RKDCYL(R2)  ;LOAD CYLINDER
3605  014742  012762  000417  000006          MOV     #417,RKDA(R2)   ;LOAD TRACK AND SECTOR
3606  014750  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
3607  014756  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
3608  014764  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3609  014772  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3610                                                                  ;  FOR SECTOR PULSE
3611  014776  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
3612  015004  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3613  015012  005300                          DEC     R0
3614  015014  001370                          BNE     1$
3615  015016  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3616  015024  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3617  015032  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
3618  015036  005037  003256                  CLR     M1.BIT
3619  015042  012700  000377                  MOV     #255.,R0
3620  015046  004737  035422          5$:     JSR     PC,RDBIT
3621  015052  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
3622  015054  001374                          BNE     5$
3623  015056  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
3624  015064  004737  035422                  JSR     PC,RDBIT
3625  015070  012703  051776                  MOV     #HEAD4,R3       ;SIMULATE HEADER ERROR
3626  015074  012701  000003                  MOV     #3,R1
3627  015100  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
3628  015102  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
3629  015106  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
3630  015114  006004                          ROR     R4              ;GET NEXT BIT
3631  015116  103403                          BCS     17$
3632  015120  005037  003254                  CLR     PR.BIT
3633  015124  000403                          BR      18$
3634
3635  015126  012737  000001  003254  17$:    MOV     #1,PR.BIT
```

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3636  015134  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
3637  015140  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
3638  015142  001361                          BNE     15$             ;NO, CONTINUE
3639  015144  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEAD4
3640  015146  001354                          BNE     12$             ;NO, CONTINUE
3641  015150  012700  000100                  MOV     #64.,R0         ;LOAD COUNT FOR GAP
3642  015154  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
3643  015162  005037  003254                  CLR     PR.BIT
3644  015166  004737  035422                  JSR     PC,RDBIT
3645  015172  005300                          DEC     R0              ;CHECK IF GAP FINISHED
3646  015174  001367                          BNE     25$             ;NO, CONTINUE
3647  015176  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
3648  015204  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
3649  015212  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG
3650  015220  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
3651  015226  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
3652  015234  012737  000400  003214          MOV     #HVRC,E.ER      ;LOAD EXPECTED ERROR REG.
3653  015242  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
3654  015250  001401                          BEQ     30$             ;YES, CHECK CS2
3655  015252  104066                          ERROR   66              ;CS1 INCORRECT
3656  015254  023737  003210  003150  30$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
3657  015262  001401                          BEQ     32$             ;YES, CHECK ERROR REG.
3658  015264  104067                          ERROR   67              ;CS2 INCORRECT
3659  015266  023737  003214  003154  32$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
3660  015274  001401                          BEQ     TST26           ;;YES, GO ON TO NEXT TEST
3661  015276  104070                          ERROR   70              ;ERROR REG INCORRECT
3662
3663                                  ;;*****************************************************************
3664                                  ;*TEST 26       GOOD HEADER AND PREVIOUS BSE
3665                                  ;*
3666                                  ;*      CLEAR RK611 CONTROLLER WITH CONTROLLER CLEAR.  PUT
3667                                  ;*      CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA OF
3668                                  ;*      ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 100,
3669                                  ;*      HEAD 0, SECTOR 1.  CLOCK THROUGH SEEK AND DRIVE CLEAR
3670                                  ;*      MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER OF THE
3671                                  ;*      FOLLOWING 3 WORDS WITH A BAD SECTOR INDICATION:
3672                                  ;*
3673                                  ;*              000100
3674                                  ;*              040000
3675                                  ;*              040100
3676                                  ;*
3677                                  ;*      MAKE SURE NO ERROR IS REPORTED AND WRITE GATE DOES NOT
3678                                  ;*      SET.  SIMULATE A SECTOR PULSE AND A HEADER OF THE FOLLOWING
3679                                  ;*      3 WORDS:
3680                                  ;*
3681                                  ;*              000100
3682                                  ;*              140001
3683                                  ;*              140101
3684                                  ;*
3685                                  ;*      MAKE SURE WRITE GATE SETS INDICATING THAT HEADER HAS
3686                                  ;*      BEEN RECOGNIZED.
3687                                  ;*
3688                                  ;*****************************************************************
3689  015300  000004                  TST26:  SCOPE
3690  015302  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3691  015310  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
```

```
3692  015314  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
3693  015322  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
3694  015330  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
3695  015336  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT -1
3696  015344  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
3697  015352  012762  000100  000020          MOV     #100,RKDCYL(R2)  ;LOAD CYLINDER
3698  015360  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3699  015366  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3700                                                                  ;  FOR SECTOR PULSE
3701  015372  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
3702  015400  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3703  015406  005300                          DEC     R0
3704  015410  001370                          BNE     1$
3705  015412  012705  000002                  MOV     #2,R5           ;LOAD HEADER COUNT
3706  015416  012703  052004                  MOV     #HEAD5,R3       ;LOAD ADDRESS OF HEADERS
3707  015422  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
3708  015430  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
3709  015436  005037  003214                  CLR     E.ER            ;LOAD EXPECTED MR1
3710  015442  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1  ;LOAD EXPECTED MR1
3711  015450  005037  003310                  CLR     HDRCNT          ;INITIALIZE HEADER COUNT
3712  015454  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3713  015462  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3714  015470  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
3715  015474  005037  003256                  CLR     M1.BIT
3716  015500  012700  000377                  MOV     #255.,R0
3717  015504  004737  035422          10$:    JSR     PC,RDBIT
3718  015510  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
3719  015512  001374                          BNE     10$
3720  015514  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
3721  015522  004737  035422                  JSR     PC,RDBIT
3722  015526  012701  000003                  MOV     #3,R1           ;SIMULATE HEADER
3723  015532  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
3724  015534  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
3725  015540  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
3726  015546  006004                          ROR     R4              ;GET NEXT BIT
3727  015550  103403                          BCS     17$
3728  015552  005037  003254                  CLR     PR.BIT
3729  015556  000403                          BR      18$
3730
3731  015560  012737  000001  003254  17$:    MOV     #1,PR.BIT
3732  015566  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
3733  015572  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
3734  015574  001361                          BNE     15$             ;NO, CONTINUE
3735  015576  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
3736  015600  001354                          BNE     12$             ;NO, CONTINUE
3737  015602  012700  000102                  MOV     #66.,R0         ;LOAD COUNT FOR GAP
3738                                                                  ;  PLUS 2 COUNTS FOR WRTGAT TO SET
3739  015606  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
3740  015614  005037  003254                  CLR     PR.BIT
3741  015620  004737  035422                  JSR     PC,RDBIT
3742  015624  005300                          DEC     R0              ;CHECK IF GAP IS FINISHED
3743  015626  001367                          BNE     25$             ;NO, CONTINUE
3744  015630  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
3745  015636  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
3746  015644  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG
3747  015652  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
```

```
3748  015660  001401                          BEQ     30$             ;YES, CONTINUE
3749  015662  104114                          ERROR   114             ;CS1 INCORRECT
3750  015664  023737  003210  003150  30$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
3751  015672  001401                          BEQ     31$             ;YES, CONTINUE
3752  015674  104115                          ERROR   115             ;CS2 INCORRECT
3753  015676  023737  003214  003154  31$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
3754  015704  001401                          BEQ     32$             ;YES, CONTINUE
3755  015706  104116                          ERROR   116             ;ERROR REG INCORRECT
3756  015710  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1 ;GET MR1
3757  015716  023737  003224  003164          CMP     E.MR1,T.MR1     ;CHECK WRITE GATE CORRECT
3758  015724  001401                          BEQ     34$             ;YES, CONTINUE
3759  015726  104117                          ERROR   117             ;MR1 INCORRECT
3760  015730  005237  003310          34$:    INC     HDRCNT          ;INCREMENT HEADER COUNT
3761  015734  012737  062040  003224          MOV     #WRTGAT!DMD!MEWD!ECCW,E.MR1  ;LOAD EXPECTED MR1
3762  015742  005305                          DEC     R5              ;CHECK IF FINISHED
3763  015744  001402                          BEQ     TST27           ;;YES, GO ON TO NEXT TEST
3764  015746  000137  015454                  JMP     5$
3765
3766                                  ;;*****************************************************************
3767                                  ;*TEST 27       GOOD HEADER AND PREVIOUS HVRC
3768                                  ;*
3769                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.  PUT
3770                                  ;*      CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA OF
3771                                  ;*      ONE WORD TO AN RK06 IN 26 SECTOR FORMAT, CYLINDER 200,
3772                                  ;*      HEAD 0, SECTOR 1.  CLOCK THROUGH SEEK AND DRIVE CLEAR
3773                                  ;*      MESSAGES.  SIMULATE A SECTOR PULSE AND A HEADER OF THE
3774                                  ;*      FOLLOWING 3 WORDS WITH A BAD HEADER VRC:
3775                                  ;*
3776                                  ;*              000200
3777                                  ;*              140000
3778                                  ;*              140000
3779                                  ;*
3780                                  ;*      MAKE SURE NO ERROR IS REPORTED AND WRITE GATE DOES NOT
3781                                  ;*      SET.  SIMULATE A SECTOR PULSE AND A HEADER OF THE
3782                                  ;*      FOLLOWING 3 WORDS:
3783                                  ;*
3784                                  ;*              000200
3785                                  ;*              140001
3786                                  ;*              140201
3787                                  ;*
3788                                  ;*      MAKE SURE WRITE GATE SEES INDICATING THAT HEADER HAS
3789                                  ;*      BEEN RECOGNIZED.
3790                                  ;*
3791                                  ;*****************************************************************
3792  015752  000004                  TST27:  SCOPE
3793  015754  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3794  015762  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
3795  015766  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
3796  015774  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
3797  016002  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
3798  016010  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT -1
3799  016016  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
3800  016024  012762  000200  000020          MOV     #200,RKDCYL(R2)  ;LOAD CYLINDER
3801  016032  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3802  016040  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3803                                                                  ;  FOR SECTOR PULSE
```

```
3804  016044  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
3805  016052  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3806  016060  005300                          DEC     R0
3807  016062  001370                          BNE     1$
3808  016064  012705  000002                  MOV     #2,R5           ;LOAD HEADER COUNT
3809  016070  012703  052020                  MOV     #HEAD6,R3       ;LOAD ADDRESS OF HEADERS
3810  016074  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
3811  016102  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
3812  016110  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ER
3813  016114  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1  ;LOAD EXPECTED MR1
3814  016122  005037  003310                  CLR     HDRCNT          ;INITIALIZE HEADER COUNT
3815  016126  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3816  016134  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3817  016142  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
3818  016146  005037  003256                  CLR     M1.BIT
3819  016152  012700  000377                  MOV     #255.,R0
3820  016156  004737  035422          10$:    JSR     PC,RDBIT
3821  016162  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
3822  016164  001374                          BNE     10$
3823  016166  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
3824  016174  004737  035422                  JSR     PC,RDBIT
3825  016200  012701  000003                  MOV     #3,R1           ;SIMULATE HEADER
3826  016204  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
3827  016206  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
3828  016212  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
3829  016220  006004                          ROR     R4              ;GET NEXT BIT
3830  016222  103403                          BCS     17$
3831  016224  005037  003254                  CLR     PR.BIT
3832  016230  000403                          BR      18$
3833
3834  016232  012737  000001  003254  17$:    MOV     #1,PR.BIT
3835  016240  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
3836  016244  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
3837  016246  001361                          BNE     15$             ;NO, CONTINUE
3838  016250  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
3839  016252  001354                          BNE     12$             ;NO, CONTINUE
3840  016254  012700  000102                  MOV     #66.,R0         ;LOAD COUNT FOR GAP
3841                                                                  ;  PLUS 2 COUNTS FOR WRTGAT TO SET
3842  016260  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
3843  016266  005037  003254                  CLR     PR.BIT
3844  016272  004737  035422                  JSR     PC,RDBIT
3845  016276  005300                          DEC     R0              ;CHECK IF GAP IS FINISHED
3846  016300  001367                          BNE     25$             ;NO, CONTINUE
3847  016302  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
3848  016310  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
3849  016316  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG
3850  016324  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
3851  016332  001401                          BEQ     30$             ;YES, CONTINUE
3852  016334  104120                          ERROR   120             ;CS1 INCORRECT
3853  016336  023737  003210  003150  30$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
3854  016344  001401                          BEQ     31$             ;YES, CONTINUE
3855  016346  104121                          ERROR   121             ;CS2 INCORRECT
3856  016350  023737  003214  003154  31$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
3857  016356  001401                          BEQ     32$             ;YES, CONTINUE
3858  016360  104122                          ERROR   122             ;ERROR REG INCORRECT
3859  016362  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1 ;GET MR1
```

```
3860  016370  023737  003224  003164          CMP     E.MR1,T.MR1     ;CHECK WRITE GATE CORRECT
3861  016376  001401                          BEQ     34$             ;YES, CONTINUE
3862  016400  104123                          ERROR   123             ;MR1 INCORRECT
3863  016402  005237  003310          34$:    INC     HDRCNT          ;INCREMENT HEADER COUNT
3864  016406  012737  062040  003224          MOV     #WRTGAT!DMD!MEWD!ECCW,E.MR1  ;LOAD EXPECTED MR1
3865  016414  005305                          DEC     R5              ;CHECK IF FINISHED
3866  016416  001402                          BEQ     TST30           ;;YES, GO ON TO NEXT TEST
3867  016420  000137  016126                  JMP     5$
3868
3869                                  ;;*****************************************************************
3870                                  ;*TEST 30       BAD SECTOR ERROR AND PREVIOUS HVRC
3871                                  ;*
3872                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
3873                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A
3874                                  ;*      WRITE DATA OF ONE WORD TO AN RK06 IN 26 SECTOR
3875                                  ;*      FORMAT, CYLINDER 400, HEAD 0, SECTOR 1.  CLOCK THROUGH
3876                                  ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
3877                                  ;*      AND A HEADER OF THE FOLLOWING 3 WORDS WITH A
3878                                  ;*      BAD HEADER VRC:
3879                                  ;*
3880                                  ;*              000400
3881                                  ;*              140000
3882                                  ;*              140000
3883                                  ;*
3884                                  ;*      MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
3885                                  ;*      DOES NOT SET.  SIMULATE A SECTOR PULSE AND A
3886                                  ;*      HEADER CONSISTING OF THE FOLLOWING 3 WORDS:
3887                                  ;*
3888                                  ;*              000400
3889                                  ;*              040001
3890                                  ;*              040401
3891                                  ;*
3892                                  ;*      MAKE SURE BAD SECTOR ERROR SETS AND HEADER VRC
3893                                  ;*      ERROR DOES NOT SET.
3894                                  ;*
3895                                  ;;*****************************************************************
3896  016424  000004                  TST30:  SCOPE
3897  016426  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3898  016434  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
3899  016440  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
3900  016446  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
3901  016454  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
3902  016462  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT -1
3903  016470  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
3904  016476  012762  000400  000020          MOV     #400,RKDCYL(R2)  ;LOAD CYLINDER
3905  016504  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
3906  016512  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
3907                                                                  ;  FOR SECTOR PULSE
3908  016516  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
3909  016524  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3910  016532  005300                          DEC     R0
3911  016534  001370                          BNE     1$
3912  016536  012705  000002                  MOV     #2,R5           ;LOAD HEADER COUNT
3913  016542  012703  052034                  MOV     #HEAD7,R3       ;LOAD ADDRESS OF HEADERS
3914  016546  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
3915  016554  012737  000300  003210          MOV     #IR'OR,E.CS2    ;LOAD EXPECTED CS2
```

```
3916  016562  005037  003214                  CLR     E.ER                ;LOAD EXPECTED MR1
3917  016566  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1  ;LOAD EXPECTED MR1
3918  016574  005037  003310                  CLR     HDRCNT              ;INITIALIZE HEADER COUNT
3919  016600  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
3920  016606  012762  000040  000026          MOV     #DMD,RKMR1(R2)
3921  016614  005037  003254                  CLR     PR.BIT              ;GENERATE SYNCH
3922  016620  005037  003256                  CLR     M1.BIT
3923  016624  012700  000377                  MOV     #255.,R0
3924  016630  004737  035422          10$.    JSR     PC,RDBIT
3925  016634  005300                          DEC     R0                  ;CHECK IF SYNCH FINISHED
3926  016636  001374                          BNE     10$
3927  016640  012737  000001  003254          MOV     #1,PR.BIT           ;SIMULATE SYNCH BIT
3928  016646  004737  035422                  JSR     PC,RDBIT
3929  016652  012701  000003                  MOV     #3,R1               ;SIMULATE HEADER
3930  016656  012304                  12$     MOV     (R3)+,R4            ;GET NEXT HEADER WORD
3931  016660  012700  000020                  MOV     #16.,R0             ;LOAD BITS PER WORD
3932  016664  013737  003254  003256  15$.    MOV     PR.BIT,M1.BIT       ;STORE PREVIOUS BIT
3933  016672  006004                          ROR     R4                  ;GET NEXT BIT
3934  016674  103403                          BCS     17$
3935  016676  005037  003254                  CLR     PR.BIT
3936  016702  000403                          BR      18$
3937
3938  016704  012737  000001  003254  17$     MOV     #1,PR.BIT
3939  016712  004737  035422          18$:    JSR     PC,RDBIT            ;SIMULATE NEXT BIT
3940  016716  005300                          DEC     R0                  ;CHECK IF READY FOR NEXT HEADER WORD
3941  016720  001361                          BNE     15$                 ;NO, CONTINUE
3942  016722  005301                          DEC     R1                  ;CHECK IF FINISHED WITH HEADER
3943  016724  001354                          BNE     12$                 ;NO, CONTINUE
3944  016726  012700  000102                  MOV     #66.,R0             ;LOAD COUNT FOR GAP
3945                                                                      ;  PLUS 2 COUNTS FOR WRTGAT TO SET
3946  016732  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT       ;SIMULATE GAP
3947  016740  005037  003254                  CLR     PR.BIT
3948  016744  004737  035422                  JSR     PC,RDBIT
3949  016750  005300                          DEC     R0                  ;CHECK IF GAP IS FINISHED
3950  016752  001367                          BNE     25$                 ;NO, CONTINUE
3951  016754  016237  000000  003140          MOV     RKCS1(R2),T.CS1     ;GET CS1
3952  016762  016237  000010  003150          MOV     RKCS2(R2),T.CS2     ;GET CS2
3953  016770  016237  000014  003154          MOV     RKER(R2),T.ER       ;GET ERROR REG
3954  016776  023737  003200  003140          CMP     E.CS1,T.CS1         ;CHECK CS1 CORRECT
3955  017004  001401                          BEQ     30$                 ;YES, CONTINUE
3956  017006  104124                          ERROR   124                 ;CS1 INCORRECT
3957  017010  023737  003210  003150  30$:    CMP     E.CS2,T.CS2         ;CHECK CS2 CORRECT
3958  017016  001401                          BEQ     31$                 ;YES, CONTINUE
3959  017020  104125                          ERROR   125                 ;CS2 INCORRECT
3960  017022  023737  003214  003154  31$:    CMP     E.ER,T.ER           ;CHECK ERROR REG CORRECT
3961  017030  001401                          BEQ     32$                 ;YES, CONTINUE
3962  017032  104126                          ERROR   126                 ;ERROR REG INCORRECT
3963  017034  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1     ;GET MR1
3964  017042  023737  003224  003164          CMP     E.MR1,T.MR1         ;CHECK WRITE GATE CORRECT
3965  017050  001401                          BEQ     34$                 ;YES, CONTINUE
3966  017052  104127                          ERROR   127                 ;MR1 INCORRECT
3967  017054  005237  003310          34$:    INC     HDRCNT              ;INCREMENT HEADER COUNT
3968  017060  012737  000200  003214          MOV     #BSE,E.ER           ;LOAD EXPECTER ERROR REG
3969  017066  005305                          DEC     R5                  ;CHECK IF FINISHED
3970  017070  001402                          BEQ     TST31               ;;YES, GO ON TO NEXT TEST
3971  017072  000137  016600                  JMP     5$
```

```
                                ;*****************************************************************
                                ;*TEST 31       HEADER VRC AND PREVIOUS BSE
                                ;*
                                ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                                ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A
                                ;*      WRITE DATA OR ONE WORD TO AN RKC6 IN 26 SECTOR
                                ;*      FORMAT, CYLINDER 140, HEAD 0, SECTOR 1.  CLOCK THROUGH
                                ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                                ;*      AND A HEADER OF THE FOLLOWING 3 WORDS WITH A HEADER
                                ;*      VRC ERROR:
                                ;*
                                ;*              000140
                                ;*              040000
                                ;*              040140
                                ;*
                                ;*      MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                ;*      DOES NOT SET.  STIMULATE A SECTOR PULSE AND A
                                ;*      HEADER CONSISTING OF THE FOLLOWING THREE WORDS:
                                ;*
                                ;*              000140
                                ;*              140001
                                ;*              140101
                                ;*
                                ;*      MAKE SURE HEADER VRC ERROR SETS AND BAD SECTOR
                                ;*      ERROR DOES NOT SET.
                                ;*
                                ;*****************************************************************
017076  000004                  TST31:  SCOPE
017100  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
017106  013702  001270          1$:     MOV     $BASE,R2        ;LOAD RK611 BASE
017112  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
017120  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
017126  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
017134  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT -1
017142  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
017150  012762  000140  000020          MOV     #140,RKDCYL(R2)  ;LOAD CYLINDER
017156  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
017164  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL READY
                                                                ;  FOR SECTOR PULSE
017170  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
017176  012762  000040  000026          MOV     #DMD,RKMR1(R2)
017204  005300                          DEC     R0
017206  001370                          BNE     1$
017210  012705  000002                  MOV     #2,R5           ;LOAD HEADER COUNT
017214  012703  052050                  MOV     #HEAD8,R3       ;LOAD ADDRESS OF HEADERS
017220  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
017226  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
017234  005037  003214                  CLR     E.ER            ;LOAD EXPECTED MR1
017240  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1  ;LOAD EXPECTED MR1
017246  005037  003310                  CLR     HDRCNT          ;INITIALIZE HEADER COUNT
017252  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
017260  012762  000040  000026          MOV     #DMD,RKMR1(R2)
017266  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
017272  005037  003256                  CLR     M1.BIT
017276  012700  000377                  MOV     #255.,R0
```

```
 4028  017302  004737  035422          10$:    JSR     PC,RDBIT
 4029  017306  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
 4030  017310  001374                          BNE     10$
 4031  017312  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
 4032  017320  004737  035422                  JSR     PC,RDBIT
 4033  017324  012701  000003                  MOV     #3,R1           ;SIMULATE HEADER
 4034  017330  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
 4035  017332  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
 4036  017336  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
 4037  017344  006004                          ROR     R4              ;GET NEXT BIT
 4038  017346  103403                          BCS     17$
 4039  017350  005037  003254                  CLR     PR.BIT
 4040  017354  000403                          BR      18$
 4041
 4042  017356  012737  000001  003254  17$:    MOV     #1,PR.BIT
 4043  017364  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
 4044  017370  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
 4045  017372  001361                          BNE     15$             ;NO, CONTINUE
 4046  017374  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
 4047  017376  001354                          BNE     12$             ;NO, CONTINUE
 4048  017400  012700  000102                  MOV     #66.,R0         ;LOAD COUNT FOR GAP
 4049                                                                  ;  PLUS 2 COUNTS FOR WRTGAT TO SET
 4050  017404  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 4051  017412  005037  003254                  CLR     PR.BIT
 4052  017416  004737  035422                  JSR     PC,RDBIT
 4053  017422  005300                          DEC     R0              ;CHECK IF GAP IS FINISHED
 4054  017424  001367                          BNE     25$             ;NO, CONTINUE
 4055  017426  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
 4056  017434  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
 4057  017442  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG
 4058  017450  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
 4059  017456  001401                          BEQ     30$             ;YES, CONTINUE
 4060  017460  104130                          ERROR   130             ;CS1 INCORRECT
 4061  017462  023737  003210  003150  30$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
 4062  017470  001401                          BEQ     31$             ;YES, CONTINUE
 4063  017472  104131                          ERROR   131             ;CS2 INCORRECT
 4064  017474  023737  003214  003154  31$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
 4065  017502  001401                          BEQ     32$             ;YES, CONTINUE
 4066  017504  104132                          ERROR   132             ;ERROR REG INCORRECT
 4067  017506  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1 ;GET MR1
 4068  017514  023737  003224  003164          CMP     E.MR1,T.MR1     ;CHECK WRITE GATE CORRECT
 4069  017522  001401                          BEQ     34$             ;YES, CONTINUE
 4070  017524  104133                          ERROR   133             ;MR1 INCORRECT
 4071  017526  005237  003310          34$:    INC     HDRCNT          ;INCREMENT HEADER COUNT
 4072  017532  012737  000400  003214          MOV     #HVRC,E.ER      ;LOAD EXPECTER ERROR REG
 4073  017540  005305                          DEC     R5              ;CHECK IF FINISHED
 4074  017542  001402                          BEQ     TST32           ;;YES, GO ON TO NEXT TEST
 4075  017544  000137  017252                  JMP     5$
 4076
 4077                                  ;;*****************************************************************
 4078                                  ;*TEST 32       OPI AND HVRC ON LAST HEADER
 4079                                  ;*
 4080                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
 4081                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
 4082                                  ;*      DATA OF ONE WORD TO AN RK06 IN 26 SECTOR FORMAT,
 4083                                  ;*      CYLINDER 240, HEAD 0, SECTOR 1.  CLOCK THROUGH
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                                        ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                                        ;*      AND 30 HEADERS CONSISTING OF THE FOLLOWING 3 WORDS:
                                        ;*
                                        ;*              000240
                                        ;*              140000
                                        ;*              140240
                                        ;*
                                        ;*      MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                        ;*      DOES NOT SET.  SIMULATE A SECTOR PULSE AND A
                                        ;*      HEADER CONSISTING OF THE FOLLOWING THREE WORDS:
                                        ;*
                                        ;*              000240
                                        ;*              140000
                                        ;*              140040
                                        ;*
                                        ;*      MAKE SURE HEADER VRC AND OPI ERROR SET.
                                        ;*
                                        ;;*****************************************************************
017550  000004                  TST32:  SCOPE
017552  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
017560  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
017564  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
017572  012700  002500                  MOV     #2500,R0                ;SET COUNT FOR STALL
017576  005300                  2$:     DEC     R0              ;DEC COUNT
017600  001376                          BNE     2$              ;LOOP UNTIL 0
017602  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
017610  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUFFER ADDRESS
017616  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT = 1
017624  012762  000240  000020          MOV     #240,RKDCYL(R2) ;LOAD CYLINDER
017632  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
017640  012762  000023  000000          MOV     #WRDATA,RKCS1(R2) ;ISSUE WRITE DATA
017646  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLODKS UNTIL READY
                                                                ;  FOR SECTOR PULSE
017652  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
017660  012762  000040  000026          MOV     #DMD,RKMR1(R2)
017666  005300                          DEC     R0
017670  001370                          BNE     1$
017672  012705  000040                  MOV     #32.,R5         ;LOAD HEADER COUNT
017676  012703  052464                  MOV     #OPI2,R3        ;LOAD ADDRESS OF HEADERS
017702  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
017710  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
017716  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG
017722  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1 ;LOAD EXPECTED MR1
017730  005037  003310                  CLR     HDRCNT          ;INITIALIZE HEADER COUNT
017734  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2) ;SIMULATE SECTOR PULSE
017742  012762  000040  000026          MOV     #DMD,RKMR1(R2)
017750  022737  000037  003310          CMP     #31.,HDRCNT     ;CHECK IF ALL HEADERS DONE
017756  001460                          BEQ     26$             ;YES - SKIP TO ERROR TEST
017760  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
017764  005037  003256                  CLR     M1.BIT
017770  012700  000377                  MOV     #255.,R0
017774  004737  035422          10$:    JSR     PC,RDBIT
020000  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
020002  001374                          BNE     10$
020004  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
020012  004737  035422                  JSR     PC,RDBIT
```

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 4140  020016  012701  000003                MOV     #3,R1               ;SIMULATE OPI
 4141  020022  012304                12$:    MOV     (R3)+,R4            ;GET NEXT HEADER WORD
 4142  020024  012700  000020                MOV     #16.,R0             ;LOAD BITS PER WORD
 4143  020030  013737  003254  003256  15$:  MOV     PR.BIT,M1.BIT       ;STORE PREVIOUS BIT
 4144  020036  006004                        ROR     R4                  ;GET NEXT BIT
 4145  020040  103403                        BCS     17$
 4146  020042  005037  003254                CLR     PR.BIT
 4147  020046  000403                        BR      18$
 4148
 4149  020050  012737  000001  003254  17$:  MOV     #1,PR.BIT
 4150  020056  004737  035422          18$:  JSR     PC,RDBIT            ;SIMULATE NEXT BIT
 4151  020062  005300                        DEC     R0                  ;CHECK IF READY FOR NEXT HEADER WORD
 4152  020064  001361                        BNE     15$                 ;NO, CONTINUE
 4153  020066  005301                        DEC     R1                  ;CHECK IF FINISHED WITH HEADER
 4154  020070  001354                        BNE     12$                 ;NO,CONTINUE
 4155  020072  012700  000100                MOV     #64.,R0             ;LOAD COUNT FOR GAP
 4156  020076  013737  003254  003256  25$:  MOV     PR.BIT,M1.BIT       ;SIMULATE GAP
 4157  020104  005037  003254                CLR     PR.BIT
 4158  020110  004737  035422                JSR     PC,RDBIT
 4159  020114  005300                        DEC     R0                  ;CHECK IF GAP IS FINISHED
 4160  020116  001367                        BNE     25$                 ;NO, CONTINUE
 4161  020120  016237  000000  003140  26$:  MOV     RKCS1(R2),T.CS1     ;GET CS1
 4162  020126  016237  000010  003150        MOV     RKCS2(R2),T.CS2     ;GET CS2
 4163  020134  016237  000014  003154        MOV     RKER(R2),T.ER       ;GET ERROR REG.
 4164  020142  023737  003200  003140        CMP     E.CS1,T.CS1         ;CHECK CS1 CORRECT
 4165  020150  001401                        BEQ     30$                 ;YES, CONTINUE
 4166  020152  104100                        ERROR   100                 ;CS1 INCORRECT
 4167  020154  023737  003210  003150  30$:  CMP     E.CS2,T.CS2         ;CHECK CS2 CORRECT
 4168  020162  001401                        BEQ     31$                 ;YES, CONTINUE
 4169  020164  104101                        ERROR   101                 ;CS2 INCORRECT
 4170  020166  023737  003214  003154  31$:  CMP     E.ER,T.ER           ;CHECK ERROR REG CORRECT
 4171  020174  001401                        BEQ     32$                 ;YES, CONTINUE
 4172  020176  104102                        ERROR   102                 ;ERROR REG INCORRECT
 4173  020200  016237  000026  003164  32$:  MOV     RKMR1(R2),T.MR1     ;GET MR1
 4174  020206  023737  003224  003164        CMP     E.MR1,T.MR1         ;CHECK TO MAKE SURE WRITE GATE DID NOT SET
 4175  020214  001401                        BEQ     34$                 ;YES, CONTINUE
 4176  020216  104103                        ERROR   103                 ;MR1 INCORRECT
 4177  020220  005237  003310          34$:  INC     HDRCNT              ;INCREMENT HEADER COUNT
 4178  020224  022737  000037  003310        CMP     #31.,HDRCNT         ;CHECK IF LAST HEADER
 4179  020232  001011                        BNE     35$                 ;NO, CHECK IF FINSHED
 4180  020234  012737  020400  003214        MOV     #OPI!HVRC,E.ER      ;LOAD ERROR BIT
 4181  020242  042737  000001  003200        BIC     #GO,E.CS1           ;ADJUST E.CS1 FOR END OF OP CONTENTS
 4182  020250  052737  100200  003200        BIS     #RDY!CERR,E.CS1
 4183  020256  005305                35$:    DEC     R5                  ;CHECK IF FINISHED
 4184  020260  001402                        BEQ     37$                 ;YES - SKIP
 4185  020262  000137  017734                JMP     5$                  ;DO NEXT SECTOR
 4186  020266  012762  100000  000000  37$:  MOV     #CCLR,RKCS1(R2)     ;CLEAR CONTROLLER
 4187  020274  016237  000000  003140        MOV     RKCS1(R2),T.CS1     ;GET CS1
 4188  020302  016237  000010  003150        MOV     RKCS2(R2),T.CS2     ;     CS2
 4189  020310  016237  000014  003154        MOV     RKER(R2),T.ER       ;     ER
 4190  020316  012737  000200  003200        MOV     #RDY,E.CS1          ;SET EXPECTED CS1
 4191  020324  023737  003140  003200        CMP     T.CS1,E.CS1         ;CHECK IF CORRECT
 4192  020332  001401                        BEQ     TST33               ;;GO TO NEXT TEST
 4193  020334  104153                        ERROR   153
 4194
 4195                          ;;*****************************************************************
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                                ;*TEST 33       OPI AND PREVIOUS HEADER VRC (PART 1)
                                ;*
                                ;*      CLEAR THE RK611 CONTROLLER WITH A  CONTROLLER CLEAR.
                                ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                                ;*      DATA OF ONE WORD TO AN RK06 IN 26 SECTOR FORMAT,
                                ;*      CYLINDER 300, HEAD 0, SECTOR 1.  CLOCK THROUGH
                                ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A
                                ;*      SECTOR PULSE AND 30 HEADERS CONSISTING OF THE
                                ;*      FOLLOWING 3 WORDS:
                                ;*
                                ;*              000300
                                ;*              140000
                                ;*              140300
                                ;*
                                ;*      THEN SIMULATE A 3 WORD HEADER CONSISTING ON
                                ;*      THE FOLLOWING DATA:
                                ;*
                                ;*              000300
                                ;*              140000
                                ;*              140200
                                ;*
                                ;*      MAKE SURE NO ERROR IS REPORTED AND WRITE GATE
                                ;*      DOES NOT SET.  SIMULATE A SECTOR PULSE AND A
                                ;*      HEADER CONSISTING OF THE FOLLOWING THREE WORDS:
                                ;*
                                ;*              000300
                                ;*              140000
                                ;*              140300
                                ;*
                                ;*      MAKE SURE HEADER VRC AND OPI ERRORS SET.
                                ;*
                                ;;*****************************************************************
020336  000004                  TST33:  SCOPE
020340  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
020346  013702  001270          MCV     $BASE,R2        ;LOAD RK611 BASE
020352  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
020360  012700  002500                  MOV     #2500,R0                ;SET COUNT FOR STALL
020364  005300                  2$:     DEC     R0              ;DEC COUNT
020366  001376                          BNE     2$              ;LOOP UNTIL 0
020370  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
020376  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUFFER ADDRESS
020404  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT = 1
020412  012762  000300  000020          MOV     #300,RKDCYL(R2) ;LOAD CYLINDER
020420  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
020426  012762  000023  000000          MOV     #WRDATA,RKCS1(R2) ;ISSUE WRITE DATA
020434  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLODKS UNTIL READY
                                                                ;  FOR SECTOR PULSE
020440  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
020446  012762  000040  000026          MOV     #DMD,RKMR1(R2)
020454  005300                          DEC     R0
020456  001370                          BNE     1$
020460  012705  000040                  MOV     #32.,R5         ;LOAD HEADER COUNT
020464  012703  052764                  MOV     #OPI3,R3        ;LOAD ADDRESS OF HEADERS
020470  012737  000023  003200          MOV     #WRDATA,E.CS1   ;LOAD EXPECTED CS1
020476  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
020504  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG
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4252  020510  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1 ;LOAD EXPECTED MR1
4253  020516  005037  003310                  CLR     HDRCNT              ;INITIALIZE HEADER COUNT
4254  020522  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2) ;SIMULATE SECTOR PULSE
4255  020530  012762  000040  000026          MOV     #DMD,RKMR1(R2)
4256  020536  022737  000037  003310          CMP     #31.,HDRCNT         ;CHECK IF ALL HEADERS DONE
4257  020544  001460                          BEQ     26$                 ;YES - SKIP TO ERROR TEST
4258  020546  005037  003254                  CLR     PR.BIT              ;GENERATE SYNCH
4259  020552  005037  003256                  CLR     M1.BIT
4260  020556  012700  000377                  MOV     #255.,R0
4261  020562  004737  035422          10$:    JSR     PC,RDBIT
4262  020566  005300                          DEC     R0                  ;CHECK IF SYNCH FINISHED
4263  020570  001374                          BNE     10$
4264  020572  012737  000001  003254          MOV     #1,PR.BIT           ;SIMULATE SYNCH BIT
4265  020600  004737  035422                  JSR     PC,RDBIT
4266  020604  012701  000003                  MOV     #3,R1               ;SIMULATE OPI
4267  020610  012304                  12$:    MOV     (R3)+,R4            ;GET NEXT HEADER WORD
4268  020612  012700  000020                  MOV     #16.,R0             ;LOAD BITS PER WORD
4269  020616  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT       ;STORE PREVIOUS BIT
4270  020624  006004                          ROR     R4                  ;GET NEXT BIT
4271  020626  103403                          BCS     17$
4272  020630  005037  003254                  CLR     PR.BIT
4273  020634  000403                          BR      18$
4274
4275  020636  012737  000001  003254  17$:    MOV     #1,PR.BIT
4276  020644  004737  035422          18$:    JSR     PC,RDBIT            ;SIMULATE NEXT BIT
4277  020650  005300                          DEC     R0                  ;CHECK IF READY FOR NEXT HEADER WORD
4278  020652  001361                          BNE     15$                 ;NO, CONTINUE
4279  020654  005301                          DEC     R1                  ;CHECK IF FINISHED WITH HEADER
4280  020656  001354                          BNE     12$                 ;NO,CONTINUE
4281  020660  012700  000100                  MOV     #64.,R0             ;LOAD COUNT FOR GAP
4282  020664  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT       ;SIMULATE GAP
4283  020672  005037  003254                  CLR     PR.BIT
4284  020676  004737  035422                  JSR     PC,RDBIT
4285  020702  005300                          DEC     R0                  ;CHECK IF GAP IS FINISHED
4286  020704  001367                          BNE     25$                 ;NO, CONTINUE
4287  020706  016237  000000  003140  26$:    MOV     RKCS1(R2),T.CS1 ;GET CS1
4288  020714  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
4289  020722  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG.
4290  020730  023737  003200  003140          CMP     E.CS1,T.CS1         ;CHECK CS1 CORRECT
4291  020736  001401                          BEQ     30$                 ;YES, CONTINUE
4292  020740  104104                          ERROR   104                 ;CS1 INCORRECT
4293  020742  023737  003210  003150  30$:    CMP     E.CS2,T.CS2         ;CHECK CS2 CORRECT
4294  020750  001401                          BEQ     31$                 ;YES, CONTINUE
4295  020752  104105                          ERROR   105                 ;CS2 INCORRECT
4296  020754  023737  003214  003154  31$:    CMP     E.ER,T.ER           ;CHECK ERROR REG CORRECT
4297  020762  001401                          BEQ     32$                 ;YES, CONTINUE
4298  020764  104106                          ERROR   106                 ;ERROR REG INCORRECT
4299  020766  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1 ;GET MR1
4300  020774  023737  003224  003164          CMP     E.MR1,T.MR1         ;CHECK TO MAKE SURE WRITE GATE DID NOT SET
4301  021002  001401                          BEQ     34$                 ;YES, CONTINUE
4302  021004  104107                          ERROR   107                 ;MR1 INCORRECT
 303  021006  005237  003310          34$:    INC     HDRCNT              ;INCREMENT HEADER COUNT
4304  021012  022737  000037  003310          CMP     #31.,HDRCNT         ;CHECK IF LAST HEADER
4305  021020  001011                          BNE     35$                 ;NO, CHECK IF FINSHED
4306  021022  012737  020400  003214          MOV     #OPI!HVRC,E.ER  ;LOAD ERROR BIT
4307  021030  042737  000001  003200          BIC     #GO,E.CS1           ;ADJUST E.CS1 FOR END OF OP CONTENTS
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```
4308  021036  052737  100200  003200          BIS     #RDY!CERR,E.CS1
4309  021044  005305                  35$:     DEC     R5              ;CHECK IF FINISHED
4310  021046  001402                          BEQ     37$             ;YES - SKIP
4311  021050  000137  020522                  JMP     5$              ;DO NEXT SECTOR
4312  021054  012762  100000  000000  37$:     MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
4313  021062  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
4314  021070  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;    CS2
4315  021076  016237  000014  003154          MOV     RKER(R2),T.ER   ;    ER
4316  021104  012737  000200  003200          MOV     #RDY,E.CS1      ;SET EXPECTED CS1
4317  021112  023737  003140  003200          CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
4318  021120  001401                          BEQ     TST34           ;;GO TO NEXT TEST
4319  021122  104153                          ERROR   153
4320
4321                                  ;;*****************************************************************
4322                                  ;*TEST 34       OPI AND PREVIOUS HEADER VRC (PART 2)
4323                                  ;*
4324                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
4325                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
4326                                  ;*      DATA OF ONE WORD TO AN RK06 IN 26 SECTOR FORMAT,
4327                                  ;*      CYLINDER 40, HEAD 0, SECTOR 1.  CLOCK THROUGH
4328                                  ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR
4329                                  ;*      PULSE AND A HEADER CONSISTING OF THE FOLLOWING
4330                                  ;*      THREE WORDS HAVING A BAD HEADER VRC:
4331                                  ;*
4332                                  ;*              000040
4333                                  ;*              140000
4334                                  ;*              140000
4335                                  ;*
4336                                  ;*      MAKE SURE NO ERROR IS  REPORTED AND WRITE GATE
4337                                  ;*      DOES NOT SET.   SIMULATE A SECTOR PULSE AND 31
4338                                  ;*      HEADERS CONSISTING OF THE FOLLOWING THREE WORDS:
4339                                  ;*
4340                                  ;*              000040
4341                                  ;*              140000
4342                                  ;*              140040
4343                                  ;*
4344                                  ;*      MAKE SURE HEADER VRC AND OPI ERRORS SET.
4345                                  ;*
4346                                  ;;*****************************************************************
4347  021124  000004                  TST34:  SCOPE
4348  021126  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4349  021134  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
4350  021140  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
4351  021146  012700  002500                  MOV     #2500,R0                ;SET COUNT FOR STALL
4352  021152  005300                  2$:     DEC     R0              ;DEC COUNT
4353  021154  001376                          BNE     2$              ;LOOP UNTIL 0
4354  021156  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
4355  021164  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUFFER ADDRESS
4356  021172  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT = 1
4357  021200  012762  000040  000020          MOV     #40,RKDCYL(R2) ;LOAD CYLINDER
4358  021206  012762  000001  000006          MOV     #1,RKDA(R2)     ;LOAD TRACK AND SECTOR
4359  021214  012762  000023  000000          MOV     #WRDATA,RKCS1(R2) ;ISSUE WRITE DATA
4360  021222  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLODKS UNTIL READY
4361                                                                  ;  FOR SECTOR PULSE
4362  021226  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
4363  021234  012762  000040  000026          MOV     #DMD,RKMR1(R2)
```

```
4364  021242  005300                          DEC     R0
4365  021244  001370                          BNE     1$
4366  021246  012705  000040                  MOV     #32.,R5         ;LOAD HEADER COUNT
4367  021252  012703  053264                  MOV     #OPI4,R3        ;LOAD ADDRESS OF HEADERS
4368  021256  012737  000023  003200          MOV     #RDATA,E.CS1    ;LOAD EXPECTED CS1
4369  021264  012737  000300  003210          MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
4370  021272  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG
4371  021276  012737  022040  003224          MOV     #DMD!MEWD!ECCW,E.MR1 ;LOAD EXPECTED MR1
4372  021304  005037  003310                  CLR     HDRCNT          ;INITIALIZE HEADER COUNT
4373  021310  012762  000140  000026  5$:     MOV     #DMD!MSP,RKMR1(R2) ;SIMULATE SECTOR PULSE
4374  021316  012762  000040  000026          MOV     #DMD,RKMR1(R2)
4375  021324  022737  000037  003310          CMP     #31.,HDRCNT     ;CHECK IF ALL HEADERS DONE
4376  021332  001460                          BEQ     26$             ;YES - SKIP TO ERROR TEST
4377  021334  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
4378  021340  005037  003256                  CLR     M1.BIT
4379  021344  012700  000377                  MOV     #255.,R0
4380  021350  004737  035422          10$:    JSR     PC,RDBIT
4381  021354  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
4382  021356  001374                          BNE     10$
4383  021360  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
4384  021366  004737  035422                  JSR     PC,RDBIT
4385  021372  012701  000003                  MOV     #3,R1           ;SIMULATE OPI
4386  021376  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
4387  021400  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
4388  021404  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
4389  021412  006004                          ROR     R4              ;GET NEXT BIT
4390  021414  103403                          BCS     17$
4391  021416  005037  003254                  CLR     PR.BIT
4392  021422  000403                          BR      18$
4393
4394  021424  012737  000001  003254  17$:    MOV     #1,PR.BIT
4395  021432  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
4396  021436  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
4397  021440  001361                          BNE     15$             ;NO, CONTINUE
4398  021442  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
4399  021444  001354                          BNE     12$             ;NO,CONTINUE
4400  021446  012700  000100                  MOV     #64.,R0         ;LOAD COUNT FOR GAP
4401  021452  013737  003254  003256  25$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
4402  021460  005037  003254                  CLR     PR.BIT
4403  021464  004737  035422                  JSR     PC,RDBIT
4404  021470  005300                          DEC     R0              ;CHECK IF GAP IS FINISHED
4405  021472  001367                          BNE     25$             ;NO, CONTINUE
4406  021474  016237  000000  003140  26$:    MOV     RKCS1(R2),T.CS1 ;GET CS1
4407  021502  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;GET CS2
4408  021510  016237  000014  003154          MOV     RKER(R2),T.ER   ;GET ERROR REG.
4409  021516  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
4410  021524  001401                          BEQ     30$             ;YES, CONTINUE
4411  021526  104110                          ERROR   110             ;CS1 INCORRECT
4412  021530  023737  003210  003150  30$:    CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
4413  021536  001401                          BEQ     31$             ;YES, CONTINUE
4414  021540  104111                          ERROR   111             ;CS2 INCORRECT
4415  021542  023737  003214  003154  31$:    CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
4416  021550  001401                          BEQ     32$             ;YES, CONTINUE
4417  021552  104112                          ERROR   112             ;ERROR REG INCORRECT
4418  021554  016237  000026  003164  32$:    MOV     RKMR1(R2),T.MR1 ;GET MR1
4419  021562  023737  003224  003164          CMP     E.MR1,T.MR1     ;CHECK TO MAKE SURE WRITE GATE DID NOT SET
```

```
4420  021570  001401                        BEQ     34$             ;YES, CONTINUE
4421  021572  104113                        ERROR   113             ;MR1 INCORRECT
4422  021574  005237  003310          34$:  INC     HDRCNT          ;INCREMENT HEADER COUNT
4423  021600  022737  000037  003310        CMP     #31.,HDRCNT     ;CHECK IF LAST HEADER
4424  021606  001011                        BNE     35$             ;NO, CHECK IF FINSHED
4425  021610  012737  020400  003214        MOV     #OPI!HVRC,E.ER  ;LOAD ERROR BIT
4426  021616  042737  000001  003200        BIC     #GO,E.CS1       ;ADJUST E.CS1 FOR END OF OP CONTENTS
4427  021624  052737  100200  003200        BIS     #RDY!CERR,E.CS1
4428  021632  005305                  35$:  DEC     R5              ;CHECK IF FINISHED
4429  021634  001402                        BEQ     37$             ;YES - SKIP
4430  021636  000137  021310                JMP     5$              ;DO NEXT SECTOR
4431  021642  012762  100000  000000  37$:  MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
4432  021650  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
4433  021656  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;    CS2
4434  021664  016237  000014  003154        MOV     RKER(R2),T.ER   ;    ER
4435  021672  012737  000200  003200        MOV     #RDY,E.CS1      ;SET EXPECTED CS1
4436  021700  023737  003140  003200        CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
4437  021706  001401                        BEQ     TST35           ;;GO TO NEXT TEST
4438  021710  104153                        ERROR   153
4439
4440
4441                                  ;;*****************************************************************
4442                                  ;*TEST 35       BSE AND CONTROLLER ERROR
4443                                  ;*
4444                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
4445                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
4446                                  ;*      OF 1 WORD TO AN RK06 IN 26 SECTOR FORMAT,
4447                                  ;*      CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
4448                                  ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
4449                                  ;*      AND A HEADER WITH A BSE ERROR.  MAKE SURE CONTROLLER
4450                                  ;*      ERROR AND HVRC SET. CLEAR CONTROLLER AND MAKE SURE
4451                                  ;*      CONTROLLER ERROR RESETS.
4452                                  ;*
4453                                  ;;*****************************************************************
4454  021712  000004                  TST35:  SCOPE
4455  021714  012737  000010  001200          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
4456  021722  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
4457  021726  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
4458  021734  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
4459  021742  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUF ADDRESS
4460  021750  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
4461  021756  012762  000000  000020          MOV     #0,RKDCYL(R2)  ;LOAD CYLINDER 11DMS
4462  021764  012762  000000  000006          MOV     #0,RKDA(R2)     ;LOAD TRACK AND SECTOR
4463  021772  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)       ;ISSUE COMMAND
4464  022000  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL
4465                                                                  ;  READY FOR SECTOR PULSE.
4466  022004  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
4467  022012  012762  000040  000026          MOV     #DMD,RKMR1(R2)
4468  022020  005300                          DEC     R0
4469  022022  001370                          BNE     1$
4470  022024  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
4471  022032  012762  000040  000026          MOV     #DMD,RKMR1(R2)
4472  022040  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
4473  022044  005037  003256                  CLR     M1.BIT
4474  022050  012700  000377                  MOV     #255.,R0
4475  022054  004737  035422          5$:     JSR     PC,RDBIT
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 4476  022060  005300                        DEC     R0              ;CHECK IF SYNCH FINISHED
 4477  022062  001374                        BNE     5$
 4478  022064  012737  000001  003254        MOV     #1,PR.BIT       ;SIMULATE SYNCH
 4479  022072  004737  035422                JSR     PC,RDBIT
 4480  022076  012703  051762                MOV     #HEAD2,R3       ;LOAD HEADER
 4481  022102  012701  000003                MOV     #3,R1           ;LOAD WORDS PER HEADER
 4482  022106  012304              10$:      MOV     (R3)+,R4        ;GET NEXT WORD
 4483  022110  012700  000020                MOV     #16.,R0         ;LOAD BITS PER WORD
 4484  022114  013737  003254  003256  12$:  MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
 4485  022122  006004                        ROR     R4              ;GET NEXT BIT
 4486  022124  103403                        BCS     15$
 4487  022126  005037  003254                CLR     PR.BIT
 4488  022132  000403                        BR      16$
 4489
 4490  022134  012737  000001  003254  15$:  MOV     #1,PR.BIT
 4491  022142  004737  035422          16$:  JSR     PC,RDBIT        ;SIMULATE NEXT BIT
 4492  022146  005300                        DEC     R0              ;CHECK IF READY FOR NEXT WORD
 4493  022150  001361                        BNE     12$             ;NO, CONTINUE
 4494  022152  005301                        DEC     R1              ;CHECK IF FINISHED WITH HEADER
 4495  022154  001354                        BNE     10$             ;NO, CONTINUE
 4496  022156  012700  000101                MOV     #65.,R0
 4497  022162  013737  003254  003256  20$:  MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 4498  022170  005037  003254                CLR     PR.BIT
 4499  022174  004737  035422                JSR     PC,RDBIT
 4500  022200  005300                        DEC     R0              ;CHECK IF GAP FINISHED
 4501  022202  001367                        BNE     20$             ;NO, CONTINUE
 4502  022204  012700  021200                MOV     #2*<256.*<16.*256.>+64.>,R0  ;LOAD COUNT UNTIL POSTAMBLE
 4503  022210  012762  000440  000026  25$:  MOV     #DMD!MCLK,RKMR1(R2)
 4504  022216  012762  000040  000026        MOV     #DMD,RKMR1(R2)
 4505  022224  005300                        DEC     R0
 4506  022226  001370                        BNE     25$
 4507  022230  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
 4508  022236  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;GET CS2
 4509  022244  016237  000014  003154        MOV     RKER(R2),T.ER   ;GET ERROR REG
 4510  022252  012737  100222  003200        MOV     #CERR!RDY!WRDATA&<^C<GO>>,E.CS1  ;LOAD EXPECTED CS1
 4511  022260  012737  000300  003210        MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
 4512  022266  012737  000200  003214        MOV     #BSE,E.ER       ;LOAD EXPECTED ERROR REG
 4513  022274  023737  003200  003140        CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
 4514  022302  001401                        BEQ     30$             ;YES, CONTINUE
 4515  022304  104136                        ERROR   136             ;CS1 INCORRECT
 4516  022306  023737  003210  003150  30$:  CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
 4517  022314  001401                        BEQ     32$             ;YES, CONTINUE
 4518  022316  104137                        ERROR   137             ;CS2 INCORRECT
 4519  022320  023737  003214  003154  32$:  CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
 4520  022326  001401                        BEQ     35$             ;YES - SKIP
 4521  022330  104140                        ERROR   140             ;ERROR REG INCORRECT
 4522  022332  012762  100000  000000  35$:  MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
 4523  022340  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
 4524  022346  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;    CS2
 4525  022354  016237  000014  003154        MOV     RKER(R2),T.ER   ;    ER
 4526  022362  012737  000200  003200        MOV     #200,E.CS1      ;SET EXPECTED CS1
 4527  022370  023737  003140  003200        CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
 4528  022376  001401                        BEQ     TST36           ;;GO TO NEXT TEST
 4529  022400  104153                        ERROR   153             ;ERROR DID NOT CLEAR
 4530
 4531                          ;;*************************************************************
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                        ;*TEST 36       HVRC AND CONTROLLER ERROR
                        ;*
                        ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
                        ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
                        ;*      OF 1 WORD TO AN RK06 IN 26 SECTOR FORMAT,
                        ;*      CYLINDER 300, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
                        ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
                        ;*      AND A HEADER WITH A HVRC ERROR.  MAKE SURE CONTROLLER
                        ;*      ERROR AND HVRC SET. CLEAR CONTROLLER AND MAKE SURE
                        ;*      CONTROLLER ERROR RESETS.
                        ;*
                        ;;*****************************************************************
022402  000004         TST36:  SCOPE
022404  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
022412  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
022416  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
022424  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
022432  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
022440  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
022446  012762  000300  000020          MOV     #300,RKDCYL(R2)  ;LOAD CYLINDER 11DMS
022454  012762  000000  000006          MOV     #0,RKDA(R2)     ;LOAD TRACK AND SECTOR
022462  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)       ;ISSUE COMMAND
022470  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL
                                                                ;  READY FOR SECTOR PULSE.
022474  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
022502  012762  000040  000026          MOV     #DMD,RKMR1(R2)
022510  005300                          DEC     R0
022512  001370                          BNE     1$
022514  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
022522  012762  000040  000026          MOV     #DMD,RKMR1(R2)
022530  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
022534  005037  003256                  CLR     M1.BIT
022540  012700  000377                  MOV     #255.,R0
022544  004737  035422          5$:     JSR     PC,RDBIT
022550  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
022552  001374                          BNE     5$
022554  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH
022562  004737  035422                  JSR     PC,RDBIT
022566  012703  052064                  MOV     #HEAD10,R3      ;LOAD HEADER
022572  012701  000003                  MOV     #3,R1           ;LOAD WORDS PER HEADER
022576  012304                  10$:    MOV     (R3)+,R4        ;GET NEXT WORD
022600  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
022604  013737  003254  003256  12$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
022612  006004                          ROR     R4              ;GET NEXT BIT
022614  103403                          BCS     15$
022616  005037  003254                  CLR     PR.BIT
022622  000403                          BR      16$

022624  012737  000001  003254  15$:    MOV     #1,PR.BIT
022632  004737  035422          16$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
022636  005300                          DEC     R0              ;CHECK IF READY FOR NEXT WORD
022640  001361                          BNE     12$             ;NO, CONTINUE
022642  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
022644  001354                          BNE     10$             ;NO, CONTINUE
022646  012700  000101                  MOV     #65.,R0
022652  013737  003254  003256  20$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
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4588  022660  005037  003254                    CLR     PR.BIT
4589  022664  004737  035422                    JSR     PC,RDBIT
4590  022670  005300                            DEC     R0              ;CHECK IF GAP FINISHED
4591  022672  001367                            BNE     20$             ;NO, CONTINUE
4592  022674  012700  021200                    MOV     #2*<256.*<16.*256.>*64.>,R0  ;LOAD COUNT UNTIL POSTAMBLE
4593  022700  012762  000440  000026  25$:     MOV     #DMD!MCLK,RKMR1(R2)
4594  022706  012762  000040  000026            MOV     #DMD,RKMR1(R2)
4595  022714  005300                            DEC     R0
4596  022716  001370                            BNE     25$
4597  022720  016237  000000  003140            MOV     RKCS1(R2),T.CS1 ;GET CS1
4598  022726  016237  000010  003150            MOV     RKCS2(R2),T.CS2 ;GET CS2
4599  022734  016237  000014  003154            MOV     RKER(R2),T.ER   ;GET ERROR REG
4600  022742  012737  100222  003200            MOV     #CERR!RDY!WRDATA&<^C<GO>>,E.CS1  ;LOAD EXPECTED CS1
4601  022750  012737  000300  003210            MOV     #IR!OR,E.CS2    ;LOAD EXPECTED CS2
4602  022756  012737  000400  003214            MOV     #HVRC,E.ER      ;LOAD EXPECTED ERROR REG
4603  022764  023737  003200  003140            CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
4604  022772  001401                            BEQ     30$             ;YES, CONTINUE
4605  022774  104141                            ERROR   141             ;CS1 INCORRECT
4606  022776  023737  003210  003150  30$:     CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
4607  023004  001401                            BEQ     32$             ;YES, CONTINUE
4608  023006  104142                            ERROR   142             ;CS2 INCORRECT
4609  023010  023737  003214  003154  32$:     CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
4610  023016  001401                            BEQ     35$             ;YES - SKIP
4611  023020  104143                            ERROR   143             ;ERROR REG INCORRECT
4612  023022  012762  100000  000000  35$:     MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
4613  023030  016237  000000  003140            MOV     RKCS1(R2),T.CS1 ;GET CS1
4614  023036  016237  000010  003150            MOV     RKCS2(R2),T.CS2 ;    CS2
4615  023044  016237  000014  003154            MOV     RKER(R2),T.ER   ;    ER
4616  023052  012737  000200  003200            MOV     #200,E.CS1      ;SET EXPECTED CS1
4617  023060  023737  003140  003200            CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
4618  023066  001401                            BEQ     TST37           ;;GO TO NEXT TEST
4619  023070  104153                            ERROR   153             ;ERROR DID NOT CLEAR
4620
4621                                    ;;*****************************************************************
4622                                    ;*TEST 37       READ DATA AND HVRC ERROR
4623                                    ;*
4624                                    ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
4625                                    ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A READ DATA
4626                                    ;*      OF 1 WORD TO AN RK06 IN 26 SECTOR FORMAT,
4627                                    ;*      CYLINDER 300, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
4628                                    ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
4629                                    ;*      AND A HEADER WITH A HVRC ERROR.  MAKE SURE CONTROLLER
4630                                    ;*      ERROR AND HVRC SET. CLEAR CONTROLLER AND MAKE SURE
4631                                    ;*      CONTROLLER ERROR RESETS.
4632                                    ;*
4633                                    ;*****************************************************************
4634  023072  000004                    TST37:  SCOPE
4635  023074  012737  000012  001200            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4636  023102  013702  001270                    MOV     $BASE,R2        ;LOAD RK611 BASE
4637  023106  012762  100000  000000            MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
4638  023114  012762  000040  000026            MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
4639  023122  012762  053606  000004            MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
4640  023130  012762  177777  000002            MOV     #-1,RKWC(R2)    ;WORD COUNT=1
4641  023136  012762  000300  000020            MOV     #300,RKDCYL(R2)  ;LOAD CYLINDER 11DMS
4642  023144  012762  000000  000006            MOV     #0,RKDA(R2)     ;LOAD TRACK AND SECTOR
4643  023152  012762  000021  000000            MOV     #RDDATA,RKCS1(R2)       ;ISSUE COMMAND
```

```
4644  023160  012700  000426                MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL
4645                                                                  ;  READY FOR SECTOR PULSE.
4646  023164  012762  000440  000026  1$:   MOV     #DMD!MCLK,RKMR1(R2)
4647  023172  012762  000040  000026        MOV     #DMD,RKMR1(R2)
4648  023200  005300                        DEC     R0
4649  023202  001370                        BNE     1$
4650  023204  012762  000140  000026        MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
4651  023212  012762  000040  000026        MOV     #DMD,RKMR1(R2)
4652  023220  005037  003254                CLR     PR.BIT          ;GENERATE SYNCH
4653  023224  005037  003256                CLR     M1.BIT
4654  023230  012700  000377                MOV     #255.,R0
4655  023234  004737  035422          5$:   JSR     PC,RDBIT
4656  023240  005300                        DEC     R0              ;CHECK IF SYNCH FINISHED
4657  023242  001374                        BNE     5$
4658  023244  012737  000001  003254        MOV     #1,PR.BIT       ;SIMULATE SYNCH
4659  023252  004737  035422                JSR     PC,RDBIT
4660  023256  012703  052064                MOV     #HEAD10,R3      ;LOAD HEADER
4661  023262  012701  000003                MOV     #3,R1           ;LOAD WORDS PER HEADER
4662  023266  012304                  10$:   MOV     (R3)+,R4        ;GET NEXT WORD
4663  023270  012700  000020                MOV     #16.,R0         ;LOAD BITS PER WORD
4664  023274  013737  003254  003256  12$:   MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
4665  023302  006004                        ROR     R4              ;GET NEXT BIT
4666  023304  103403                        BCS     15$
4667  023306  005037  003254                CLR     PR.BIT
4668  023312  000403                        BR      16$
4669
4670  023314  012737  000001  003254  15$:   MOV     #1,PR.BIT
4671  023322  004737  035422          16$:   JSR     PC,RDBIT        ,SIMULATE NEXT BIT
4672  023326  005300                        DEC     R0              ;CHECK IF READY FOR NEXT WORD
4673  023330  001361                        BNE     12$             ;NO, CONTINUE
4674  023332  005301                        DEC     R1              ;CHECK IF FINISHED WITH HEADER
4675  023334  001354                        BNE     10$             ;NO, CONTINUE
4676  023336  012700  000101                MOV     #65.,R0
4677  023342  013737  003254  003256  20$:   MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
4678  023350  005037  0C3254                CLR     PR.BIT
4679  023354  004737  035422                JSR     PC,RDBIT
4680  023360  005300                        DEC     R0              ;CHECK IF GAP FINISHED
4681  023362  001367                        BNE     20$             ;NO, CONTINUE
4682  023364  012700  021200                MOV     #2*<256.+<16.*256.>+64.>,R0  ;LOAD COUNT UNTIL POSTAMBLE
4683  023370  012762  000440  000026  25$:   MOV     #DMD!MCLK,RKMR1(R2)
4684  023376  012762  000040  000026        MOV     #DMD,RKMR1(R2)
4685  023404  005300                        DEC     R0
4686  023406  001370                        BNE     25$
4687  023410  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
4688  023416  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;GET CS2
4689  023424  016237  000014  003154        MOV     RKER(R2),T.ER   ;GET ERROR REG
4690  023432  012737  100220  003200        MOV     #CERR!RDY!RDDATA&<^C<GO>>,E.CS1  ;LOAD EXPECTED CS1
4691  023440  012737  000100  003210        MOV     #IR,E.CS2       ;LOAD EXPECTED CS2
4692  023446  012737  000400  003214        MOV     #HVRC,E.ER      ;LOAD EXPECTED ERROR REG
4693  023454  023737  003200  003140        CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
4694  023462  001401                        BEQ     30$             ;YES, CONTINUE
4695  023464  104141                        ERROR   141             ;CS1 INCORRECT
4696  023466  023737  003210  003150  30$:   CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
4697  023474  001401                        BEQ     32$             ;YES, CONTINUE
4698  023476  104142                        ERROR   142             ;CS2 INCORRECT
4699  023500  023737  003214  003154  32$:   CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
```

```
 4700  023506  001401                          BEQ     35$             ;YES - SKIP
 4701  023510  104143                          ERROR   143             ;ERROR REG INCORRECT
 4702  023512  012762  100000  000000  35$:    MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
 4703  023520  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;GET CS1
 4704  023526  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;    CS2
 4705  023534  016237  000014  003154          MOV     RKER(R2),T.ER   ;    ER
 4706  023542  012737  000200  003200          MOV     #200,E.CS1      ;SET EXPECTED CS1
 4707  023550  023737  003140  003200          CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
 4708  023556  001401                          BEQ     TST40           ;;GO TO NEXT TEST
 4709  023560  104153                          ERROR   153             ;ERROR DID NOT CLEAR
 4710
 4711                                  ;;*****************************************************************
 4712                                  ;*TEST 40       WRITE CHECK AND HVRC
 4713                                  ;*
 4714                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
 4715                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
 4716                                  ;*      CHECK OF 400 WORDS TO AN RK06 IN 26 SECTOR FORMAT,
 4717                                  ;*      CYLINDER 300, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
 4718                                  ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE AND
 4719                                  ;*      A HEADER WITH A HEADER VRC ERROR.  MAKE SURE
 4720                                  ;*      HVRC AND CONTROLLER ERROR ARE SET. CLEAR CONTROLLER
 4721                                  ;*      AND MAKE SURE CONTROLLER ERROR RESETS.
 4722                                  ;*
 4723                                  ;*****************************************************************
 4724  023562  000004                  TST40:  SCOPE
 4725  023564  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
 4726  023572  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
 4727  023576  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
 4728  023604  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
 4729  023612  012762  053606  000004          MOV     #BUFF,RKBA(R2)  ;LOAD DUMMY BUS ADDRESS
 4730  023620  012762  177777  000002          MOV     #-1,RKWC(R2)    ;WORD COUNT=1
 4731  023626  012762  000300  000020          MOV     #300,RKDCYL(R2)  ;LOAD CYLINDER 11DMS
 4732  023634  012762  000000  000006          MOV     #0,RKDA(R2)     ;LOAD TRACK AND SECTOR
 4733  023642  012762  000031  000000          MOV     #WRTCHK,RKCS1(R2)       ;ISSUE COMMAND
 4734  023650  012700  000426                  MOV     #69.*4+2,R0     ;ISSUE ENOUGH CLOCKS UNTIL
 4735                                                                  ;  READY FOR SECTOR PULSE.
 4736  023654  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
 4737  023662  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 4738  023670  005300                          DEC     R0
 4739  023672  001370                          BNE     1$
 4740  023674  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
 4741  023702  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 4742  023710  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
 4743  023714  005037  003256                  CLR     M1.BIT
 4744  023720  012700  000377                  MOV     #255.,R0
 4745  023724  004737  035422          5$:     JSR     PC,RDBIT
 4746  023730  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
 4747  023732  001374                          BNE     5$
 4748  023734  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH
 4749  023742  004737  035422                  JSR     PC,RDBIT
 4750  023746  012703  052064                  MOV     #HEAD10,R3      ;LOAD HEADER
 4751  023752  012701  000003                  MOV     #3,R1           ;LOAD WORDS PER HEADER
 4752  023756  012304                  10$:    MOV     (R3)+,R4        ;GET NEXT WORD
 4753  023760  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
 4754  023764  013737  003254  003256  12$.    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
 4755  023772  006004                          ROR     R4              ;GET NEXT BIT
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```
 4756  023774  103403                        BCS     15$
 4757  023776  005037  003254                CLR     PR.BIT
 4758  024002  000403                        BR      16$
 4759
 4760  024004  012737  000001  003254  15$:  MOV     #1,PR.BIT
 4761  024012  004737  035422          16$:  JSR     PC,RDBIT        ;SIMULATE NEXT BIT
 4762  024016  005300                        DEC     R0              ;CHECK IF READY FOR NEXT WORD
 4763  024020  001361                        BNE     12$             ;NO, CONTINUE
 4764  024022  005301                        DEC     R1              ;CHECK IF FINISHED WITH HEADER
 4765  024024  001354                        BNE     10$             ;NO, CONTINUE
 4766  024026  012700  000101                MOV     #65.,R0
 4767  024032  013737  003254  003256  20$:  MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 4768  024040  005037  003254                CLR     PR.BIT
 4769  024044  004737  035422                JSR     PC,RDBIT
 4770  024050  005300                        DEC     R0              ;CHECK IF GAP FINISHED
 4771  024052  001367                        BNE     20$             ;NO, CONTINUE
 4772  024054  012700  021200                MOV     #2**<256.*<16.*256.>+64.>,R0  ;LOAD COUNT UNTIL POSTAMBLE
 4773  024060  012762  000440  000026  25$:  MOV     #DMD!MCLK,RKMR1(R2)
 4774  024066  012762  000040  000026        MOV     #DMD,RKMR1(R2)
 4775  024074  005300                        DEC     R0
 4776  024076  001370                        BNE     25$
 4777  024100  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
 4778  024106  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;GET CS2
 4779  024114  016237  000014  003154        MOV     RKER(R2),T.ER   ;GET ERROR REG
 4780  024122  012737  100230  003200        MOV     #CERR!RDY!WRTCHK&<^C<GO>>,E.CS1  ;LOAD EXPECTED CS1
 4781  024130  012737  000100  003210        MOV     #IR,E.CS2       ;LOAD EXPECTED CS2
 4782  024136  012737  000400  003214        MOV     #HVRC,E.ER      ;LOAD EXPECTED ERROR REG
 4783  024144  023737  003200  003140        CMP     E.CS1,T.CS1     ;CHECK CS1 CORRECT
 4784  024152  001401                        BEQ     30$             ;YES, CONTINUE
 4785  024154  104141                        ERROR   141             ;CS1 INCORRECT
 4786  024156  023737  003210  003150  30$:  CMP     E.CS2,T.CS2     ;CHECK CS2 CORRECT
 4787  024164  001401                        BEQ     32$             ;YES, CONTINUE
 4788  024166  104142                        ERROR   142             ;CS2 INCORRECT
 4789  024170  023737  003214  003154  32$:  CMP     E.ER,T.ER       ;CHECK ERROR REG CORRECT
 4790  024176  001401                        BEQ     35$             ;YES - SKIP
 4791  024200  104143                        ERROR   143             ;ERROR REG INCORRECT
 4792  024202  012762  100000  000000  35$.  MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
 4793  024210  016237  000000  003140        MOV     RKCS1(R2),T.CS1 ;GET CS1
 4794  024216  016237  000010  003150        MOV     RKCS2(R2),T.CS2 ;    CS2
 4795  024224  016237  000014  003154        MOV     RKER(R2),T.ER   ;    ER
 4796  024232  012737  000200  003200        MOV     #200,E.CS1      ;SET EXPECTED CS1
 4797  024240  023737  003140  003200        CMP     T.CS1,E.CS1     ;CHECK IF CORRECT
 4798  024246  001401                        BEQ     TST41           ;;GO TO NEXT TEST
 4799  024250  104153                        ERROR   153             ;ERROR DID NOT CLEAR
 4800
 4801
 4802                          .SBTTL  **ECC GENERATION TESTS
 4803
 4804                          ;;*******************************************************************
 4805                          ;*TEST 41       ECC INITIALIZATION
 4806                          ;*
 4807                          ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
 4808                          ;*      PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
 4809                          ;*      DATA OF 10 WORDS TO AN RK06, IN 26 SECTOR
 4810                          ;*      FORMAT, CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH
 4811                          ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE
```

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                                        ;*      A SECTOR PULSE AND A GOOD HEADER.  CLOCK THROUGH ONLY FOUR
                                        ;*      DATA WORDS OF ZEROES.  MAKE SURE THE ECC PATTERN
                                        ;*      REGISTER REMAINS ZERO.
                                        ;*
                                        ;;*****************************************************************
024252  000004                  TST41:  SCOPE
024254  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
024262  013702  001270          1$:     MOV     $BASE,R2        ;LOAD RK611 BASE
024266  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
024274  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
024302  012762  052100  000004          MOV     #ECC1,RKBA(R2)  ;LOAD ADDRESS OF ECC DATA
024310  012762  177770  000002          MOV     #-10,RKWC(R2)   ;WORD COUNT =10
024316  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
024324  012700  000450                  MOV     #8.*37.,R0      ;ISSUE ENOUGH CLOCKS UNTIL
                                                                ;  READY FOR SECTOR PULSE
024330  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
024336  012762  000040  000026          MOV     #DMD,RKMR1(R2)
024344  005300                          DEC     R0
024346  001370                          BNE     1$
024350  012762  000140  000026          MOV     #DMD'MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
024356  012762  000040  000026          MOV     #DMD,RKMR1(R2)
024364  005037  003254                  CLR     PR.BIT          ;GENERATE SYNCH
024370  005037  003256                  CLR     M1.BIT
024374  012700  000377                  MOV     #255.,R0
024400  004737  035422          5$:     JSR     PC,RDBIT
024404  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
024406  001374                          BNE     5$
024410  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
024416  004737  035422                  JSR     PC,RDBIT
024422  012701  000003                  MOV     #3,R1           ;SIMULATE HEADER
024426  012703  051754                  MOV     #HEAD1,R3       ;  CYL 0, TRK 0, SECTOR 0
024432  012304                  12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
024434  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
024440  013737  003254  003256  15$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
024446  006004                          ROR     R4              ;GET NEXT BIT
024450  103403                          BCS     17$
024452  005037  003254                  CLR     PR.BIT
024456  000403                          BR      18$

024460  012737  000001  003254  17$:    MOV     #1,PR.BIT
024466  004737  035422          18$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
024472  005300                          DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
024474  001361                          BNE     15$             ;NO, CONTINUE
024476  005301                          DEC     R1              ;CHECK IF FINISHED WITH HEADER
024500  001354                          BNE     12$             ;NO, CONTINUE
024502  012700  000101                  MOV     #65.,R0         ;SIMULATE GAP +1 FOR SWITCH FROM READ TO WRITE
024506  013737  003254  003256  20$:    MOV     PR.BIT,M1.BIT
024514  005037  003254                  CLR     PR.BIT
024520  004737  035422                  JSR     PC,RDBIT
024524  005300                          DEC     R0              ;CHECK IF GAP FINISHED
024526  001367                          BNE     20$             ;NO, CONTINUE
024530  012700  000400                  MOV     #256.,R0        ;LOAD COUNT FOR SYNCH FIELD
024534  012737  047260  001310          MOV     #EM327,EMW      ;LOAD ERROR MESSAGE
024542  005037  003252                  CLR     P1.BIT          ;INITIALIZE BITS
024546  005037  003254                  CLR     PR.BIT
024552  005037  003256                  CLR     M1.BIT
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 4868  024556  005037  003260                    CLR     M2.BIT
 4869  024562  005037  003262                    CLR     BITCNT          ;INITIALIZE BIT COUNT
 4870  024566  012737  062040  003224            MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1 ;LOAD EXPECTED MR1
 4871  024574  004737  034674          25$:      JSR     PC,WRTBIT       ;WRITE BIT
 4872  024600  104002                            ERROR   2               ;DATA INCORRECT
 4873  024602  005237  003262                    INC     BITCNT          ;INCREMENT BIT COUNT
 4874  024606  005300                            DEC     R0              ;CHECK IF FINISHED
 4875  024610  001371                            BNE     25$             ;NO, CONTINUE
 4876  024612  012737  000001  003252            MOV     #1,P1.BIT       ;SIMULATE SYNCH BIT
 4877  024620  004737  034674                    JSR     PC,WRTBIT
 4878  024624  104002                            ERROR   2
 4879  024626  005037  003262                    CLR     BITCNT          ;CLEAR BIT COUNT
 4880  024632  012737  047332  001310            MOV     #EM328,EMW      ;LOAD ERROR MESSAGE
 4881  024640  005037  003234                    CLR     E.ECPT          ;CLEAR EXPECTED ECC PATTERN
 4882  024644  012703  052100                    MOV     #ECC1,R3        ;LOAD START OF DATA
 4883  024650  012701  000004                    MOV     #4,R1           ;LOAD COUNT
 4884  024654  012304                  30$:      MOV     (R3)+,R4        ;GET NEXT WORD
 4885  024656  012700  000020                    MOV     #16.,R0         ;LOAD BITS PER WORD
 4886  024662  013737  003256  003260  32$:      MOV     M1.BIT,M2.BIT   ;SHIFT BITS
 4887  024670  013737  003254  003256            MOV     PR.BIT,M1.BIT
 4888  024676  013737  003252  003254            MOV     P1.BIT,PR.BIT
 4889  024704  006004                            ROR     R4              ;GET NEXT BIT
 4890  024706  103403                            BCS     34$
 4891  024710  005037  003252                    CLR     P1.BIT
 4892  024714  000403                            BR      35$
 4893
 4894  024716  012737  000001  003252  34$:      MOV     #1,P1.BIT
 4895  024724  004737  034674          35$:      JSR     PC,WRTBIT       ;SIMULATE BIT
 4896  024730  104002                            ERROR   2
 4897  024732  016237  000032  003174            MOV     RKECPT(R2),T.ECPT  ;STORE ECC WORD
 4898  024740  023737  003234  003174            CMP     E.ECPT,T.ECPT   ;CHECK ECC PATTERN CORRECT
 4899  024746  001401                            BEQ     37$             ;YES, CONTINUE
 4900  024750  104134                            ERROR   134             ;ECC PATTERN NOT ZERO
 4901  024752  005237  003262          37$:      INC     BITCNT          ;INCREMENT BIT COUNT
 4902  024756  005300                            DEC     R0              ;CHECK IF FINISHED WITH WORD
 4903  024760  001340                            BNE     32$             ;NO, CONTINUE
 4904  024762  005301                            DEC     R1              ;CHECK IF FINISHED WITH TEST
 4905  024764  001333                            BNE     30$             ;NO, CONTINUE
 4906
 4907                                  ;;*****************************************************************
 4908                                  ;*TEST 42       ECC GENERATION (PART 1)
 4909                                  ;*
 4910                                  ;*       CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
 4911                                  ;*       PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
 4912                                  ;*       DATA OF 12 WORDS TO AN RK06, IN 26 SECTOR
 4913                                  ;*       FORMAT, CYLINER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH
 4914                                  ;*       SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR
 4915                                  ;*       PULSE AND A GOOD HEADER.  CLOCK THROUGH ONLY THE
 4916                                  ;*       FOLLOWING SIX WORDS OF DATA:
 4917                                  ;*
 4918                                  ;*               005001
 4919                                  ;*               040040
 4920                                  ;*               020004
 4921                                  ;*               000064
 4922                                  ;*               000000
 4923                                  ;*               000000
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4924                                        ;*
4925                                        ;*      CLOCK IN EACH BIT INDIVIDUALLY AND CHECK FOR PROPER ECC
4926                                        ;*      GENERATION AS SEEN THROUGH THE ECC PATTERN REGISTER.
4927                                        ;*
4928                                        ;;*****************************************************************
4929  024766  000004                        TST42:  SCOPE
4930  024770  012737  000012  001200                MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4931  024776  013702  001270                        MOV     $BASE,R2        ;LOAD RK611 BASE
4932  025002  012762  100000  000000                MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
4933  025010  012762  000040  000026                MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
4934  025016  012762  052120  000004                MOV     #ECC2,RKBA(R2)  ;LOAD ECC DATA
4935  025024  012762  177766  000002                MOV     #-12.,RKWC(R2)  ;WORD COUNT=12
4936  025032  012762  000023  000000                MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
4937  025040  012700  000562                       MOV     #10.*37.,R0     ;ISSUE ENOUGH CLOCKS UNTIL
4938                                                                        ;  READY FOR SECTOR PULSE
4939  025044  012762  000440  000026  1$:   MOV     #DMD!MCLK,RKMR1(R2)
4940  025052  012762  000040  000026                MOV     #DMD,RKMR1(R2)
4941  025060  005300                                DEC     R0
4942  025062  001370                                BNE     1$
4943  025064  012762  000140  000026                MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
4944  025072  012762  000040  000026                MOV     #DMD,RKMR1(R2)
4945  025100  005037  003254                       CLR     PR.BIT          ;GENERATE SYNCH
4946  025104  005037  003256                       CLR     M1.BIT
4947  025110  012700  000377                       MOV     #255.,R0
4948  025114  004737  035422          5$:   JSR     PC,RDBIT
4949  025120  005300                                DEC     R0              ;CHECK IF SYNCH FINISHED
4950  025122  001374                                BNE     5$
4951  025124  012737  000001  003254                MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
4952  025132  004737  035422                       JSR     PC,RDBIT
4953  025136  012701  000003                       MOV     #3,R1           ;SIMULATE HEADER
4954  025142  012703  051754                       MOV     #HEAD1,R3       ;  CYL 0, TRK 0, SECTOR 0
4955  025146  012304                    12$:   MOV     (R3)+,R4        ;GET NEXT HEADER WORD
4956  025150  012700  000020                       MOV     #16.,R0         ;LOAD BITS PER WORD
4957  025154  013737  003254  003256  15$:   MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
4958  025162  006004                                ROR     R4              ;GET NEXT BIT
4959  025164  103403                                BCS     17$
4960  025166  005037  003254                       CLR     PR.BIT
4961  025172  000403                                BR      18$
4962
4963  025174  012737  000001  003254  17$:   MOV     #1,PR.BIT
4964  025202  004737  035422          18$:   JSR     PC,RDBIT        ;SIMULATE NEXT BIT
4965  025206  005300                                DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
4966  025210  001361                                BNE     15$             ;NO, CONTINUE
4967  025212  005301                                DEC     R1              ;CHECK IF FINISHED WITH HEADER
4968  025214  001354                                BNE     12$             ;NO, CONTINUE
4969  025216  012700  000101                       MOV     #65.,R0         ;SIMULATE GAP +1 FOR SWITCH FORM READ TO WRITE
4970  025222  013737  003254  003256  20$:   MOV     PR.BIT,M1.BIT
4971  025230  005037  003254                       CLR     PR.BIT
4972  025234  004737  035422                       JSR     PC,RDBIT
4973  025240  005300                                DEC     R0              ;CHECK IF GAP FINISHED
4974  025242  001367                                BNE     20$             ;NO, CONTINUE
4975  025244  012700  000400                       MOV     #256.,R0        ;LOAD COUNT FOR SYNCH FIELD
4976  025250  012737  047260  001310                MOV     #EM327,EMW      ;LOAD ERROR
4977  025256  005037  003252                       CLR     P1.BIT          ;INITIALIZE BITS
4978  025262  005037  003254                       CLR     PR.BIT
4979  025266  005037  003256                       CLR     M1.BIT
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 4980  025272  005037  003260                    CLR     M2.BIT
 4981  025276  005037  003262                    CLR     BITCNT          ;INITIALIZE BIT COUNT
 4982  025302  012737  062040  003224            MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;SET EXPECTED MR1
 4983  025310  004737  034674          25$:      JSR     PC,WRTBIT       ;WRITE BIT
 4984  025314  104002                            ERROR   2               ;DATA INCORRECT
 4985  025316  005237  003262                    INC     BITCNT          ;INCREMENT BIT COUNT
 4986  025322  005300                            DEC     R0              ;CHECK IF FINISHED
 4987  025324  001371                            BNE     25$             ;NO, CONTINUE
 4988  025326  012737  000001  003252            MOV     #1,P1.BIT       ;SIMULATE SYNCH BIT
 4989  025334  004737  034674                    JSR     PC,WRTBIT
 4990  025340  104002                            ERROR   2
 4991  025342  005037  003262                    CLR     BITCNT          ;CLEAR BIT COUNT
 4992  025346  012737  047332  001310            MOV     #EM328,EMW      ;LOAD ERROR MESSAGE
 4993  025354  005037  003266                    CLR     ECCHI           ;INITIALIZE ECC
 4994  025360  005037  003270                    CLR     ECCLO
 4995  025364  012703  052120                    MOV     #ECC2,R3        ;LOAD START OF DATA
 4996  025370  012701  000006                    MOV     #6,R1           ;LOAD COUNT
 4997  025374  012304                  30$:      MOV     (R3)+,R4        ;GET NEXT BIT
 4998  025376  012700  000020                    MOV     #16.,R0         ;LOAD BITS PER WORD
 4999  025402  013737  003256  003260  32$:      MOV     M1.BIT,M2.BIT   ;SHIFT BITS
 5000  025410  013737  003254  003256            MOV     PR.BIT,M1.BIT
 5001  025416  013737  003252  003254            MOV     P1.BIT,PR.BIT
 5002  025424  006004                            ROR     R4              ;GET NEXT BIT
 5003  025426  103403                            BCS     34$
 5004  025430  005037  003252                    CLR     P1.BIT
 5005  025434  000403                            BR      35$
 5006
 5007  025436  012737  000001  003252  34$:      MOV     #1,P1.BIT
 5008  025444  004737  034674          35$:      JSR     PC,WRTBIT       ;SIMULATE BIT
 5009  025450  104002                            ERROR   2
 5010  025452  016237  000032  003174            MOV     RKECPT(R2),T.ECPT  ;STORE ECC WORD
 5011  025460  004737  034526                    JSR     PC,ECCGEN       ;GENERATE EXPECTED ECC PAT
 5012  025464  023737  003234  003174            CMP     E.ECPT,T.ECPT   ;CHECK ECC PATTERN CORRECT
 5013  025472  001401                            BEQ     37$             ;YES, CONTINUE
 5014  025474  104135                            ERROR   135             ;ECC PATTERN INCORRECT
 5015  025476  005237  003262          37$:      INC     BITCNT          ;INCREMENT BIT COUNT
 5016  025502  005300                            DEC     R0              ;CHECK IF FINISHED WITH WORD
 5017  025504  001336                            BNE     32$             ;NO, CONTINUE
 5018  025506  005301                            DEC     R1              ;CHECK IF FINISHED WITH TEST
 5019  025510  001331                            BNE     30$             ;NO, CONTINUE
 5020
 5021                                  ;;*****************************************************************
 5022                                  ;*TEST 43       ECC GENERATION (PART 2)
 5023                                  ;*
 5024                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
 5025                                  ;*      PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
 5026                                  ;*      DATA OF 12 WORDS TO AN RK06, IN 26 SECTOR
 5027                                  ;*      FORMAT, CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH
 5028                                  ;*      SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
 5029                                  ;*      AND A GOOD HEADER.  CLOCK THROUGH ONLY THE FOLLOWING
 5030                                  ;*      SIX WORDS OF DATA:
 5031                                  ;*
 5032                                  ;*              177777
 5033                                  ;*              177777
 5034                                  ;*              177777
 5035                                  ;*              177777
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5036                                    ;*              177777
5037                                    ;*              177777
5038                                    ;*
5039                                    ;*      CLOCK IN EACH BIT INDIVIDUALLY AND CHECK FOR PROPER ECC
5040                                    ;*      GENERATION AS SEEN THROUGH THE ECC PATTERN REGISTER.
5041                                    ;*
5042                                    ;;*****************************************************************
5043  025512  00000'                    TST43:  SCOPE
5044  025514  012737  000012  001200            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5045  025522  013702  001270            MOV     $BASE,R2        ;LOAD RK611 BASE
5046  025526  012762  100000  000000    MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
5047  025534  012762  000040  000026    MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
5048  025542  012762  052140  000004    MOV     #ECC3,RKBA(R2)  ;LOAD ECC DATA
5049  025550  012762  177766  000002    MOV     #-12,RKWC(R2)   ;WORD COUNT=12
5050  025556  012762  000023  000000    MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
5051  025564  012700  000562            MOV     #10.*37.,R0     ;ISSUE ENOUGH CLOCKS UNTIL
5052                                                            ;  READY FOR SECTOR PULSE
5053  025570  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
5054  025576  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5055  025604  005300                    DEC     R0
5056  025606  001370                    BNE     1$
5057  025610  012762  000140  000026    MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
5058  025616  012762  000040  000026    MOV     #DMD,RKMR1(R2)
5059  025624  005037  003254            CLR     PR.BIT          ;GENERATE SYNCH
5060  025630  005037  003256            CLR     M1.BIT
5061  025634  012700  000377            MOV     #255.,R0
5062  025640  004737  035422  5$:       JSR     PC,RDBIT
5063  025644  005300                    DEC     R0              ;CHECK IF SYNCH FINISHED
5064  025646  001374                    BNE     5$
5065  025650  012737  000001  003254    MOV     #1,PR.BIT       ;SIMULATE SYNCH BIT
5066  025656  004737  035422            JSR     PC,RDBIT
5067  025662  012701  000003            MOV     #3,R1           ;SIMULATE HEADER
5068  025666  012703  051754            MOV     #HEAD1,R3       ;  CYL 0, TRK 0, SECTOR 0
5069  025672  012304            12$:    MOV     (R3)+,R4        ;GET NEXT HEADER WORD
5070  025674  012700  000020            MOV     #16.,R0         ;LOAD BITS PER WORD
5071  025700  013737  003254  003256  15$:     MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
5072  025706  006004                    ROR     R4              ;GET NEXT BIT
5073  025710  103403                    BCS     17$
5074  025712  005037  003254            CLR     PR.BIT
5075  025716  000403                    BR      18$
5076
5077  025720  012737  000001  003254  17$:     MOV     #1,PR.BIT
5078  025726  004737  035422  18$:     JSR     PC,RDBIT        ;SIMULATE NEXT BIT
5079  025732  005300                    DEC     R0              ;CHECK IF READY FOR NEXT HEADER WORD
5080  025734  001361                    BNE     15$             ;NO, CONTINUE
5081  025736  005301                    DEC     R1              ;CHECK IF FINISHED WITH HEADER
5082  025740  001354                    BNE     12$             ;NO, CONTINUE
5083  025742  012700  000101            MOV     #65.,R0         ;SIMULATE GAP +1 FOR SWITCH FORM READ TO WRITE
5084  025746  013737  003254  003256  20$:     MOV     PR.BIT,M1.BIT
5085  025754  005037  003254            CLR     PR.BIT
5086  025760  004737  035422            JSR     PC,RDBIT
5087  025764  005300                    DEC     R0              ;CHECK IF GAP FINISHED
5088  025766  001367                    BNE     20$             ;NO, CONTINUE
5089  025770  012700  000400            MOV     #256.,R0        ;LOAD COUNT FOR SYNCH FIELD
5090  025774  012737  047260  001310    MOV     #EM327,EMW      ;LOAD ERROR
5091  026002  005037  003252            CLR     P1.BIT          ;INITIALIZE BITS
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5092  026006  005037  003254                      CLR     PR.BIT
5093  026012  005037  003256                      CLR     M1.BIT
5094  026016  005037  003260                      CLR     M2.BIT
5095  026022  005037  003262                      CLR     BITCNT          ;INITIALIZE BIT COUNT
5096  026026  012737  062040  003224              MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;SET EXPECTED MR1
5097  026034  004737  034674          25$:        JSR     PC,WRTBIT       ;WRITE BIT
5098  026040  104002                              ERROR   2               ;DATA INCORRECT
5099  026042  005237  003262                      INC     BITCNT          ;INCREMENT BIT COUNT
5100  026046  005300                              DEC     R0              ;CHECK IF FINISHED
5101  026050  001371                              BNE     25$             ;NO, CONTINUE
5102  026052  012737  000001  003252              MOV     #1,P1.BIT       ;SIMULATE SYNCH BIT
5103  026060  004737  034674                      JSR     PC,WRTBIT
5104  026064  104002                              ERROR   2
5105  026066  005037  003262                      CLR     BITCNT          ;CLEAR BIT COUNT
5106  026072  012737  047332  001310              MOV     #EM328,EMW      ;LOAD ERROR MESSAGE
5107  026100  005037  003266                      CLR     ECCHI           ;INITIALIZE ECC
5108  026104  005037  003270                      CLR     ECCLO
5109  026110  012703  052140                      MOV     #ECC3,R3        ;LOAD START OF DATA
5110  026114  012701  000006                      MOV     #6,R1           ;LOAD COUNT
5111  026120  012304                  30$:        MOV     (R3)+,R4        ;GET NEXT BIT
5112  026122  012700  000020                      MOV     #16.,R0         ;LOAD BITS PER WORD
5113  026126  013737  003256  003260  32$:        MOV     M1.BIT,M2.BIT   ;SHIFT BITS
5114  026134  013737  003254  003256              MOV     PR.BIT,M1.BIT
5115  026142  013737  003252  003254              MOV     P1.BIT,PR.BIT
5116  026150  006004                              ROR     R4              ;GET NEXT BIT
5117  026152  103403                              BCS     34$
5118  026154  005037  003252                      CLR     P1.BIT
5119  026160  000403                              BR      35$
5120
5121  026162  012737  000001  003252  34$:        MOV     #1,P1.BIT
5122  026170  004737  034674          35$:        JSR     PC,WRTBIT       ;SIMULATE BIT
5123  026174  104002                              ERROR   2
5124  026176  016237  000032  003174              MOV     RKECPT(R2),T.ECPT  ;STORE ECC WORD
5125  026204  004737  034526                      JSR     PC,ECCGEN       ;GENERATE EXPECTED ECC PAT
5126  026210  023737  003234  003174              CMP     E.ECPT,T.ECPT   ;CHECK ECC PATTERN CORRECT
5127  026216  001401                              BEQ     37$             ;YES, CONTINUE
5128  026220  104135                              ERROR   135             ;ECC PATTERN INCORRECT
5129  026222  005237  003262          37$:        INC     BITCNT          ;INCREMENT BIT COUNT
5130  026226  005300                              DEC     R0              ;CHECK IF FINISHED WITH WORD
5131  026230  001336                              BNE     32$             ;NO, CONTINUE
5132  026232  005301                              DEC     R1              ;CHECK IF FINISHED WITH TEST
5133  026234  001331                              BNE     30$             ;NO, CONTINUE
5134
5135                                  ;;*****************************************************************
5136                                  ;*TEST 44        ECC WRITING
5137                                  ;*
5138                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
5139                                  ;*      PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
5140                                  ;*      DATA OF 400 WORDS.  TO AN RK06 IN 26 SECTOR FORMAT,
5141                                  ;*      CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
5142                                  ;*      AND DRIVE CLEAR MESSAGE.  SIMULATE A SECTOR PULSE
5143                                  ;*      AND A GOOD HEADER.  CLOCK THROUGH ALL 400 WORDS
5144                                  ;*      AND THE TWO ECC WORDS.  MAKE SURE THE TWO ECC WORDS
5145                                  ;*      ARE CORRECT AND WRITTEN PROPERLY.  CHECK BUS ADDRESS,
5146                                  ;*      WORD COUNT, CYLINDER, TRACK, AND SECTOR.
5147                                  ;*
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5148                                    ;;*****************************************************************
5149  026236  000004                    TST44:  SCOPE
5150  026240  012737  000012  001200            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5151
5152  026246  013702  001270                    MOV     $BASE,R2        ;LOAD RK611 BASE
5153  026252  012762  100000  000000            MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
5154  026260  012762  000040  000026            MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
5155  026266  012762  054606  000004            MOV     #ECCBUF,RKBA(R2)  ;LOAD ADDRESS
5156  026274  012762  177400  000002            MOV     #-400,RKWC(R2)  ;WORD COUNT=400
5157  026302  012762  000023  000000            MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
5158  026310  012700  004612                    MOV     #66.*37.,R0     ;ISSUE ENOUGH CLOCKS UNTIL
5159                                                                    ;  READY FOR SECTOR PULSE
5160  026314  012762  000440  000026  1$:       MOV     #DMD!MCLK,RKMR1(R2)
5161  026322  012762  000040  000026            MOV     #DMD,RKMR1(R2)
5162  026330  005300                            DEC     R0
5163  026332  001370                            BNE     1$
5164  026334  012762  000140  000026            MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
5165  026342  012762  000040  000026            MOV     #DMD,RKMR1(R2)
5166  026350  005037  003254                    CLR     PR.BIT
5167  026354  005037  003256                    CLR     M1.BIT
5168  026360  012700  000377                    MOV     #255.,R0
5169  026364  004737  035422          5$:       JSR     PC,RDBIT
5170  026370  005300                            DEC     R0              ;CHECK IF SYNCH FINISHED
5171  026372  001374                            BNE     5$
5172  026374  012737  000001  003254            MOV     #1,PR.BIT       ;SIMULATE SYNCH
5173  026402  004737  035422                    JSR     PC,RDBIT
5174  026406  012703  051754                    MOV     #HEAD1,R3       ;LOAD HEADER
5175  026412  012701  000003                    MOV     #3,R1           ;LOAD WORDS PER HEADER
5176  026416  012304                  10$:      MOV     (R3)+,R4        ;GET NEXT WORD
5177  026420  012700  000020                    MOV     #16.,R0         ;LOAD BITS PER
5178  026424  013737  003254  003256  12$:      MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
5179  026432  006004                            ROR     R4              ;GET NEXT BIT
5180  026434  103403                            BCS     15$
5181  026436  005037  003254                    CLR     PR.BIT
5182  026442  000403                            BR      16$
5183
5184  026444  012737  000001  003254  15$:      MOV     #1,PR.BIT
5185  026452  004737  035422          16$:      JSR     PC,RDBIT        ;SIMULATE NEXT BIT
5186  026456  005300                            DEC     R0              ;CHECK IF READY FOR NEXT WORD
5187  026460  001361                            BNE     12$             ;NO, CONTINUE
5188  026462  005301                            DEC     R1              ;CHECK IF FINISHED WITH HEADER
5189  026464  001354                            BNE     10$             ;NO, CONTINUE
5190  026466  012700  000101                    MOV     #65.,R0
5191  026472  013737  003254  003256  20$:      MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
5192  026500  005037  003254                    CLR     PR.BIT
5193  026504  004737  035422                    JSR     PC,RDBIT
5194  026510  005300                            DEC     R0              ;CHECK IF GAP FINISHED
5195  026512  001367                            BNE     20$             ;NO, CONTINUE
5196  026514  005037  003252                    CLR     P1.BIT          ;INITIALIZE BITS FOR SYNCH
5197  026520  005037  003254                    CLR     PR.BIT
5198  026524  005037  003256                    CLR     M1.BIT
5199  026530  005037  003260                    CLR     M2.BIT
5200  026534  012737  047260  001310            MOV     #EM327,EMW      ;LOAD ERROR MESSAGE
5201  026542  005037  003262                    CLR     BITCNT          ;INITIALIZE BIT COUNT
5202  026546  012700  000400                    MOV     #256.,R0        ;LOAD SYNCH COUNT AND WRITE SYNCH
5203  026552  012737  062040  003224            MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;SET EXPECTED MR1
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5204  026560  004737  034674          25$:    JSR     PC,WRTBIT
5205  026564  104002                          ERROR   2
5206  026566  005237  003262                  INC     BITCNT          ;CLEAR BIT COUNT
5207  026572  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
5208  026574  001371                          BNE     25$             ;NO, CONTINUE
5209  026576  012737  000001  003252          MOV     #1,P1.BIT       ;WRITE SYNCH BIT
5210  026604  004737  034674                  JSR     PC,WRTBIT
5211  026610  104002                          ERROR   2
5212  026612  005037  003266                  CLR     ECCHI           ;INITIALIZE ECC GENERATOR
5213  026616  005037  003270                  CLR     ECCLO
5214  026622  012737  047332  001310          MOV     #EM328,EMW      ;LOAD ERROR MESSAGE
5215  026630  005037  003262                  CLR     BITCNT          ;INITIALIZE BIT COUNT
5216  026634  012701  000400                  MOV     #256.,R1        ;LOAD WORDS PER SECTOR
5217  026640  012703  054606                  MOV     #ECCBUF,R3      ;LOAD ADDRESS OF BUFFER
5218  026644  012304                  30$:    MOV     (R3)+,R4        ;GET NEXT WORD
5219  026646  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
5220  026652  013737  003256  003260  32$:    MOV     M1.BIT,M2.BIT   ;SHIFT BITS
5221  026660  013737  003254  003256          MOV     PR.BIT,M1.BIT
5222  026666  013737  003252  003254          MOV     P1.BIT,PR.BIT
5223  026674  006004                          ROR     R4              ;DETERMINE NEXT BIT
5224  026676  103403                          BCS     34$
5225  026700  005037  003252                  CLR     P1.BIT
5226  026704  000403                          BR      35$
5227
5228  026706  012737  000001  003252  34$:    MOV     #1,P1.BIT
5229  026714  004737  034674          35$:    JSR     PC,WRTBIT       ;WRITE NEXT BIT
5230  026720  104002                          ERROR   2
5231  026722  004737  034526                  JSR     PC,ECCGEN       ;GENERATE ECC
5232  026726  016237  000032  003174          MOV     RKECPT(R2),T.ECPT  ;GET PATTERN
5233  026734  023737  003234  003174          CMP     E.ECPT,T.ECPT   ;CHECK ECC PATTERN CORRECT
5234  026742  001401                          BEQ     37$             ;YES, CONTINUE
5235  026744  104135                          ERROR   135             ;ECC PATTERN INCORRECT
5236  026746  005237  003262          37$:    INC     BITCNT          ;INCREMENT BIT COUNT
5237  026752  022700  000002                  CMP     #2,R0           ;IF THE NEXT BIT IS THE LAST BIT OF
5238  026756  001006                          BNE     28$             ;THE LAST DATA WORD, ECCW MUST BE RESET
5239  026760  022701  000001                  CMP     #1,R1           ;IN THE EXPECTED MR1 TO INDICATE ECC
5240  026764  001003                          BNE     28$             ;BEING WRITTEN
5241  026766  042737  020000  003224          BIC     #ECCW,E.MR1
5242  026774  005300                  28$:    DEC     R0              ;CHECK IF THROUGH WITH WORD
5243  026776  001325                          BNE     32$             ;NO, CONTINUE
5244  027000  005301                          DEC     R1              ;CHECK IF AT END OF SECTOR
5245  027002  001320                          BNE     30$             ;NO, CONTINUE
5246  027004  012737  047677  001310          MOV     #EM333,EMW      ;LOAD ERROR MESSAGE
5247  027012  005037  003262                  CLR     BITCNT          ;INITIALIZE BIT COUNT
5248  027016  012701  000002                  MOV     #2,R1           ;LOAD NUMBER OF ECO WORDS
5249  027022  012703  003266                  MOV     #ECCHI,R3       ;LOAD ADDRESS OF ECC
5250  027026  012304                  40$:    MOV     (R3)+,R4        ;GET NEXT ECC WORD
5251  027030  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
5252  027034  013737  003256  003260  42$:    MOV     M1.BIT,M2.BIT   ;SHIFT BITS
5253  027042  013737  003254  003256          MOV     PR.BIT,M1.BIT
5254  027050  013737  003252  003254          MOV     P1.BIT,PR.BIT
5255  027056  006004                          ROR     R4              ;DETERMINE NEXT BIT
5256  027060  103403                          BCS     44$
5257  027062  005037  003252                  CLR     P1.BIT
5258  027066  000403                          BR      45$
5259
```

```
5260  027070  012737  000001  003252  44$:    MOV     #1,P1.BIT
5261  027076  004737  034674          45$:    JSR     PC,WRTBIT       ;WRITE NEXT BIT
5262  027102  104002                          ERROR   2
5263  027104  005237  003262                  INC     BITCNT          ;INCREMENT BIT COUNT
5264  027110  022700  000002                  CMP     #2,R0           ;IF THE LAST BIT OF THE LAST ECC WORD
5265  027114  001006                          BNE     46$             ;IS BEING WRITTEN, ECCW MUST BE SET
5266  027116  022701  000001                  CMP     #1,R1           ;IN EXPECTED MR1 TO INDICATE ECC
5267  027122  001003                          BNE     46$             ;WRITING IS DONE
5268  027124  052737  020000  003224          BIS     #ECCW,E.MR1
5269  027132  005300                  46$:    DEC     R0              ;CHECK IF THROUGH WITH WORD
5270  027134  001337                          BNE     42$             ;NO, CONTINUE
5271  027136  005301                          DEC     R1              ;CHECK IF FINISH WITH ECC
5272  027140  001332                          BNE     40$             ;NO, CONTINUE
5273  027142  012737  047735  001310          MOV     #EM334,EMW      ;LOAD ERROR MESSAGE
5274  027150  005037  003262                  CLR     BITCNT          ;CLEAR BIT COUNT
5275  027154  012700  000017                  MOV     #15.,R0         ;LOAD POSTAMBLE BIT COUNT
5276  027160  013737  003256  003260  47$:    MOV     M1.BIT,M2.BIT   ;SHIFT BIT
5277  027166  013737  003254  003256          MOV     PR.BIT,M1.BIT
5278  027174  013737  003252  003254          MOV     P1.BIT,PR.BIT
5279  027202  005037  003252                  CLR     P1.BIT
5280  027206  004737  034674                  JSR     PC,WRTBIT       ;WRITE NEXT BIT
5281  027212  104002                          ERROR   2
5282  027214  005237  003262                  INC     BITCNT          ;INCREMENT BIT COUNT
5283  027220  005300                          DEC     R0              ;CHECK IF THROUGH WITH POSTAMBLE
5284  027222  001356                          BNE     47$             ;NO, CONTINUE
5285  027224  012700  000014                  MOV     #3+4,R0         ;ISSUE CLOCKS TO COMPLETE COMMAND
5286  027230  012762  000440  000026  50$:    MOV     #DMD!MCLK,RKMR1(R2) ;ISSUE CLOCK PULSES
5287  027236  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5288  027244  005300                          DEC     R0
5289  027246  001370                          BNE     50$
5290  027250  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;SAVE CS1
5291  027256  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;SAVE CS2
5292  027264  016237  000014  003154          MOV     RKER(R2),T.ER   ;SAVE ERROR REG
5293  027272  012737  000222  003200          MOV     #RDY!WRDATA&<^C<GO>>,E.CS1  ;LOAD EXPECTED CS1
5294  027300  012737  000100  003210          MOV     #IR,E.CS2       ;LOAD EXPECTED CS2
5295  027306  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG.
5296  027312  016237  000020  003160          MOV     RKDCYL(R2),T.DCYL  ;SAVE CYLINDER ADDR REG
5297  027320  016237  000006  003146          MOV     RKDA(R2),T.DA   ;SAVE DISK AND REG
5298  027326  016237  000004  003144          MOV     RKBA(R2),T.BA   ;SAVE BUS ADD REG
5299  027334  016237  000002  003142          MOV     RKWC(R2),T.WC   ;SAVE WORD COUNT
5300  027342  005037  003220                  CLR     E.DCYL          ;LOAD EXPECTED CYLINDER AND REG.
5301  027346  012737  000001  003206          MOV     #1,E.DA         ;LOAD EXPECTED DISK
5302  027354  012737  055606  003204          MOV     #ECCBUF+<400*2>,E.BA  ;LOAD EXPECTED
5303  027362  005037  003202                  CLR     E.WC            ;LOAD EXPECTED ECC WORD
5304  027366  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1
5305  027374  001401                          BEQ     55$
5306  027376  104144                          ERROR   144
5307  027400  023737  003210  003150  55$:    CMP     E.CS2,T.CS2     ;CHECK CS2
5308  027406  001401                          BEQ     56$
5309  027410  104145                          ERROR   145
5310  027412  023737  003214  003154  56$:    CMP     E.ER,T.ER       ;CHECK ERROR REG
5311  027420  001401                          BEQ     57$
5312  027422  104146                          ERROR   146
5313  027424  023737  003204  003144  57$:    CMP     E.BA,T.BA       ;CHECK BUS ADD
5314  027432  001401                          BEQ     58$
5315  027434  104147                          ERROR   147
```

```
5316  027436  023737  003202  003142  58$:    CMP     E.WC,T.WC       ;CHECK WORD COUNT
5317  027444  001401                          BEQ     59$
5318  027446  104150                          ERROR   150
5319  027450  023737  003220  003160  59$:    CMP     E.DCYL,T.DCYL   ;CHECK CYLINDER ADD
5320  027456  001401                          BEQ     60$
5321  027460  104151                          ERROR   151
5322  027462  023737  003206  003146  60$:    CMP     E.DA,T.DA       ;CHECK DISK ADDR.
5323  027470  001401                          BEQ     TST45           ;;YES, GO ON TO NEXT TEST
5324  027472  104152                          ERROR   152
5325
5326                                  .SBTTL  **PARTIAL WRITE DATA
5327
5328                                  ;;*******************************************************************
5329                                  ;*TEST 45       ZERO FILL ON WRITE DATA
5330                                  ;*
5331                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
5332                                  ;*      PUT THE CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
5333                                  ;*      DATA OF 103 WORDS TO AN RK06 IN 26 SECTOR FORMAT,
5334                                  ;*      CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
5335                                  ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
5336                                  ;*      AND A GOOD HEADER.  CLOCK THROUGH ALL 400 WORDS AND
5337                                  ;*      THE TWO ECC WORDS.  CHECK THE SECTOR FOR ZERO FILL
5338                                  ;*      AND MAKE SURE THE TWO ECC WORDS ARE WRITTEN PROPERLY.
5339                                  ;*      CHECK BUS ADDRESS, WORD COUNT, CYLINDER, TRACK, AND SECTOR.
5340                                  ;*
5341                                  ;*******************************************************************
5342  027474  000004                  TST45:  SCOPE
5343  027476  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5344
5345  027504  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
5346  027510  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR RK611
5347  027516  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;PUT RK611 IN DIAGNOSTIC MODE
5348  027524  012762  054606  000004          MOV     #ECCBUF,RKBA(R2)  ;LOAD ADDRESS
5349  027532  012762  177675  000002          MOV     #-103,RKWC(R2)  ;WORD COUNT=400
5350  027540  012762  000023  000000          MOV     #WRDATA,RKCS1(R2)  ;ISSUE WRITE DATA
5351  027546  012700  004612                  MOV     #66.*37.,R0     ;ISSUE ENOUGH CLOCKS UNTIL
5352                                                                  ;  READY FOR SECTOR PULSE
5353  027552  012762  000440  000026  1$:     MOV     #DMD!MCLK,RKMR1(R2)
5354  027560  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5355  027566  005300                          DEC     R0
5356  027570  001370                          BNE     1$
5357  027572  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
5358  027600  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5359  027606  005037  003254                  CLR     PR.BIT
5360  027612  005037  003256                  CLR     M1.BIT
5361  027616  012700  000377                  MOV     #255.,R0
5362  027622  004737  035422          5$:     JSR     PC,RDBIT
5363  027626  005300                          DEC     R0              ;CHECK IF SYNCH FINISHED
5364  027630  001374                          BNE     5$
5365  027632  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNCH
5366  027640  004737  035422                  JSR     PC,RDBIT
5367  027644  012703  051754                  MOV     #HEAD1,R3       ;LOAD HEADER
5368  027650  012701  000003                  MOV     #3,R1           ;LOAD WORDS PER HEADER
5369  027654  012304                  10$:    MOV     (R3)+,R4        ;GET NEXT WORD
5370  027656  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER
5371  027662  013737  003254  003256  12$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
```

```
5372  027670  006004                        ROR     R4              ;GET NEXT BIT
5373  027672  103403                        BCS     15$
5374  027674  005037  003254                CLR     PR.BIT
5375  027700  000403                        BR      16$
5376
5377  027702  012737  000001  003254  15$:  MOV     #1,PR.BIT
5378  027710  004737  035422          16$:  JSR     PC,RDBIT        ;SIMULATE NEXT BIT
5379  027714  005300                        DEC     R0              ;CHECK IF READY FOR NEXT WORD
5380  027716  001361                        BNE     12$             ;NO, CONTINUE
5381  027720  005301                        DEC     R1              ;CHECK IF FINISHED WITH HEADER
5382  027722  001354                        BNE     10$             ;NO, CONTINUE
5383  027724  012700  000101                MOV     #65.,R0
5384  027730  013737  003254  003256  20$:  MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
5385  027736  005037  003254                CLR     PR.BIT
5386  027742  004737  035422                JSR     PC,RDBIT
5387  027746  005300                        DEC     R0              ;CHECK IF GAP FINISHED
5388  027750  001367                        BNE     20$             ;NO, CONTINUE
5389  027752  005037  003252                CLR     P1.BIT          ;INITIALIZE BITS FOR SYNCH
5390  027756  005037  003254                CLR     PR.BIT
5391  027762  005037  003256                CLR     M1.BIT
5392  027766  005037  003260                CLR     M2.BIT
5393  027772  012737  047260  001310        MOV     #EM327,EMW      ;LOAD ERROR MESSAGE
5394  030000  005037  003262                CLR     BITCNT          ;INITIALIZE BIT COUNT
5395  030004  012700  000400                MOV     #256.,R0        ;LOAD SYNCH COUNT AND WRITE SYNCH
5396  030010  012737  062040  003224        MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;SET EXPECTED MR1
5397  030016  004737  034674          25$:  JSR     PC,WRTBIT
5398  030022  104002                        ERROR   2
5399  030024  005237  003262                INC     BITCNT          ;CLEAR BIT COUNT
5400  030030  005300                        DEC     R0              ;CHECK IF SYNCH FINISHED
5401  030032  001371                        BNE     25$             ;NO, CONTINUE
5402  030034  012737  000001  003252        MOV     #1,P1.BIT       ;WRITE SYNCH BIT
5403  030042  004737  034674                JSR     PC,WRTBIT
5404  030046  104002                        ERROR   2
5405  030050  005037  003266                CLR     ECCHI           ;INITIALIZE ECC GENERATOR
5406  030054  005037  003270                CLR     ECCLO
5407  030060  012737  047332  001310        MOV     #EM328,EMW      ;LOAD ERROR MESSAGE
5408  030066  005037  003262                CLR     BITCNT          ;INITIALIZE BIT COUNT
5409  030072  012701  000400                MOV     #256.,R1        ;LOAD WORDS PER SECTOR
5410  030076  012703  054606                MOV     #ECCBUF,R3      ;LOAD ADDRESS OF BUFFER
5411  030102  012304                  30$:  MOV     (R3)+,R4        ;GET NEXT WORD
5412  030104  012700  000020          31$:  MOV     #16.,R0         ;LOAD BITS PER WORD
5413  030110  013737  003256  003260  32$:  MOV     M1.BIT,M2.BIT   ;SHIFT BITS
5414  030116  013737  003254  003256        MOV     PR.BIT,M1.BIT
5415  030124  013737  003252  003254        MOV     P1.BIT,PR.BIT
5416  030132  006004                        ROR     R4              ;DETERMINE NEXT BIT
5417  030134  103403                        BCS     34$
5418  030136  005037  003252                CLR     P1.BIT
5419  030142  000403                        BR      35$
5420
5421  030144  012737  000001  003252  34$:  MOV     #1,P1.BIT
5422  030152  004737  034674          35$:  JSR     PC,WRTBIT       ;WRITE NEXT BIT
5423  030156  104002                        ERROR   2
5424  030160  004737  034526                JSR     PC,ECCGEN       ;GENERATE ECC
5425  030164  016237  000032  003174        MOV     RKECPT(R2),T.ECPT  ;GET PATTERN
5426  030172  023737  003234  003174        CMP     L.ECPT,T.ECPT   ;CHECK ECC PATTERN CORRECT
5427  030200  001401                        BEQ     37$             ;YES, CONTINUE
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5428  030202  104135                        ERROR   135             ;ECC PATTERN INCORRECT
5429  030204  005237  003262          37$:   INC     BITCNT          ;INCREMENT BIT COUNT
5430  030210  022700  000002                CMP     #2,R0           ;IF THE NEXT BIT IS THE LAST BIT OF
5431  030214  001006                        BNE     28$             ;THE LAST DATA WORD, ECCW MUST BE RESET
5432  030216  022701  000001                CMP     #1,R1           ;IN THE EXPECTED MR1 TO INDICATE ECC
5433  030222  001003                        BNE     28$             ;BEING WRITTEN
5434  030224  042737  020000  003224        BIC     #ECCW,E.MR1
5435  030232  005300                  28$:   DEC     R0              ;CHECK IF THROUGH WITH WORD
5436  030234  001325                        BNE     32$             ;NO, CONTINUE
5437  030236  005301                        DEC     R1              ;CHECK IF AT END OF SECTOR
5438  030240  001405                        BEQ     39$             ;YES -SKIP
5439  030242  022703  055014                CMP     #ECCBUF+<103*2>,R3  ;CHECK IF 103 WORDS TRANSFERED
5440  030246  003315                        BGT     30$             ;NO - GO TO GET NEXT WORD
5441  030250  005004                        CLR     R4              ;ELSE CLEAR R4 FOR ZEROS
5442  030252  000714                        BR      31$             ;GO SIMULATE REST OF SECTOR
5443  030254  012737  047677  001310  39$:   MOV     #EM333,EMW      ;LOAD ERROR MESSAGE
5444  030262  005037  003262                CLR     BITCNT          ;INITIALIZE BIT COUNT
5445  030266  012701  000002                MOV     #2,R1           ;LOAD NUMBER OF ECO WORDS
5446  030272  012703  003266                MOV     #ECCHI,R3       ;LOAD ADDRESS OF ECC
5447  030276  012304                  40$:   MOV     (R3)+,R4        ;GET NEXT ECC WORD
5448  030300  012700  000020                MOV     #16.,R0         ;LOAD BITS PER WORD
5449  030304  013737  003256  003260  42$:   MOV     M1.BIT,M2.BIT   ;SHIFT BITS
5450  030312  013737  003254  003256        MOV     PR.BIT,M1.BIT
5451  030320  013737  003252  003254        MOV     P1.BIT,PR.BIT
5452  030326  006004                        ROR     R4              ;DETERMINE NEXT BIT
5453  030330  103403                        BCS     44$
5454  030332  005037  003252                CLR     P1.BIT
5455  030336  000403                        BR      45$
5456
5457  030340  012737  000001  003252  44$:   MOV     #1,P1.BIT
5458  030346  004737  034674          45$:   JSR     PC,WRTBIT       ;WRITE NEXT BIT
5459  030352  104002                        ERROR   2
5460  030354  005237  003262                INC     BITCNT          ;INCREMENT BIT COUNT
5461  030360  022700  000002                CMP     #2,R0           ;IF THE LAST BIT OF THE LAST ECC WORD
5462  030364  001006                        BNE     46$             ;IS BEING WRITTEN, ECCW MUST BE SET
5463  030366  022701  000001                CMP     #1,R1           ;IN EXPECTED MR1 TO INDICATE ECC
5464  030372  001003                        BNE     46$             ;WRITING IS DONE
5465  030374  052737  020000  003224        BIS     #ECCW,E.MR1
5466  030402  005300                  46$:   DEC     R0              ;CHECK IF THROUGH WITH WORD
5467  030404  001337                        BNE     42$             ;NO, CONTINUE
5468  030406  005301                        DEC     R1              ;CHECK IF FINISH WITH ECC
5469  030410  001332                        BNE     40$             ;NO, CONTINUE
5470  030412  012737  047735  001310        MOV     #EM334,EMW      ;LOAD ERROR MESSAGE
5471  030420  005037  003262                CLR     BITCNT          ;CLEAR BIT COUNT
5472  030424  012700  000017                MOV     #15.,R0         ;LOAD POSTAMBLE BIT COUNT
5473  030430  013737  003256  003260  47$:   MOV     M1.BIT,M2.BIT   ;SHIFT BIT
5474  030436  013737  003254  003256        MOV     PR.BIT,M1.BIT
5475  030444  013737  003252  003254        MOV     P1.BIT,PR.BIT
5476  030452  005037  003252                CLR     P1.BIT
5477  030456  004737  034674                JSR     PC,WRTBIT       ;WRITE NEXT BIT
5478  030462  104002                        ERROR   2
5479  030464  005237  003262                INC     BITCNT          ;INCREMENT BIT COUNT
5480  030470  005300                        DEC     R0              ;CHECK IF THROUGH WITH POSTAMBLE
5481  030472  001356                        BNE     47$             ;NO, CONTINUE
5482  030474  012700  000014                MOV     #3*4,R0         ;ISSUE CLOCKS TO COMPLETE COMMAND
5483  030500  012762  000440  000026  50$:   MOV     #DMD!MCLK,RKMR1(R2) ;ISSUE CLOCK PULSES
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5484  030506  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5485  030514  005300                          DEC     R0
5486  030516  001370                          BNE     50$
5487  030520  016237  000000  003140          MOV     RKCS1(R2),T.CS1 ;SAVE CS1
5488  030526  016237  000010  003150          MOV     RKCS2(R2),T.CS2 ;SAVE CS2
5489  030534  016237  000014  003154          MOV     RKER(R2),T.ER   ;SAVE ERROR REG
5490  030542  012737  000222  003200          MOV     #RDY!WRDATA&<^C<GO>>,E.CS1  ;LOAD EXPECTED CS1
5491  030550  012737  000100  003210          MOV     #IR,E.CS2       ;LOAD EXPECTED CS2
5492  030556  005037  003214                  CLR     E.ER            ;LOAD EXPECTED ERROR REG.
5493  030562  016237  000020  003160          MOV     RKDCYL(R2),T.DCYL  ;SAVE CYLINDER ADDR REG
5494  030570  016237  000006  003146          MOV     RKDA(R2),T.DA   ;SAVE DISK AND REG
5495  030576  016237  000004  003144          MOV     RKBA(R2),T.BA   ;SAVE BUS ADD REG
5496  030604  016237  000002  003142          MOV     RKWC(R2),T.WC   ;SAVE WORD COUNT
5497  030612  005037  003220                  CLR     E.DCYL          ;LOAD EXPECTED CYLINDER AND REG.
5498  030616  012737  000001  003206          MOV     #1,E.DA         ;LOAD EXPECTED DISK
5499  030624  012737  055014  003204          MOV     #ECCBUF+<103*2>,E.BA  ;LOAD EXPECTED
5500  030632  005037  003202                  CLR     E.WC            ;LOAD EXPECTED ECC WORD
5501  030636  023737  003200  003140          CMP     E.CS1,T.CS1     ;CHECK CS1
5502  030644  001401                          BEQ     55$
5503  030646  104154                          ERROR   154
5504  030650  023737  003210  003150  55$:    CMP     E.CS2,T.CS2     ;CHECK CS2
5505  030656  001401                          BEQ     56$
5506  030660  104155                          ERROR   155
5507  030662  023737  003214  003154  56$:    CMP     E.ER,T.ER       ;CHECK ERROR REG
5508  030670  001401                          BEQ     57$
5509  030672  104156                          ERROR   156
5510  030674  023737  003204  003144  57$:    CMP     E.BA,T.BA       ;CHECK BUS ADD
5511  030702  001401                          BEQ     58$
5512  030704  104157                          ERROR   157
5513  030706  023737  003202  003142  58$:    CMP     E.WC,T.WC       ;CHECK WORD COUNT
5514  030714  001401                          BEQ     59$
5515  030716  104160                          ERROR   160
5516  030720  023737  003220  003160  59$:    CMP     E.DCYL,T.DCYL   ;CHECK CYLINDER ADD
5517  030726  001401                          BEQ     60$
5518  030730  104161                          ERROR   161
5519  030732  023737  003206  003146  60$:    CMP     E.DA,T.DA       ;CHECK DISK ADDR.
5520  030740  001401                          BEQ     TST46           ;;YES, GO ON TO NEXT TEST
5521  030742  104162                          ERROR   162
5522                                  .SBTTL  **18 BIT FORMAT WRITES
5523
5524                                  ;NOTE: SINCE 18-BIT FUNCTIONALITY OF THE RK611 IS NOT
5525                                  ;UTILIZED ON THE PDP-11, THE FOLLOWING TESTS, INTENDED
5526                                  ;FOR MANUFACTURING USE, ARE NOT EXECUTED UNLESS LOCA-
5527                                  ;TION "SEC24" IS PATCHED TO A NON-ZERO VALUE.
5528
5529                                  ;;*****************************************************************
5530                                  ;*TEST 46       18 BIT WRITE DATA (PART 1)
5531                                  ;*
5532                                  ;*      CLEAR THE RK611 CONTROLLER WITH A CONTROLLER CLEAR.
5533                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
5534                                  ;*      OF 400 WORDS TO AN RK06 IN 24 SECTOR FORMAT,
5535                                  ;*      CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
5536                                  ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
5537                                  ;*      AND A GOOD HEADER.  CLOCK THROUGH 6 WORDS OF 177777.
5538                                  ;*      VERIFY THAT TWO ZERO BITS ARE PRESENT FOR EACH WORD.
5539                                  ;*
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```
5540                                    ;;*****************************************************************
5541  030744  000004                    TST46:  SCOPE
5542  030746  012737  000012  001200            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5543  030754  005737  003314                    TST     SEC24           ;SKIP 18 BIT TESTS?
5544  030760  001002                            BNE     1$              ;BRANCH IF NOT
5545  030762  000137  032760                    JMP     $EOP            ;ELSE GO TO END OF PASS
5546  030766                            1$:
5547
5548  030766  013702  001270                    MOV     $BASE,R2        ;LOAD RK611 BASE
5549  030772  012762  100000  000000            MOV     #CCLR,RKCS1(R2)  ;CLEAR CONTROLLER
5550  031000  012700  002000                    MOV     #2000,R0                ;SET A STALL COUNT
5551  031004  005300                    5$:     DEC     R0              ;LOOP UNTIL COUNT 0
5552  031006  001376                            BNE     5$
5553
5554  031010  012762  000C40  000026            MOV     #DMD,RKMR1(R2)  ;SET DIAGNOSTIC MODE
5555  031016  012762  053572  000004            MOV     #MOD2BF,RKBA(R2)  ,LOAD BUFFER ADDRESS
5556  031024  012762  177400  000002            MOV     #-400,RKWC(R2)          ; --- WORD COUNT
5557  031032  012762  010023  000000            MOV     #WRDATA!CFMT,RKCS1(R2)  ; --- START COMMAND
5558  031040  012700  005136                    MOV     #66.*40.+<4.*3.+2>,R0  ;ISSUE ENOUGH CLOCKS UNTIL
5559                                                                          ;  READY FOR SECTOR PULSE
5560  031044  012762  000440  000026    7$:     MOV     #DMD!MCLK,RKMR1(R2)
5561  031052  012762  000040  000026            MOV     #DMD,RKMR1(R2)
5562  031060  005300                            DEC     R0
5563  031062  001370                            BNE     7$
5564
5565  031064  012762  000140  000026            MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
5566  031072  012762  000040  000026            MOV     #DMD,RKMR1(R2)
5567
5568  031100  005037  003254                    CLR     PR.BIT          ;GENERATE SYNC
5569  031104  005037  003256                    CLR     M1.BIT
5570  031110  012700  000377                    MOV     #255.,R0
5571
5572  031114  004737  035422            9$:     JSR     PC,RDBIT        ;SIMULATE SYNC 0 BITS
5573  031120  005300                            DEC     R0
5574  031122  001374                            BNE     9$
5575
5576  031124  012737  000001  003254            MOV     #1,PR.BIT       ;SIMULATE SYNC 1 BIT
5577  031132  004737  035422                    JSR     PC,RDBIT
5578
5579  031136  012703  05207                     MOV     #HEAD11,R3      ;SIMULATE HEADER
5580  031142  012701  000003                    MOV     #3,R1           ;  CYL 0 TRK 0, SEC 0
5581  031146  012304                    11$:    MOV     (R3)+,R4        ;GET HEADER WORD
5582  031150  012700  000020                    MOV     #16.,R0         ;LOAD BITS PER WORD
5583  031154  013737  003254  003256  13$:     MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
5584  031162  006004                            ROR     R4              ;GET NEXT BIT
5585  031164  103403                            BCS     15$
5586  031166  005037  003254                    CLR     PR.BIT
5587  031172  000403                            BR      16$
5588
5589  031174  012737  000001  003254  15$:     MOV     #1,PR.BIT
5590  031202  004737  035422            16$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
5591  031206  005300                            DEC     R0              ;READY FOR NEXT HEADER WORD?
5592  031210  001361                            BNE     13$             ;NO - GET NEXT BIT THIS WORD
5593  031212  005301                            DEC     R1              ;HEADER DONE?
5594  031214  001354                            BNE     11$             ;NO - GET NEXT HEADER WORD
5595  031216  012700  000101                    MOV     #65.,R0         ;SET COUNT FOR GAP.
```

```
 5596  031222  013737  003254  003256  20$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 5597  031230  005037  003254                  CLR     PR.BIT
 5598  031234  004737  035422                  JSR     PC,RDBIT
 5599  031240  005300                          DEC     R0
 5600  031242  001367                          BNE     20$
 5601  031244  012700  000400                  MOV     #256.,R0        ;SET COUNT FOR WRITE DATA SYNC
 5602  031250  012737  047260  001310          MOV     #EM327,EMW      ;LOAD ERROR MESSAGE
 5603  031256  005037  003252                  CLR     P1.BIT          ;CLEAR BITS
 5604  031262  005037  003254                  CLR     PR.BIT
 5605  031266  005037  003256                  CLR     M1.BIT
 5606  031272  005037  003260                  CLR     M2.BIT
 5607  031276  005037  003262                  CLR     BITCNT          ;CLEAR BIT COUNTER
 5608  031302  012737  062040  003224          MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;SET EXPECTED MR1
 5609  031310  004737  034674          22$:    JSR     PC,WRTBIT       ;SIMULATE SYNC 0
 5610  031314  104002                          ERROR   2
 5611  031316  005237  003262                  INC     BITCNT          ;BUMP BIT COUNT
 5612  031322  005300                          DEC     R0              ;LOOP UNTIL SYNC 0 WRITTEN
 5613  031324  001371                          BNE     22$
 5614  031326  012737  000001  003252          MOV     #1,P1.BIT       ;SIMULATE SYNC 1
 5615  031334  004737  034674                  JSR     PC,WRTBIT
 5616  031340  104002                          ERROR   2
 5617  031342  005037  003266                  CLR     ECCHI           ;INITIALIZE ECC WORDS.
 5618  031346  005037  003270                  CLR     ECCLO
 5619  031352  005037  003262                  CLR     BITCNT          ;CLEAR BIT COUNT
 5620  031356  012703  053572                  MOV     #MOD2BF,R3      ;SET DATA POINTER
 5621  031362  012701  000006                  MOV     #6.,R1  ;SET DATA COUNT
 5622  031366  012304                  24$:    MOV     (R3)+,R4        ;GET DATA WORD
 5623  031370  012737  050203  001310          MOV     #EM338,EMW      ;LOAD MESSAGE (18 BIT DATA WRITE)
 5624  031376  012700  000022                  MOV     #18.,R0         ;LOAD BITS PER WORD
 5625  031402  013737  003256  003260  25$:    MOV     M1.BIT,M2.BIT   ;SHIFT BITS
 5626  031410  013737  003254  003256          MOV     PR.BIT,M1.BIT
 5627  031416  013737  003252  003254          MOV     P1.BIT,PR.BIT
 5628  031424  000241                          CLC                     ;CLEAR CARRY & GET NEXT BIT
 5629  031426  006004                          ROR     R4
 5630  031430  103403                          BCS     27$
 5631  031432  005037  003252                  CLR     P1.BIT
 5632  031436  000403                          BR      28$
 5633
 5634  031440  012737  000001  003252  27$:    MOV     #1,P1.BIT
 5635  031446  004737  034674          28$:    JSR     PC,WRTBIT       ;SIMULATE NEXT BIT
 5636  031452  104002                          ERROR   2
 5637  031454  016237  000032  003174          MOV     RKECPT(R2),T.ECPT  ;GET ECC PATTERN
 5638  031462  004737  034526                  JSR     PC,ECCGEN       ;COMPUTE EXPECTED ECC
 5639  031466  023737  003174  003234          CMP     T.ECPT,E.ECPT   ;CHECK IF CORRECT
 5640  031474  001401                          BEQ     29$             ;YES - SKIP
 5641  031476  104164                          ERROR   164
 5642  031500  005237  003262          29$:    INC     BITCNT
 5643  031504  005300                          DEC     R0
 5644  031506  020027  000002                  CMP     R0,#2           ;1ST 16 BITS JUST DONE?
 5645  031512  001403                          BEQ     31$             ;YES - SKIP
 5646  031514  005700                          TST     R0              ;ELSE TEST IF WORD DONE
 5647  031516  001331                          BNE     25$             ;NO - DO NEXT BIT
 5648  031520  000406                          BR      32$             ;ELSE DO NEXT WORD
 5649  031522  012737  050271  001310  31$:    MOV     #EM339,EMW      ;LOAD MESSAGE (BIT 16.17)
 5650  031530  012704  000000                  MOV     #0,R4   ;SET UPPER BITS OF WORD
 5651  031534  000722                          BR      25$             ;GO DO BITS
```

```
5652
5653  031536  005301                  32$:    DEC     R1              ;ALL WORDS DONE?
5654  031540  001312                          BNE     24$             ;NO - GET NEXT WORD
5655
5656                                  ;;*****************************************************************
5657                                  ;*TEST 47       18 BIT WRITE DATA (PART 2)
5658                                  ;*
5659                                  ;*      CLEAR RK611 CONTROLLER WITH A CONTROLLER CLEAR.
5660                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE DATA
5661                                  ;*      OF 400 WORDS TO AN RK06 IN 24 SECTOR FORMAT,
5662                                  ;*      CYLINDER 0, HEAD 0, SECTOR 0.  CLOCK THROUGH SEEK
5663                                  ;*      AND DRIVE CLEAR MESSAGES.  SIMULATE A SECTOR PULSE
5664                                  ;*      AND A GOOD HEADER.  CLOCK THROUGH 400 18 BIT WORDS
5665                                  ;*      AND THE 32 BIT ECC.  VERIFY THAT THE ECC IS
5666                                  ;*      WRITTEN CORRECTLY.
5667                                  ;*
5668                                  ;;*****************************************************************
5669  031542  000004                  TST47:  SCOPE
5670  031544  012737  000012  001200          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5671
5672
5673  031552  013702  001270                  MOV     $BASE,R2        ;LOAD RK611 BASE
5674  031556  012762  100000  000000          MOV     #CCLR,RKCS1(R2)  ;CLEAR CONTROLLER
5675  031564  012700  002000                  MOV     #2000,R0                ;SET A STALL COUNT
5676  031570  005300                  5$:     DEC     R0              ;LOOP UNTIL COUNT 0
5677  031572  001376                          BNE     5$
5678
5679  031574  012762  000040  000026          MOV     #DMD,RKMR1(R2)  ;SET DIAGNOSTIC MODE
5680  031602  012762  054606  000004          MOV     #ECCBUF,RKBA(R2)  ;LOAD BUFFER ADDRESS
5681  031610  012762  177400  000002          MOV     #-400,RKWC(R2)          ; --- WORD COUNT
5682  031616  012762  010023  000000          MOV     #WRDATA!CFMT,RKCS1(R2)  ; --- START COMMAND
5683  031624  012700  005136                  MOV     #66.*40.+<4.*3.+2>,R0  ;ISSUE ENOUGH CLOCKS UNTIL
5684                                                                          ;  READY FOR SECTOR PULSE
5685  031630  012762  000440  000026  7$:     MOV     #DMD!MCLK,RKMR1(R2)
5686  031636  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5687  031644  005300                          DEC     R0
5688  031646  001370                          BNE     7$
5689
5690  031650  012762  000140  000026          MOV     #DMD!MSP,RKMR1(R2)  ;SIMULATE SECTOR PULSE
5691  031656  012762  000040  000026          MOV     #DMD,RKMR1(R2)
5692
5693  031664  005037  003254                  CLR     PR.BIT          ;GENERATE SYNC
5694  031670  005037  003256                  CLR     M1.BIT
5695  031674  012700  000377                  MOV     #255.,R0
5696
5697  031700  004737  035422          9$:     JSR     PC,RDBIT        ;SIMULATE SYNC 0 BITS
5698  031704  005300                          DEC     R0
5699  031706  001374                          BNE     9$
5700
5701  031710  012737  000001  003254          MOV     #1,PR.BIT       ;SIMULATE SYNC 1 BIT
5702  031716  004737  035422                  JSR     PC,RDBIT
5703
5704  031722  012703  052072                  MOV     #HEAD11,R3      ;SIMULATE HEADER
5705  031726  012701  000003                  MOV     #3,R1           ;  CYL 0 TRK 0, SEC 0
5706  031732  012304                  11$:    MOV     (R3)+,R4        ;GET HEADER WORD
5707  031734  012700  000020                  MOV     #16.,R0         ;LOAD BITS PER WORD
```

```
 5708  031740  013737  003254  003256  13$:    MOV     PR.BIT,M1.BIT   ;STORE PREVIOUS BIT
 5709  031746  006004                          ROR     R4              ;GET NEXT BIT
 5710  031750  103403                          BCS     15$
 5711  031752  005037  003254                  CLR     PR.BIT
 5712  031756  000403                          BR      16$
 5713
 5714  031760  012737  000001  003254  15$:    MOV     #1,PR.BIT
 5715  031766  004737  035422          16$:    JSR     PC,RDBIT        ;SIMULATE NEXT BIT
 5716  031772  005300                          DEC     R0              ;READY FOR NEXT HEADER WORD?
 5717  031774  001361                          BNE     13$             ;NO - GET NEXT BIT THIS WORD
 5718  031776  005301                          DEC     R1              ;HEADER DONE?
 5719  032000  001354                          BNE     11$             ;NO - GET NEXT HEADER WORD
 5720  032002  012700  000101                  MOV     #65.,R0         ;SET COUNT FOR GAP.
 5721  032006  013737  003254  003256  20$:    MOV     PR.BIT,M1.BIT   ;SIMULATE GAP
 5722  032014  005037  003254                  CLR     PR.BIT
 5723  032020  004737  035422                  JSR     PC,RDBIT
 5724  032024  005300                          DEC     R0
 5725  032026  001367                          BNE     20$
 5726  032030  012700  000400                  MOV     #256.,R0        ;SET COUNT FOR WRITE DATA SYNC
 5727  032034  012737  047260  001310          MOV     #EM327,EMW      ;LOAD ERROR MESSAGE
 5728  032042  005037  003252                  CLR     P1.BIT          ;CLEAR BITS
 5729  032046  005037  003254                  CLR     PR.BIT
 5730  032052  005037  003256                  CLR     M1.BIT
 5731  032056  005037  003260                  CLR     M2.BIT
 5732  032062  005037  003262                  CLR     BITCNT          ;CLEAR BIT COUNTER
 5733  032066  012737  062040  003224          MOV     #DMD!ECCW!MEWD!WRTGAT,E.MR1  ;SET EXPECTED MR1
 5734  032074  004737  034674          22$:    JSR     PC,WRTBIT       ;SIMULATE SYNC 0
 5735  032100  104002                          ERROR   2
 5736  032102  005237  003262                  INC     BITCNT          ;BUMP BIT COUNT
 5737  032106  005300                          DEC     R0              ;LOOP UNTIL SYNC 0 WRITTEN
 5738  032110  001371                          BNE     22$
 5739  032112  012737  000001  003252          MOV     #1,P1.BIT       ;SIMULATE SYNC 1
 5740  032120  004737  034674                  JSR     PC,WRTBIT
 5741  032124  104002                          ERROR   2
 5742  032126  005037  003266                  CLR     ECCHI           ;INITIALIZE ECC WORDS.
 5743  032132  005037  003270                  CLR     ECCLO
 5744  032136  005037  003262                  CLR     BITCNT          ;CLEAR BIT COUNT
 5745  032142  012703  054606                  MOV     #ECCBUF,R3      ;SET DATA POINTER
 5746  032146  012701  000377                  MOV     #255.,R1        ;SET DATA COUNT
 5747  032152  012304                  24$:    MOV     (R3)+,R4        ;GET DATA WORD
 5748  032154  012737  050203  001310          MOV     #EM338,EMW      ;LOAD MESSAGE (18 BIT DATA WRITE)
 5749  032162  012700  000022                  MOV     #18.,R0         ;LOAD BITS PER WORD
 5750  032166  013737  003256  003260  25$:    MOV     M1.BIT,M2.BIT   ;SHIFT BITS
 5751  032174  013737  003254  003256          MOV     PR.BIT,M1.BIT
 5752  032202  013737  003252  003254          MOV     P1.BIT,PR.BIT
 5753  032210  000241                          CLC                     ;CLEAR CARRY & GET NEXT BIT
 5754  032212  006004                          ROR     R4
 5755  032214  103403                          BCS     27$
 5756  032216  005037  003252                  CLR     P1.BIT
 5757  032222  000403                          BR      28$
 5758
 5759  032224  012737  000001  003252  27$:    MOV     #1,P1.BIT
 5760  032232  004737  034674          28$:    JSR     PC,WRTBIT       ;SIMULATE NEXT BIT
 5761  032236  104002                          ERROR   2
 5762  032240  016237  000032  003174          MOV     RKECPT(R2),T.ECPT  ;GET ECC PATTERN
 5763  032246  004737  034526                  JSR     PC,ECCGEN       ;COMPUTE EXPECTED ECC
```

```
 5764  032252  023737  003174  003234          CMP     T.ECPT,E.ECPT   ;CHECK IF CORRECT
 5765  032260  001401                          BEQ     29$             ;YES - SKIP
 5766  032262  104164                          ERROR   164
 5767  032264  005237  003262          29$:    INC     BITCNT
 5768  032270  005300                          DEC     R0
 5769  032272  020027  000002                  CMP     R0,#2           ;1ST 16 BITS JUST DONE?
 5770  032276  001403                          BEQ     31$             ;YES - SKIP
 5771  032300  005700                          TST     R0              ;ELSE TEST IF WORD DONE
 5772  032302  001331                          BNE     25$             ;NO - DO NEXT BIT
 5773  032304  000406                          BR      32$             ;ELSE DO NEXT WORD
 5774  032306  012737  050271  001310  31$:    MOV     #EM339,EMW      ;LOAD MESSAGE (BIT 16.17)
 5775  032314  012704  000000                  MOV     #0,R4   ;SET UPPER BITS OF WORD
 5776  032320  000722                          BR      25$             ;GO DO BITS
 5777
 5778  032322  005301                  32$:    DEC     R1              ;ALL WORDS DONE?
 5779  032324  001312                          BNE     24$             ;NO - GET NEXT WORD
 5780
 5781  032326  012737  050203  001310          MOV     #EM338,EMW      ;SET ERROR MESSAGE
 5782  032334  012304                          MOV     (R3)+,R4        ;GET LAST WORD
 5783  032336  012700  000022                  MOV     #18.,R0         ;SET BIT COUNT
 5784  032342  013737  003256  003260  34$:    MOV     M1.BIT,M2.BIT   ;SHIFT BITS
 5785  032350  013737  003254  003256          MOV     PR.BIT,M1.BIT
 5786  032356  013737  003252  003254          MOV     P1.BIT,PR.BIT
 5787  032364  000241                          CLC                     ;CLEAR CARRY
 5788  032366  006004                          ROR     R4              ;TEST NEXT BIT
 5789  032370  103403                          BCS     36$             ;SKIP IF A ONE
 5790  032372  005037  003252                  CLR     P1.BIT          ;ELSE SET NEXT BIT FOR ZERO
 5791  032376  000403                          BR      37$
 5792
 5793  032400  012737  000001  003252  36$:    MOV     #1,P1.BIT       ;SET NEXT BIT FOR 1
 5794  032406  004737  034674          37$:    JSR     PC,WRTBIT       ;SIMULATE BIT
 5795  032412  104002                          ERROR   2
 5796  032414  016237  000032  003174          MOV     RKECPT(R2),T.ECPT  ;GET PATTERN
 5797  032422  004737  034526                  JSR     PC,ECCGEN       ;GENERATE ECC PATTERN
 5798  032426  023737  003174  003234          CMP     T.ECPT,E.ECPT   ;TEST IF CORRECT
 5799  032434  001401                          BEQ     39$             ;YES - SKIP
 5800  032436  104164                          ERROR   164             ;ELSE REPORT
 5801  032440  005237  003262          39$:    INC     BITCNT          ;BUMP BIT COUNT
 5802  032444  022700  000002                  CMP     #2,R0           ;IF NEXT BIT IS THE LAST DATA BIT
 5803  032450  001003                          BNE     41$             ;ECCW MUST BE RESET TO INDICATE
 5804  032452  042737  020000  003224          BIC     #ECCW,E.MR1             ;ECC BEING WRITTEN
 5805  032460  005300                  41$:    DEC     R0
 5806  032462  022700  000002                  CMP     #2,R0           ;TEST IF 1ST 16 BITS DONE
 5807  032466  001403                          BEQ     42$             ;YES - SKIP
 5808  032470  005700                          TST     R0              ;ELSE TEST IF WORD DONE
 5809  032472  001323                          BNE     34$             ;NO - SKIP
 5810  032474  000406                          BR      45$             ;ELSE GO TO ECC PROCESSING
 5811
 5812  032476  012737  050271  001310  42$:    MOV     #EM339,EMW      ;SET MESSAGE FOR BITS 16 AND 17
 5813  032504  012704  000000                  MOV     #0,R4           ;SET UP UPPER BITS
 5814  032510  000714                          BR      34$             ;GO DO LAST TWO BITS
 5815  032512  012737  047677  001310  45$:    MOV     #EM333,EMW      ;MESSAGE (ECC WRITE)
 5816  032520  005037  003262                  CLR     BITCNT          ;CLEAR BIT COUNT
 5817  032524  012703  003266                  MOV     #ECCHI,R3       ;LOAD POINTER TO ECC WORDS
 5818  032530  012701  000002                  MOV     #2,R1           ;SET FOR 2 WORDS
 5819  032534  012304                  43$:    MOV     (R3)+,R4        ;GET ECC WORD
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 5820  032536  012700  000020                MOV     #16.,R0          ;SET BIT COUNT
 5821  032542  013737  003256  003260  44$:   MOV     M1.BIT,M2.BIT    ;SHIFT BITS
 5822  032550  013737  003254  003256        MOV     PR.BIT,M1.BIT
 5823  032556  013737  003252  003254        MOV     P1.BIT,PR.BIT
 5824  032564  006004                        ROR     R4               ;LOAD NEXT BIT
 5825  032566  103403                        BCS     46$
 5826  032570  005037  003252                CLR     P1.BIT
 5827  032574  000403                        BR      47$
 5828
 5829  032576  012737  000001  003252  46$:   MOV     #1,P1.BIT
 5830  032604  004737  034674        47$:   JSR     PC,WRTBIT        ;SIMULATE NEXT BIT
 5831  032610  104002                        ERROR   2
 5832  032612  022700  000002                CMP     #2,R0            ;IF THIS BIT IS THE LAST ECC BIT
 5833  032616  001006                        BNE     49$              ;ECCW MUST BE SET TO INDICATE
 5834  032620  022701  000001                CMP     #1,R1            ;ECC IS DONE
 5835  032624  001003                        BNE     49$
 5836  032626  052737  020000  003224        BIS     #ECCW,E.MR1
 5837  032634  005237  003262        49$:   INC     BITCNT           ;BUMP BIT COUNT
 5838  032640  005300                        DEC     R0               ;TEST IF LAST BIT THIS WORD IS DONE
 5839  032642  001337                        BNE     44$              ;NO - LOOP
 5840  032644  005301                        DEC     R1               ;TEST IF BOTH WORDS WRITTEN
 5841  032646  001332                        BNE     43$              ;NO - LOOP
 5842  032650  012737  047735  001310        MOV     #EM334,EMW       ;LOAD MESSAGE (POSTAMBLE)
 5843  032656  005037  003262                CLR     BITCNT           ;CLEAR BIT COUNT
 5844  032662  012700  000017                MOV     #15.,R0          ;SET GAP COUNT
 5845  032666  013737  003256  003260  51$:   MOV     M1.BIT,M2.BIT    ;SHIFT REST OF BITS
 5846  032674  013737  003254  003256        MOV     PR.BIT, M1.BIT
 5847  032702  013737  003252  003254        MOV     P1.BIT,PR.BIT
 5848  032710  005037  003252                CLR     P1.BIT           ;CLEAR NEXT BIT
 5849  032714  004737  034674                JSR     PC,WRTBIT        ;SIMULATE BIT
 5850  032720  104002                        ERROR   2
 5851  032722  005237  003262                INC     BITCNT           ;BUMP BIT COUNT
 5852  032726  005300                        DEC     R0               ;GAP WRITTEN?
 5853  032730  001356                        BNE     51$              ;NO - LOOP
 5854  032732  012737  000001  003234        MOV     #1,E.ECPT        ;SET EXPECTED PATTERN
 5855  032740  016237  000032  003174        MOV     RKECPT(R2),T.ECPT  ;GET '611 PATTERN
 5856  032746  023737  003174  003234        CMP     T.ECPT, E.ECPT   ;TEST IF EQUAL
 5857  032754  001401                        BEQ     56$              ;YES - SKIP
 5858  032756  104163                        ERROR   163              ;ELSE REPORT
 5859  032760                        56$:
 5860                                .SBTTL  END OF PASS ROUTINE
 5861
 5862                                ;;**************************************************************************
 5863                                ;*INCREMENT THE PASS NUMBER ($PASS)
 5864                                ;*TYPE "END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY"
 5865                                ;*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
 5866                                ;*IF THERES A MONITOR GO TO IT
 5867                                ;*IF THERE ISN'T JUMP TO TST1
 5868
 5869  032760                        $EOP:
 5870  032760  000004                        SCOPE
 5871  032762  005037  001102                CLR     $TSTNM           ;;ZERO THE TEST NUMBER
 5872  032766  005037  001200                CLR     $TIMES           ;;ZERO THE NUMBER OF ITERATIONS
 5873  032772  005237  001222                INC     $PASS            ;;INCREMENT THE PASS NUMBER
 5874  032776  042737  100000  001222        BIC     #100000,$PASS    ;;DON'T ALLOW A NEG. NUMBER
 5875  033004  005327                        DEC     (PC)+            ;;LOOP?
```

```
 5876  033006  000001                  $EOPCT: .WORD   1
 5877  033010  003063                          BGT     $DOAGN          ;;YES
 5878  033012  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
 5879  033014  000001                  $ENDCT: .WORD   1
 5880  033016  033006                          $EOPCT
 5881  033020  104401  033026                TYPE    ,65$            ;;TYPE ASCIZ STRING
 5882  033024  000407                  BR      64$             ;;GET OVER THE ASCIZ
 5883                                   ;;65$:  .ASCIZ  <12><15>/END PASS #/
 5884  033044                          64$:
 5885  033044  013746  001222                MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
 5886                                                                  ;;TYPE PASS NUMBER
 5887  033050  104405                  TYPDS                           ;;GO TYPE--DECIMAL ASCII WITH SIGN
 5888  033052  104401  033060                TYPE    ,67$            ;;TYPE ASCIZ STRING
 5889  033056  000421                  BR      66$             ;;GET OVER THE ASCIZ
 5890                                   ;;67$:  .ASCIZ  /  TOTAL ERRORS SINCE LAST REPORT /
 5891  033122                          66$:
 5892  033122  013746  001112                MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
 5893                                                                  ;;TOTAL NUMBER OF ERRORS
 5894  033126  104405                  TYPDS                           ;;GO TYPE--DECIMAL ASCII WITH SIGN
 5895  033130  104401  001211                TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
 5896  033134  005037  001112                CLR     $ERTTL          ;;CLEAR ERROR TOTAL
 5897  033140  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
 5898  033144  001405                  BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
 5899  033146  000005                  RESET                           ;;CLEAR THE WORLD
 5900  033150  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
 5901  033152  000240                  NOP                             ;;SAVE ROOM
 5902  033154  000240                  NOP                             ;;FOR
 5903  033156  000240                  NOP                             ;;ACT11
 5904  033160                          $DOAGN:
 5905  033160  000137                  JMP     @(PC)+          ;;RETURN
 5906  033162  004312                  $RTNAD: .WORD   TST1
 5907  033164     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
 5908          033170                  .EVEN
 5909
 5910
 5911                                   .SBTTL  CONTROLLED HALT ROUTINE
 5912                                   ;*      THIS ROUTINE IS ENTERED WHEN A ^C IS ENTERED IN THE KEYBOARD.
 5913                                   ;*      IF NO MONITOR IS PRESENT THE PROGRAM HALTS ELSE THE PROGRAM
 5914                                   ;*      IS FORCED TO LAST PASS AND JUMPS TO END OF PASS.
 5915
 5916  033170  013702  001270          CTRHLT: MOV     $BASE,R2        ;SET '611 BASE
 5917  033174  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
 5918  033202  104401  042221                TYPE    ,OPR005         ;TYPE HALT MESSAGE
 5919  033206  012706  001100                MOV     #STACK,SP       ;CLEAR STACK
 5920  033212  005037  001202                CLR     $ESCAPE         ;CLEAR ESCAPE
 5921  033216  105037  001103                CLRB    $ERFLG          ;CLEAR ERROR FLAG
 5922  033222  005737  000042                TST     42              ;TEST IF STAND ALONE
 5923  033226  001404                  BEQ     1$              ;YES - SKIP
 5924  033230  005037  033006                CLR     $EOPCT          ;ZERO PASS COUNT
 5925  033234  000137  032760                JMP     $EOP            ;GO TO END OF PASS
 5926
 5927  033240  000000                  1$:     HALT                    ;HALT PROGRAM
 5928  033242  000137  003342                JMP     START1          ;GO TO RESTART IF CONTINUE
 5929
 5930                                   .SBTTL  SCOPE HANDLER ROUTINE
 5931
```

```
                        ;;*****************************************************************
                        ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                        ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                        ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                        ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                        ;*SW14=1         LOOP ON TEST
                        ;*SW11=1         INHIBIT ITERATIONS
                        ;*SW09=1         LOOP ON ERROR
                        ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                        ;*CALL
                        ;*      SCOPE            ;;SCOPE=IOT

033246                  $SCOPE:
033246  104407                 CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
033250  032777  040000  145502  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
033256  001131                 BNE     $OVER           ;;YES IF SW14=1
                        ;#####START OF CODE FOR THE XOR TESTER#####
033260  000416          $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
033262  013746  000004         MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
033266  012737  033306  000004 MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
033274  005737  177060         TST     @#177060        ;;TIME OUT ON XOR?
033300  012637  000004         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
033304  000500                 BR      $SVLAD          ;;GO TO THE NEXT TEST
033306  022626          5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
033310  012637  000004         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
033314  000440                 BR      7$              ;;LOOP ON THE PRESENT TEST
033316                  6$:;#####END OF CODE FOR THE XOR TESTER#####
033316  032777  000400  145614 BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
033324  001421                 BEQ     2$              ;;BR IF NO
033326  005046                 CLR     -(SP)           ;;CLEAR A TEMP. LOCATION
033330  117716  145604         MOVB    @SWR,(SP)       ;;PICKUP THE DESIRED TEST NUMBER
033334  001414                 BEQ     8$              ;;BRANCH IF BAD TEST NUMBER IN SWR
033336  022716  000047         CMP     #47,(SP)        ;;CHECK THE NUMBER IN THE SWR
033342  002411                 BLT     8$              ;;BRANCH IF TEST NUMBER IS OUT OF RANGE
033344  011637  001102         MOV     (SP),$TSTNM     ;;UPDATE THE TEST NUMBER
033350  005316                 DEC     (SP)            ;;BACKUP BY ONE
033352  006316                 ASL     (SP)            ;;SCALE THE TEST NUMBER AS AN INDEX
033354  062716  033560         ADD     #$SW08TBL,(SP)  ;;FORM THE ADDRESS OF TEST POINTER
033360  013637  001106         MOV     @(SP)+,$LPADR   ;;SET LOOP ADDRESS TO DESIRED TEST
033364  000466                 BR      $OVER           ;;GO LOOP ON THE TEST
033366  005726          8$:     TST     (SP)+           ;;CLEAN THE BAD TEST NUMBER OFF OF THE STACK
033370  105737  001103  2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
033374  001421                 BEQ     3$              ;;BR IF NO
033376  123737  001115  001103 CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
033404  101015                 BHI     3$              ;;BR IF NO
033406  032777  001000  145524 BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
033414  001404                 BEQ     4$              ;;BR IF NO
033416  013737  001110  001106 7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
033424  000446                 BR      $OVER
033426  105037  001103  4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
033432  005037  001200         CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
033436  000415                 BR      1$              ;;ESCAPE TO THE NEXT TEST
033440  032777  004000  145472 3$:     BIT     #BIT11,@SWR     ;,INHIBIT ITERATIONS?
033446  001011                 BNE     1$              ;;BR IF YES
033450  005737  001222         TST     $PASS           ;;IF FIRST PASS OF PROGRAM
```

```
 5988  033454  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
 5989  033456  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
 5990  033462  023737  001200  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
 5991  033470  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
 5992  033472  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
 5993  033500  013737  033556  001200          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
 5994  033506  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
 5995  033512  113737  001102  001220          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
 5996  033520  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 5997  033524  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 5998  033530  005037  001202                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 5999  033534  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 6000  033542  013777  001102  145372  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 6001  033550  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 6002  033554  000002                          RTI                     ;;FIXES PS
 6003  033556  003720                  $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
 6004  033560                          $SW08TBL:
 6005  033560  004314                          .WORD   TST1+2          ;;STARTING ADDRESS OF TEST 1
 6006  033562  004546                          .WORD   TST2+2          ;;STARTING ADDRESS OF TEST 2
 6007  033564  005000                          .WORD   TST3+2          ;;STARTING ADDRESS OF TEST 3
 6008  033566  005232                          .WORD   TST4+2          ;;STARTING ADDRESS OF TEST 4
 6009  033570  005462                          .WORD   TST5+2          ;;STARTING ADDRESS OF TEST 5
 6010  033572  005712                          .WORD   TST6+2          ;;STARTING ADDRESS OF TEST 6
 6011  033574  006142                          .WORD   TST7+2          ;;STARTING ADDRESS OF TEST 7
 6012  033576  006426                          .WORD   TST10+2         ;;STARTING ADDRESS OF TEST 10
 6013  033600  006676                          .WORD   TST11+2         ;;STARTING ADDRESS OF TEST 11
 6014  033602  007146                          .WORD   TST12+2         ;;STARTING ADDRESS OF TEST 12
 6015  033604  007422                          .WORD   TST13+2         ;;STARTING ADDRESS OF TEST 13
 6016  033606  010072                          .WORD   TST14+2         ;;STARTING ADDRESS OF TEST 14
 6017  033610  010516                          .WORD   TST15+2         ;;STARTING ADDRESS OF TEST 15
 6018  033612  011056                          .WORD   TST16+2         ;;STARTING ADDRESS OF TEST 16
 6019  033614  011450                          .WORD   TST17+2         ;;STARTING ADDRESS OF TEST 17
 6020  033616  012044                          .WORD   TST20+2         ;;STARTING ADDRESS OF TEST 20
 6021  033620  012440                          .WORD   TST21+2         ;;STARTING ADDRESS OF TEST 21
 6022  033622  013034                          .WORD   TST22+2         ;;STARTING ADDRESS OF TEST 22
 6023  033624  013430                          .WORD   TST23+2         ;;STARTING ADDRESS OF TEST 23
 6024  033626  014216                          .WORD   TST24+2         ;;STARTING ADDRESS OF TEST 24
 6025  033630  014706                          .WORD   TST25+2         ;;STARTING ADDRESS OF TEST 25
 6026  033632  015302                          .WORD   TST26+2         ;;STARTING ADDRESS OF TEST 26
 6027  033634  015754                          .WORD   TST27+2         ;;STARTING ADDRESS OF TEST 27
 6028  033636  016426                          .WORD   TST30+2         ;;STARTING ADDRESS OF TEST 30
 6029  033640  017100                          .WORD   TST31+2         ;;STARTING ADDRESS OF TEST 31
 6030  033642  017552                          .WORD   TST32+2         ;;STARTING ADDRESS OF TEST 32
 6031  033644  020340                          .WORD   TST33+2         ;;STARTING ADDRESS OF TEST 33
 6032  033646  021126                          .WORD   TST34+2         ;;STARTING ADDRESS OF TEST 34
 6033  033650  021714                          .WORD   TST35+2         ;;STARTING ADDRESS OF TEST 35
 6034  033652  022404                          .WORD   TST36+2         ;;STARTING ADDRESS OF TEST 36
 6035  033654  023074                          .WORD   TST37+2         ;;STARTING ADDRESS OF TEST 37
 6036  033656  023564                          .WORD   TST40+2         ;;STARTING ADDRESS OF TEST 40
 6037  033660  024254                          .WORD   TST41+2         ;;STARTING ADDRESS OF TEST 41
 6038  033662  024770                          .WORD   TST42+2         ;;STARTING ADDRESS OF TEST 42
 6039  033664  025514                          .WORD   TST43+2         ;;STARTING ADDRESS OF TEST 43
 6040  033666  026240                          .WORD   TST44+2         ;;STARTING ADDRESS OF TEST 44
 6041  033670  027476                          .WORD   TST45+2         ;;STARTING ADDRESS OF TEST 45
 6042  033672  030746                          .WORD   TST46+2         ;;STARTING ADDRESS OF TEST 46
 6043  033674  031544                          .WORD   TST47+2         ;;STARTING ADDRESS OF TEST 47
```

```
                                ;;*****************************************************************
                                .SBTTL  LOOP ON INTERNAL ERROR

033676  032777  001000  145234  SCOP1$: BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
033704  001405                          BEQ     5$              ;NO RETURN
033706  105737  001103                  TSTB    $ERFLG          ;CHECK IF ERROR OCCURED
033712  001402                          BEQ     5$              ;NO, RETURN
033714  013716  001110                  MOV     $LPERR,(SP)     ;GO BACK TO BEGINNING OF LOOP
033720  000002                  5$:     RTI                     ;RETURN

                                ;;*****************************************************************
                                .SBTTL  TYPE ERROR ROUTINE
                                ;*ENTRY JSR PC,TYPERR
                                ;*RETURN RTS PC
                                ;*
                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                                ;*ERROR IS TO BE REPORTED. IT THEN USES THE "ERROR TABLE" ($ERRTB)
                                ;*ENTRY TO DEFINE WHAT INFORMATION IS TO BE REPORTED CONCERNING
                                ;*THE ERROR.
                                ;;*****************************************************************
033722  104413                  TYPERR: SAVREG
033724  113737  001102  001220          MOVB    $TSTNM,$TESTN   ;GET TEST NUMBER
033732  042737  177400  001220          BIC     #177400,$TESTN  ;CLEAR UNUSED BITS
033740  113700  001114                  MOVB    $ITEMB,R0       ;ENTER ERROR NUMBER
033744  042700  177400                  BIC     #177400,R0      ;CLEAR UNUSED BITS
033750  005300                          DEC     R0              ;FORM INDEX FOR ERROR TABLE
033752  006300                          ASL     R0
033754  006300                          ASL     R0
033756  006300                          ASL     R0
033760  062700  001300          1$:     ADD     #$ERRTB,R0      ;FORM ADDRESS OF ERROR ENTRY
033764  012037  034000                  MOV     (R0)+,2$        ;GET EM POINTER
033770  001404                          BEQ     3$              ;BRANCH IF THERE ISN'T ONE
033772  104401  001211                  TYPE    ,$CRLF          ;TYPE CARRIAGE RETURN LINE FEED
033776  104401                          TYPE                    ;TYPE ERROR MESSAGE (EM)
034000  000000                  2$:     .WORD   0               ;EM POINTER GOES HERE
034002  012037  034016          3$:     MOV     (R0)+,4$        ;GET DH POINTER
034006  001404                          BEQ     5$              ;BRANCH IF THERE ISN'T ONE
034010  104401  001211                  TYPE    ,$CRLF          ;TYPE CR-LF
034014  104401                          TYPE                    ;TYPE DATA HEADER
034016  000000                  4$:     .WORD   0               ;DH POINTER GOES HERE
034020  012001                  5$:     MOV     (R0)+,R1        ;GET DT POINTER
034022  001445                          BEQ     20$             ;BRANCH IF THERE ARE NONE
034024  005004                          CLR     R4              ;RESET INDENT SWITCH
034026  012000                          MOV     (R0)+,R0        ;GET DF POINTER
034030  012002                          MOV     (R0)+,R2        ;STORE NUMBER OF DH'S
034032  104401  001211                  TYPE    ,$CRLF
034036  112003                  10$:    MOVB    (R0)+,R3        ;GET & STORE NUMBER OF DATA WORDS
034040  105720                          TSTB    (R0)+           ;BUMP PAST FORMAT WORD
034042  005703                          TST     R3              ;TEST IF ANY DATA FOR THIS HEADER
034044  001416                          BEQ     14$             ;NO - SKIP DATA PRINT
034046  005704                          TST     R4              ;CHECK IF INDENT WORDS
034050  001004                          BNE     12$             ;YES, GO INDENT
034052  013146                  11$:    MOV     @(R1)+,-(SP)    ;PUT FIRST DATA WORD ON STACK
034054  104402                          TYPOC                   ;TYPE IT
034056  005303                          DEC     R3              ;MORE DATA WORDS
034060  001403                          BEQ     13$             ;NO-BRANCH
```

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6100  034062  104401  042341          12$:    TYPE    ,SPACE2         ;TYPE SEPARATORS
6101  034066  000771                  BR      11$             ;LOOP
6102  034070  104401  001211          13$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
6103  034074  005710                  TST     (R0)            ;CHECK IF NEXT HEADER AVAILIBLE
6104  034076  001401                  BEQ     14$             ;NO, DO NOT CHANGE INDENT
6105  034100  005104                  COM     R4              ;CHANGE INDENT
6106  034102  005302          14$:    DEC     R2              ;MORE DH'S?
6107  034104  003414                  BLE     20$             ;NO-BRANCH
6108  034106  012037  034126          15$:    MOV     (R0)+,18$       ;GET NEXT DH POINTER
6109  034112  001751                  BEQ     10$             ;IF NO HEADER GET DATA
6110  034114  005704                  TST     R4              ;INDENT?
6111  034116  001402                  BEQ     17$             ;NO-BRANCH
6112  034120  104401  042341          TYPE    ,SPACE2         ;INDENT
6113  034124  104401          17$:    TYPE                    ;TYPE DH
6114  034126  000000          18$:    .WORD   0               ;DH POINTER GOES HERE
6115  034130  104401  001211          TYPE    ,$CRLF
6116  034134  000740                  BR      10$             ;LOOP
6117  034136  104414          20$:    RESREG
6118  034140  005237  003250          INC     ERRCNT          ;INCREMENT ERROR COUNT
6119  034144  032777  010000  144766  BIT     #SW12,@SWR      ;CHECK IF ABORT AFTER 20 ERRORS
6120  034152  001421                  BEQ     25$             ;NO, RETURN
6121  034154  022737  000024  003250  CMP     #20.,ERRCNT     ;CHECK IF EROR THRESHOLD EXCEEDED
6122  034162  103015                  BHIS    25$             ;NO, RETURN
6123  034164  104401  042344          TYPE    ,ABORT          ;TYPE "PROGRAM HAS BEEN ABORTED BECAUSE
6124                                                          ;  ERROR THRESHOLD EXCEEDED"
6125  034170  005737  000042          TST     42              ;CHECK IF IN CHAIN MODE
6126  034174  001407                  BEQ     30$             ;NO, HALT
6127  034176  012737  000001  033006  MOV     #1,$EOPCT       ;FORCE END OF PASS COUNT TO ONE FOR ABORT
6128  034204  012706  001100          MOV     #STACK,SP       ;INITIALIZE STACK
6129  034210  000137  032760          JMP     $EOP            ;BRING IN NEXT PROGRAM IN CHAIN
6130  034214  000000          30$:    HALT
6131  034216  000207          25$:    RTS     PC
6132
6133                          .SBTTL  GENERATE HEADERS FOR SECTOR, TRACK, AND CYLINDER INCREMENTS
6134
6135  034220  013737  003300  003302  INCHDR: MOV     CYLN,HEADER     ;LOAD HEADER WORD 1
6136  034226  005037  003304          CLR     HEADER+2        ;CALCULATE HEADER WORD 2
6137  034232  113737  003277  003305  MOVB    TRACK,HEADER+3
6138  034240  006237  003304          ASR     HEADER+2
6139  034244  006237  003304          ASR     HEADER+2
6140  034250  006237  003304          ASR     HEADER+2
6141  034254  153737  003276  003304  BISB    SECTOR,HEADER+2
6142  034262  052737  140000  003304  BIS     #140000,HEADER+2
6143  034270  013746  003302          MOV     HEADER,-(SP)    ;GENERATE XOR
6144  034274  013737  003304  003306  MOV     HEADER+2,HEADER+4
6145  034302  043737  003302  003306  BIC     HEADER,HEADER+4
6146  034310  043716  003304          BIC     HEADER+2,(SP)
6147  034314  052637  003306          BIS     (SP)+,HEADER+4
6148  034320  013737  003300  003220  MOV     CYLN,E.DCYL     ;INCREMENT DISK ADDRESS
6149  034326  013737  003276  003206  MOV     SECTOR,E.DA
6150  034334  105237  003206          INCB    E.DA
6151  034340  122737  000026  003206  CMPB    #26,E.DA
6152  034346  001014                  BNE     10$
6153  034350  105037  003206          CLRB    E.DA
6154  034354  105237  003207          INCB    E.DA+1
6155  034360  122737  000003  003207  CMPB    #3,E.DA+1
```

```
                                        BNE     10$
                                        CLR     E.DA
                                        INC     E.DCYL
                                10$:    RTS     PC              ;RETURN

                                .SBTTL  CALCULATE EXPECTED HEADER

                                CALHDR: CLR     R3              ;CLEAR EXPECTED FIRST WORD
                                        MOV     E.DCYL,R1       ;STORE CYLINDER
                                        BEQ     5$              ;CHECK IF ZERO
                                        MOV     #16.,R0         ;LOAD SHIFT COUNT
                                1$:     ROL     R1              ;CALCULATE FIRST WORD
                                        ROR     R3
                                        DEC     R0
                                        BNE     1$
                                5$:     MOV     R3,E.MR2        ;LOAD FIRST WORD
                                        MOV     E.DA,-(SP)      ;GET TRACK AND SECTOR
                                        BEQ     7$              ;CHECK IF TRACK = 0 AND SECTOR = 0
                                        BIC     #377,(SP)       ;CLEAR SECTOR BITS
                                        BEQ     6$              ;CHECK TRACK = 0
                                        ASR     (SP)            ;SHIFT HEAD 3 BITS RIGHT
                                        ASR     (SP)
                                        ASR     (SP)
                                6$:     BISB    E.DA,(SP)       ;OR IN SECTOR BITS
                                7$:     MOV     (SP)+,R1
                                        BIT     #CFMT,E.CS1     ;CHECK FORMAT = 24 SECTOR
                                        BEQ     8$              ;NO, CALCULATE SECOND WORD
                                        BIS     #BIT9,R1        ;SET FORMAT BIT
                                8$:     CLR     R3              ;CLEAR EXPECTED SECOND WORD
                                        TST     R1              ;CHECK IF WORD = 0
                                        BEQ     15$             ;YES, RETURN
                                        MOV     #16.,R0         ;LOAD SHIFT COUNT
                                10$:    ROL     R1
                                        ROR     R3
                                        DEC     R0
                                        BNE     10$
                                15$:    MOV     R3,E.MR3        ;LOAD SECOND WORD
                                        RTS     PC              ;RETURN

                                ;;*****************************************************************
                                .SBTTL  GENERATE ECC WORD

                                ECCGEN: TST     P1.BIT          ;CHECK IF 1
                                        BEQ     3$              ;NO, CHECK IF BIT 31    1
                                        BIT     #1,ECCHI        ;NO, CHECK IF BIT 31    1
                                        BEQ     5$              ;NO, SET ECC XORED BIT
                                1$:     CLR     ECCXOR          ;CLEAR ECC XORED BIT
                                        CLC                     ;CLEAR CARRY FLOP
                                        BR      7$              ;SHIFT IN ECC BIT

                                3$:     BIT     #1,ECCHI        ;CHECK IF BIT 31 = 1
                                        BEQ     1$              ;NO, CLEAR ECC XORED BIT
                                5$:     MOV     #1,ECCXOR       ;SET ECC XOR
                                        SEC                     ;SET CARRY FLOP
                                7$:     ROR     ECCLO
                                        ROR     ECCHI
```

```
                                        ;CHECK IF XOR NEEDED
                                        ;NO, RETURN
                                        ;DO XOR OF ECC BITS
                                        ;  0, 2, 11, 21, 23
                                        ;STORE ECC PATTERN
                                        ;MASK UNSEEN BITS
                                        ;RETURN
;;*****************************************************************
.SBTTL  SIMULATE ONE BIT WRITE IN MAINTENCE MODE
                                        ;INITIALIZE
                                        ;  EXPECTED MR1
                                        ;CHECK IF ONE
                                        ;YES, SIMULATE A ONE
                                        ;CHECK IF PREVIOUS ONE
                                        ;YES, NO TRANSITION
                                        ;INDICATE TRANSITION
                                        ;CHECK IF NEXT BIT = 1
                                        ;YES, CHECK FOR PRECOMP ADVANCE
                                        ;CHECK FOR PRECOMP. DELAY
                                        ;NO, CLOCK IN ZERO
                                        ;SET PRECOMP. DELAY
                                        ;CLOCK IN ZERO

                                        ;CHECK FOR PRECOMP. ADVANCE
                                        ;CLOCK IN ZERO
                                        ;SET PRECOMPENSATION ADVANCE
                                        ;CLOCK IN DATA BIT

                                        ;STORE MR1
                                        ;CHECK IF MR1 CORRECT
                                        ;YES, CLOCK IN REST OF BIT
                                        ;LOAD ESCAPE
                                        ;LOAD ERROR MESSAGE
                                        ;STORE RETURN
                                        ;REPORT ERROR
                                        ;CHECK IF LOOP ON ERROR
                                        ;NO, CONTINUE
                                        ;GO LOOP ON ERROR

                                        ;RESET TRANSITION INDICATION
                                        ;CLOCK IN DATA BIT

                                        ;STORE MR1
                                        ;CHECK IF MR1 CORRECT
                                        ;YES, RETURN
                                        ;LOAD ESCAPE
                                        ;LOAD ERROR MESSAGE
                                        ;SAVE RETURN
                                        ;REPORT ERROR
```

```
6268
6269  035140  032777  001000  143772  *7$:    BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
6270  035146  001117                          BNE     63$
6271  035150  005037  001202          18$:    CLR     $ESCAPE         ;CLEAR ESCAPE
6272  035154  062716  000002                  ADD     #2,(SP)         ;ADJUST ESCAPE
6273  035160  000207                          RTS     PC              ;RETURN
6274
6275
6276  035162  005737  003252          20$:    TST     P1.BIT          ;CHECK IF NEXT BIT A ONE
6277  035166  001007                          BNE     30$             ;YES, CHECK FOR PRECOMP. DELAY
6278  035170  005737  003256                  TST     M1.BIT          ;CHECK FOR PRECOMP. ADVANCE
6279  035174  001412                          BEQ     40$             ;NO, CHECK MR1
6280  035176  052737  004000  003224          BIS     #PCA,E.MR1      ;SET PRECOMP ADVANCE
6281  035204  000406                          BR      40$             ;CHECK MR1
6282
6283  035206  005737  003256          30$:    TST     M1.BIT          ;CHECK FOR PRECOMP. DELAY
6284  035212  001003                          BNE     40$             ;NO, CHECK MR1
6285  035214  052737  010000  003224          BIS     #PCD,E.MR1      ;SET PRECOMP. DELAY
6286  035222  012762  000440  000026  40$:    MOV     #DMD!MCLK,RKMR1(R2) ;CLOCK IN DATA BIT
6287  035230  012762  000040  000026          MOV     #DMD,RKMR1(R2)
6288  035236  016237  000026  003164          MOV     RKMR1(R2),T.MR1 ;STORE MR1
6289  035244  023737  003164  003224          CMP     T.MR1,E.MR1     ;CHECK IF MR1 CORREC
6290  035252  001414                          BEQ     45$             ;YES, CLOCK IN REST OF BIT
6291  035254  012737  035274  001202          MOV     #42$,$ESCAPE    ;LOAD ESCAPE
6292  035262  012737  051363  001312          MOV     #EMW2,EMW+2     ;LOAD ERROR MESSAGE
6293  035270  011646                          MOV     (SP),-(SP)      ;STORE RETURN
6294  035272  000207                          RTS     PC              ;REPORT ERROR
6295
6296  035274  032777  001000  143636  42$:    BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
6297  035302  001041                          BNE     63$             ;YES, LOOP ERROR
6298  035304  042737  002000  003224  45$:    BIC     #MEWD,E.MR1     ;INDICATE A TRANSITION
6299  035312  012762  000440  000026          MOV     #DMD!MCLK,RKMR1(R2) ;CLOCK TRANSITION
6300  035320  012762  000040  000026          MOV     #DMD,RKMR1(R2)
6301  035326  016237  000026  003164          MOV     RKMR1(R2),T.MR1 ;STORE MR1
6302  035334  023737  003164  003224          CMP     T.MR1,E.MR1     ;CHECK IF MR1 CORRECT
6303  035342  001414                          BEQ     50$             ;YES, RETURN
6304  035344  012737  035364  001202          MOV     #47$,$ESCAPE    ;LOAD ESCAPE
6305  035352  012737  051453  001312          MOV     #EMW4,EMW+2     ;LOAD ERROR MESSAGE
6306  035360  011646                          MOV     (SP),-(SP)      ;SAVE RETURN
6307  035362  000207                          RTS     PC              ;REPORT ERROR
6308
6309  035364  032777  001000  143546  47$:    BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
6310  035372  001005                          BNE     63$             ;YES, REPORT ERROR
6311  035374  005037  001202          50$:    CLR     $ESCAPE         ;LOAD ESCAPE
6312  035400  062716  000002                  ADD     #2,(SP)         ;ADJUST RETURN
6313  035404  000207                          RTS     PC              ;RETURN
6314
6315  035406  005037  001202          63$:    CLR     $ESCAPE         ;CLEAR ESCAPE
6316  035412  012706  001100                  MOV     #STACK,SP       ;FORCE STACK
6317  035416  000177  143466                  JMP     @$LPERR         ;JUMP TO LOOP ADDRESS
6318
6319                                  ;;*****************************************************************
6320                                  .SBTTL  SIMULATE ONE BIT OF READ DATA IN MAINTENENCE MODE
6321
6322  035422  105737  003254  RDBIT:  TSTB    PR.BIT          ;CHECK IF ONE
6323  035426  001024                          BNE     10$             ;YES, SIMULATE ONE
```

```
 6324  035430  105737  003256                  TSTB    M1.BIT          ;CHECK IF PREVIOUS ONE
 6325  035434  001404                          BEQ     4$              ;INSERT TRANSITION
 6326  035436  012762  000440  000026          MOV     #DMD!MCLK,RKMR1(R2) ;DO NOT INSERT TRANSITION
 6327  035444  000403                          BR      5$              ;CLOCK IN ZERO
 6328
 6329  035446  012762  001440  000026  4$:     MOV     #DMD!MCLK!MERD,RKMR1(R2) ;INSERT TRANSITI.
 6330  035454  012762  000040  000026  5$:     MOV     #DMD,RKMR1(R2)  ;CLOCK IN ZERO
 6331  035462  012762  000440  000026          MOV     #DMD!MCLK,RKMR1(R2)
 6332  035470  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 6333  035476  000207                          RTS     PC              ;RETURN
 6334
 6335  035500  012762  000440  000026  10$:    MOV     #DMD!MCLK,RKMR1(R2) ;CLOCK IN ONE
 6336  035506  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 6337  035514  012762  001440  000026          MOV     #DMD!MCLK!MERD,RKMR1(R2)
 6338  035522  012762  000040  000026          MOV     #DMD,RKMR1(R2)
 6339  035530  000207                          RTS     PC              ;RETURN
 6340                                  .SBTTL  APT COMMUNICATIONS ROUTINE
 6341
 6342                                  ;;**************************************************************
 6343  035532  112737  000001  035776  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
 6344  035540  112737  000001  035774  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
 6345  035546  000403                          BR      $ATYC
 6346  035550  112737  000001  035776  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
 6347  035556                          $ATYC:
 6348  035556  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 6349  035560  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 6350  035562  105737  035774                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
 6351  035566  001450                          BEQ     5$              ;;IF NOT:  BR
 6352  035570  122737  000001  001234          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
 6353  035576  001031                          BNE     3$              ;;IF NOT:  BR
 6354  035600  132737  000100  001235          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
 6355  035606  001425                          BEQ     3$              ;;IF NOT:  BR
 6356  035610  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
 6357  035614  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
 6358  035622  005737  001214          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
 6359  035626  001375                          BNE     1$              ;;IF NOT:  WAIT
 6360  035630  010037  001230                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
 6361  035634  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
 6362  035636  001376                          BNE     2$
 6363  035640  163700  001230                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
 6364  035644  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
 6365  035646  010037  001232                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
 6366  035652  012737  000004  001214          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
 6367  035660  000413                          BR      5$
 6368  035662  017637  000004  035706  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
 6369  035670  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
 6370  035676  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
 6371  035702  004737  036200                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
 6372  035706  000000                  4$:     .WORD   0
 6373  035710                          5$:
 6374  035710  105737  035776          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
 6375  035714  001416                          BEQ     12$             ;;IF NOT:  BR
 6376  035716  005737  001234                  TST     $ENV            ;;RUNNING UNDER APT?
 6377  035722  001413                          BEQ     12$             ;;IF NOT:  BR
 6378  035724  005737  001214          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
 6379  035730  001375                          BNE     11$             ;;IF NOT:  WAIT
```

```
6380  035732  017637  000004  001216          MOV     @4(SP),$FATAL   ;;GET ERROR #
6381  035740  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
6382  035746  005237  001214                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
6383  035752  105037  035776          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
6384  035756  105037  035775                  CLRB    $LFLG           ;;CLEAR LOG FLAG
6385  035762  105037  035774                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
6386  035766  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
6387  035770  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
6388  035772  000207                          RTS     PC              ;;RETURN
6389  035774     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
6390  035775     000          $LFLG:  .BYTE   0               ;;LOG FLAG
6391  035776     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
6392          036000                  .EVEN
6393          000200          APTSIZE=200
6394          000001          APTENV=001
6395          000100          APTSPOOL=100
6396          000040          APTCSUP=040
6397                          .SBTTL  ERROR HANDLER ROUTINE
6398
6399                          ;;**************************************************************
6400                          ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
6401                          ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
6402                          ;*AND GO TO TYPEPR ON ERROR
6403                          ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
6404                          ;*SW15=1        HALT ON ERROR
6405                          ;*SW13=1        INHIBIT ERROR TYPEOUTS
6406                          ;*SW10=1        BELL ON ERROR
6407                          ;*SW09=1        LOOP ON ERROR
6408                          ;*CALL
6409                          ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
6410
6411  036000          $ERROR:
6412  036000  104407                  CKSWR                           ;;TEST FOR CHANGE IN SOFT-SWR
6413  036002  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
6414  036006  001775                  BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
6415  036010  013777  001102  143124          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
6416  036016  032777  002000  143114          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
6417  036024  001402                  BEQ     1$              ;;NO - SKIP
6418  036026  104401  001204                  TYPE    ,$BELL          ;;RING BELL
6419  036032  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
6420  036036  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
6421  036042  162737  000002  001116          SUB     #2,$ERRPC
6422  036050  117737  143042  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
6423  036056  032777  020000  143054          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
6424  036064  001004                  BNE     20$             ;;SKIP TYPEOUTS
6425  036066  004737  033722                  JSR     PC,TYPERR       ;;GO TO USER ERROR ROUTINE
6426  036072  104401  001211                  TYPE    ,$CRLF
6427  036076          20$:
6428  036076  122737  000001  001234          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
6429  036104  001007                  BNE     2$              ;;NO,SKIP APT ERROR REPORT
6430  036106  113737  001114  036120          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
6431  036114  004737  035550                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
6432  036120     000          21$:    .BYTE   0
6433  036121     000                  .BYTE   0
6434  036122  000777          22$:    BR      22$             ;;APT ERROR LOOP
6435  036124  005777  143010          2$:     TST     @SWR            ;;HALT ON ERROR
```

```
 6436  036130  100002                          BPL     3$              ;;SKIP IF CONTINUE
 6437  036132  000000                          HALT                    ;;HALT ON ERROR!
 6438  036134  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
 6439  036136  032777  001000  142774  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
 6440  036144  001402                          BEQ     4$              ;;BR IF NO
 6441  036146  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
 6442  036152  005737  001202          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
 6443  036156  001402                          BEQ     5$              ;;BR IF NONE
 6444  036160  013716  001202                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
 6445  036164                          5$:
 6446  036164  022737  033150  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
 6447  036172  001001                          BNE     6$              ;;BRANCH IF NO
 6448  036174  000000                          HALT                    ;;YES
 6449  036176                          6$:
 6450  036176  000002                          RTI                     ;;RETURN
 6451
 6452                                  .SBTTL  TYPE ROUTINE
 6453
 6454                                  ;;**********************************************************************
 6455                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
 6456                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
 6457                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
 6458                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
 6459                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
 6460                                  ;*
 6461                                  ;*CALL:
 6462                                  ;*1) USING A TRAP INSTRUCTION
 6463                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
 6464                                  ;*OR
 6465                                  ;*      TYPE
 6466                                  ;*      MESADR
 6467                                  ;*
 6468
 6469  036200  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
 6470  036204  100002                          BPL     1$              ;;BR IF YES
 6471  036206  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
 6472  036210  000430                          BR      3$              ;;LEAVE
 6473  036212  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
 6474  036214  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
 6475  036220  122737  000001  001234          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
 6476  036226  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
 6477  036230  132737  000100  001235          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
 6478  036236  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
 6479  036240  010037  036250                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
 6480  036244  004737  035540                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
 6481  036250  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
 6482  036252  132737  000040  001235  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
 6483  036260  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
 6484  036262  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
 6485  036264  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
 6486  036266  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
 6487  036270  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
 6488  036272  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
 6489  036276  000002                          RTI                     ;;RETURN
 6490  036300  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
 6491  036304  001430                          BEQ     8$
```

```
6492  036306  122716  000200            CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
6493  036312  001006                    BNE     5$
6494  036314  005726                    TST     (SP)+           ;;POP  <CR><LF> EQUIV
6495  036316  104401                    TYPE                    ;;TYPE A CR AND LF
6496  036320  001211                    $CRLF
6497  036322  105037  036456            CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
6498  036326  000755                    BR      2$              ;;GET NEXT CHARACTER
6499  036330  004737  036412    5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
6500  036334  123726  001156    6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
6501  036340  001350                    BNE     2$              ;;IF NO GO GET NEXT CHAR.
6502  036342  013746  001154            MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
6503                                                            ;;AND THE NULL CHAR.
6504  036346  105366  000001    7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
6505  036352  002770                    BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
6506  036354  004737  036412            JSR     PC,$TYPEC       ;;GO TYPE A NULL
6507  036360  105337  036456            DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
6508  036364  000770                    BR      7$              ;;LOOP
6509
6510                                    ;HORIZONTAL TAB PROCESSOR
6511
6512  036366  112716  000040    8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
6513  036372  004737  036412    9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
6514  036376  132737  000007  036456    BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
6515  036404  001372                    BNE     9$              ;;TAB STOP
6516  036406  005726                    TST     (SP)+           ;;POP SPACE OFF STACK
6517  036410  000724                    BR      2$              ;;GET NEXT CHARACTER
6518  036412  105777  142532    $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
6519  036416  100375                    BPL     $TYPEC
6520  036420  116677  000002  142524    MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
6521  036426  122766  000015  000002    CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
6522  036434  001003                    BNE     1$              ;;BRANCH IF NO
6523  036436  105037  036456            CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
6524  036442  000406                    BR      $TYPEX          ;;EXIT
6525  036444  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
6526  036452  001402                    BEQ     $TYPEX          ;;BRANCH IF YES
6527  036454  105227                    INCB    (PC)+           ;;COUNT THE CHARACTER
6528  036456  000000            $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
6529  036460  000207            $TYPEX: RTS     PC
6530
6531                                    .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
6532
6533                                    ;;**************************************************************
6534                                    ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
6535                                    ;*OCTAL (ASCII) NUMBER AND TYPE IT.
6536                                    ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
6537                                    ;*CALL:
6538                                    ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
6539                                    ;*      TYPOS                   ;;CALL FOR TYPEOUT
6540                                    ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
6541                                    ;*      .BYTE   M               ;;M=1 OR 0
6542                                    ;*                                      ;;1=TYPE LEADING ZEROS
6543                                    ;*                                      ;;0=SUPPRESS LEADING ZEROS
6544                                    ;*
6545                                    ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
6546                                    ;*$TYPOS OR $TYPOC
6547                                    ;*CALL:
```

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                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPON                   ;;CALL FOR TYPEOUT
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT

036462  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
036466  116637  000001  036705          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
036474  112637  036707                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
036500  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
036504  000406                          BR      $TYPON
036506  112737  000001  036705  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
036514  112737  000006  036707          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
036522  112737  000005  036704  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
036530  010346                          MOV     R3,-(SP)        ;;SAVE R3
036532  010446                          MOV     R4,-(SP)        ;;SAVE R4
036534  010546                          MOV     R5,-(SP)        ;;SAVE R5
036536  113704  036707                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
036542  005404                          NEG     R4
036544  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAx. ALLOWED
036550  110437  036706                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
036554  113704  036705                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
036560  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
036564  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
036566  006105                  1$:     ROL     R5              ;;RO'ATE MSB INTO "C"
036570  000404                          BR      3$              ;;GO DO MSB
036572  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
036574  006105                          ROL     R5
036576  006105                          ROL     R5
036600  010503                          MOV     R5,R3
036602  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
036604  105337  036706                  DECB    $OMODE          ;;TYPE THIS DIGIT?
036610  100016                          BPL     7$              ;;BR IF NO
036612  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
036616  001002                          BNE     4$              ;;TEST FOR 0
036620  005704                          TST     R4              ;;SUPPRESS THIS 0?
036622  001403                          BEQ     5$              ;;BR IF YES
036624  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
036626  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
036632  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
036636  110337  036702                  MOVB    R3,8$           ;;SAVE FOR TYPING
036642  104401  036702                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
036646  105337  036704          7$:     DECB    $OCNT           ;;COUNT BY 1
036652  003347                          BGT     2$              ;;BR IF MORE TO DO
036654  002402                          BLT     6$              ;;BR IF DONE
036656  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
036660  000744                          BR      2$              ;;GO DO THE LAST DIGIT
036662  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
036664  012604                          MOV     (SP)+,R4        ;;RESTORE R4
036666  012603                          MOV     (SP)+,R3        ;;RESTORE R3
036670  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
036676  012616                          MOV     (SP)+,(SP)
036700  000002                          RTI                     ;;RETURN
036702     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
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6604  036703  000                     .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
6605  036704  000             $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
6606  036705  000             $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
6607  036706  000000          $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
6608                          .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
6609
6610                          ;;**************************************************************************
6611                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
6612                          ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
6613                          ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
6614                          ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
6615                          ;*REPLACED WITH SPACES.
6616                          ;*CALL:
6617                          ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
6618                          ;*      TYPDS                   ;;GO TO THE ROUTINE
6619
6620  036710                  $TYPDS:
6621  036710  010046                 MOV     R0,-(SP)        ;;PUSH R0 ON STACK
6622  036712  010146                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
6623  036714  010246                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
6624  036716  010346                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
6625  036720  010546                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
6626  036722  012746  020200         MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
6627  036726  016605  000020         MOV     20(SP),R5       ;;GET THE INPUT NUMBER
6628  036732  100004                 BPL     1$              ;;BR IF INPUT IS POS.
6629  036734  005405                 NEG     R5              ;;MAKE THE BINARY NUMBER POS.
6630  036736  112766  000055  000001 MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
6631  036744  005000          1$:    CLR     R0              ;;ZERO THE CONSTANTS INDEX
6632  036746  012703  037124         MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
6633  036752  112723  000040         MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
6634  036756  005002          2$:    CLR     R2              ;;CLEAR THE BCD NUMBER
6635  036760  016001  037114         MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
6636  036764  160105          3$:    SUB     R1,R5           ;;FORM THIS BCD DIGIT
6637  036766  002402                 BLT     4$              ;;BR IF DONE
6638  036770  005202                 INC     R2              ;;INCREASE THE BCD DIGIT BY 1
6639  036772  000774                 BR      3$
6640  036774  060105          4$:    ADD     R1,R5           ;;ADD BACK THE CONSTANT
6641  036776  005702                 TST     R2              ;;CHECK IF BCD DIGIT=0
6642  037000  001002                 BNE     5$              ;;FALL THROUGH IF 0
6643  037002  105716                 TSTB    (SP)            ;;STILL DOING LEADING 0'S?
6644  037004  100407                 BMI     7$              ;;BR IF YES
6645  037006  106316          5$:    ASLB    (SP)            ;;MSD?
6646  037010  103003                 BCC     6$              ;;BR IF NO
6647  037012  116663  000001 177777 MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
6648  037020  052702  000060  6$:    BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
6649  037024  052702  000040  7$:    BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
6650  037030  110223                 MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
6651  037032  005720                 TST     (R0)+           ;;JUST INCREMENTING
6652  037034  020027  000010         CMP     R0,#10          ;;CHECK THE TABLE INDEX
6653  037040  002746                 BLT     2$              ;;GO DO THE NEXT DIGIT
6654  037042  003002                 BGT     8$              ;;GO TO EXIT
6655  037044  010502                 MOV     R5,R2           ;;GET THE LSD
6656  037046  000764                 BR      6$              ;;GO CHANGE TO ASCII
6657  037050  105726          8$:    TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
6658  037052  100003                 BPL     9$              ;;BR IF NO
6659  037054  116663  177777 177776 MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
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6660  037062  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
6661  037064  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
6662  037066  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
6663  037070  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
6664  037072  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
6665  037074  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
6666  037076  104401  037124                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
6667  037102  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
6668  037110  012616                          MOV     (SP)+,(SP)
6669  037112  000002                          RTI                     ;;RETURN TO USER
6670  037114  023420                  $DTBL:  10000.
6671  037116  001750                          1000.
6672  037120  000144                          100.
6673  037122  000012                          10.
6674  037124  000004                  $DBLK:  .BLKW   4
6675                                  .SBTTL  TTY INPUT ROUTINE
6676
6677                                  ;;**********************************************************************
6678                                  .ENABL  LSB
6679  037134  000000                  $TKCNT: .WORD   0               ;;NUMBER OF ITEMS IN QUEUE
6680  037136  000000                  $TKQIN: .WORD   0               ;;INPUT POINTER
6681  037140  000000                  $TKQOUT: .WORD  0               ;;OUTPUT POINTER
6682  037142  000001                  $TKQSRT: .BLKB  1               ;;TTY KEYBOARD QUEUE
6683          037143                  $TKQEND=.
6684          037144                  .EVEN
6685
6686                                  ;*TK INITIALIZE ROUTINE
6687                                  ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
6688                                  ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
6689                                  ;
6690                                  ;*CALL:
6691                                  ;*      JSR     PC,$TKINT
6692                                  ;*      RETURN
6693                                  ;
6694  037144  005037  037134          $TKINT: CLR     $TKCNT          ;;CLEAR COUNT OF ITEMS IN QUEUE
6695  037150  012737  037142  037136          MOV     #$TKQSRT,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
6696  037156  013737  037136  037140          MOV     $TKQIN,$TKQOUT  ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
6697  037164  012737  037214  000060          MOV     #$TKSRV,@#TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
6698  037172  012737  000200  000062          MOV     #200,@#TKVEC+2  ;;"BR" LEVEL 4
6699  037200  005777  141742                  TST     @$TKB           ;;CLEAR DONE FLAG
6700  037204  012777  000100  141732          MOV     #100,@$TKS      ;;ENABLE TTY KEYBOARD INTERRUPT
6701  037212  000207                          RTS     PC              ;;RETURN TO CALLER
6702
6703                                  ;*TK SERVICE ROUTINE
6704                                  ;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
6705                                  ;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
6706                                  ;*IT IN THE QUEUE.
6707                                  ;*IF THE CHARACTER IS A "CONTROL-C" (^C) $TKINT IS CALLED AND
6708                                  ;*UPON RETURN EXIT IS MADE TO THE "CONTROL-C" RESTART ADDRESS (CTRHLT)
6709                                  ;
6710  037214  117746  141726          $TKSRV: MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
6711  037220  042716  177600                  BIC     #^C177,(SP)     ;;STRIP THE JUNK
6712  037224  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL C?
6713  037230  001007                          BNE     1$              ;;BRANCH IF NO
6714  037232  104401  040330                  TYPE    ,$CNILC         ;;TYPE A CONTROL-C (^C)
6715  037236  004737  037144                  JSR     PC,$TKINT       ;;INIT THE KEYBOARD
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6716  037242  005726                          TST     (SP)+           ;;CLEAN UP STACK
6717  037244  000137  033170                  JMP     CTRHLT          ;;CONTROL C RESTART
6718  037250  021627  000007          1$:     CMP     (SP),#7         ;;IS IT A CONTROL G?
6719  037254  001004                          BNE     2$              ;;BRANCH IF NO
6720  037256  022737  000176  001140          CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
6721  037264  001500                          BEQ     6$              ;;GO TO SWR CHANGE
6722
6723  037266                          2$:
6724  037266  022737  000001  037134          CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
6725  037274  001004                          BNE     3$              ;;BRANCH IF NO
6726  037276  104401  001204                  TYPE    ,$BELL          ;;RING THE TTY BELL
6727  037302  005726                          TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
6728  037304  000451                          BR      5$              ;;EXIT
6729  037306  021627  000023          3$:     CMP     (SP),#23        ;;IS IT A CONTROL-S?
6730  037312  001021                          BNE     32$             ;;BRANCH IF NO
6731  037314  005077  141624                  CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
6732  037320  005726                          TST     (SP)+           ;;CLEAN CHAR OFF STACK
6733  037322  105777  141616          31$:    TSTB    @$TKS           ;;WAIT FOR A CHAR
6734  037326  100375                          BPL     31$             ;;LOOP UNTIL ITS THERE
6735  037330  117746  141612                  MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
6736  037334  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
6737  037340  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
6738  037344  001366                          BNE     31$             ;;BRANCH IF NO
6739  037346  012777  000100  141570          MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
6740  037354  000002                          RTI                     ;;RETURN
6741  037356  005237  037134          32$:    INC     $TKCNT          ;;COUNT THIS CHARACTER
6742  037362  021627  000140                  CMP     (SP),#140       ;;IS IT UPPER CASE?
6743  037366  002405                          BLT     4$              ;;BRANCH IF YES
6744  037370  021627  000175                  CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
6745  037374  003002                          BGT     4$              ;;BRANCH IF YES
6746  037376  042716  000040                  BIC     #40,(SP)        ;;MAKE IT UPPER CASE
6747  037402  112677  177530          4$:     MOVB    (SP)+,@$TKQIN   ;;AND PUT IT IN QUEUE
6748  037406  005237  037136                  INC     $TKQIN          ;;UPDATE THE POINTER
6749  037412  023727  037136  037143          CMP     $TKQIN,#$TKQEND ;;GO OFF THE END?
6750  037420  001003                          BNE     5$              ;;BRANCH IF NO
6751  037422  012737  037142  037136          MOV     #$TKQSRT,$TKQIN ;;RESET THE POINTER
6752  037430  000002                  5$:     RTI                     ;;RETURN
6753
6754                                  ;;**********************************************************************
6755                                  ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
6756                                  ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
6757                                  ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
6758                                  ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
6759  037432  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED
6760  037440  001124                          BNE     15$             ;;EXIT IF NOT
6761  037442  105777  141476                  TSTB    @$TKS           ;;IS A CHAR WAITING?
6762  037446  100121                          BPL     15$             ;;IF NOT, EXIT
6763  037450  117746  141472                  MOVB    @$TKB,-(SP)     ;;YES
6764  037454  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT  7-BIT ASCII
6765  037460  021627  000007                  CMP     (SP),#7         ;;IS IT A CONTROL-G?
6766  037464  001300                          BNE     2$              ;;IF NOT, PUT IT IN THE TTY QUEUE
6767                                                                  ;;AND EXIT
6768
6769                                  ;;**********************************************************************
6770                                  ;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
6771                                  ;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
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 6772                                   ;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
 6773  037466  123727  001134  000001  6$:     CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
 6774  037474  001674                          BEQ     2$              ;;BRANCH IF YES
 6775  037476  005726                          TST     (SP)+           ;;CLEAR CONTROL-G OFF STACK
 6776  037500  004737  037144                  JSR     PC,$TKINT       ;;FLUSH THE TTY INPUT QUEUE
 6777  037504  005077  141434                  CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
 6778  037510  112737  000001  001135          MOVB    #1,$INTAG       ;;SET INTERRUPT MODE INDICATOR
 6779
 6780  037516  104401  040342                  TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
 6781  037522  104401  040347  $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
 6782  037526  013746  000176                  MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
 6783  037532  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 6784  037534  104401  040360                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
 6785  037540  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
 6786  037542  005046                          CLR     -(SP)           ;;THE NEW SWR
 6787  037544  105777  141374          7$:     TSTB    @$TKS           ;;CHAR THERE?
 6788  037550  100375                          BPL     7$              ;;IF NOT TRY AGAIN
 6789
 6790  037552  117746  141370                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
 6791  037556  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
 6792
 6793  037562  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL-C?
 6794  037566  001015                          BNE     9$              ;;BRANCH IF NOT
 6795  037570  104401  040330                  TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
 6796  037574  062706  000006                  ADD     #6,SP           ;;CLEAN UP STACK
 6797  037600  123727  001135  000001          CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
 6798  037606  001003                          BNE     8$              ;;BRANCH IF NO
 6799  037610  012777  000100  141326          MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
 6800  037616  000137  033170          8$:     JMP     CTRHLT          ;;CONTROL-C RESTART
 6801
 6802
 6803  037622  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
 6804  037626  001005                          BNE     10$             ;;BRANCH IF NOT
 6805  037630  104401  040335                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
 6806  037634  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
 6807  037640  000737                          BR      19$             ;;LET'S TRY IT AGAIN
 6808
 6809
 6810  037642  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
 6811  037646  001022                          BNE     16$             ;;BRANCH IF NO
 6812  037650  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
 6813  037654  001403                          BEQ     11$             ;;BRANCH IF YES
 6814  037656  016677  000002  141254          MOV     2(SP),@SWR      ;;SAVE NEW SWR
 6815  037664  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
 6816  037670  104401  001211          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
 6817  037674  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
 6818  037702  001003                          BNE     15$             ;;BRANCH IF NOT
 6819  037704  012777  000100  141232          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
 6820  037712  000002                  15$:    RTI                     ;;RETURN
 6821  037714  004737  036412          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
 6822  037720  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
 6823  037724  002420                          BLT     18$             ;;BRANCH IF YES
 6824  037726  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
 6825  037732  003015                          BGT     18$             ;;BRANCH IF YES
 6826  037734  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
 6827  037740  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
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 6828  037744  001403                    BEQ     17$             ;;BRANCH IF YES
 6829  037746  006316                    ASL     (SP)            ;;NO, SHIFT PRESENT
 6830  037750  006316                    ASL     (SP)            ;;   CHAR OVER TO MAKE
 6831  037752  006316                    ASL     (SP)            ;;   ROOM FOR NEW ONE.
 6832  037754  005266  000002    17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
 6833  037760  056616  177776            BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
 6834  037764  000667                    BR      7$              ;;GET THE NEXT ONE
 6835  037766  104401  001210    18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
 6836  037772  000720                    BR      20$             ;;SIMULATE CONTROL-U
 6837                          .DSABL  LSB
 6838
 6839
 6840                          ;;*****************************************************************
 6841                          ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
 6842                          ;*CALL:
 6843                          ;*      RDCHR                   ;;GET A CHARACTER FROM THE QUEUE
 6844                          ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
 6845                          ;*                              ;;WITH PARITY BIT STRIPPED OFF
 6846                          ;
 6847
 6848  037774  011646            $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC AND
 6849  037776  016666  000004  000002    MOV     4(SP),2(SP)     ;;THE PS
 6850  040004  005066  000004            CLR     4(SP)           ;;GET READY FOR A CHARACTER
 6851  040010  005046                    CLR     -(SP)           ;;PUT NEW PS ON STACK
 6852  040012  012746  040020            MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
 6853  040016  000002                    RTI                     ;;POP NEW PC AND PS
 6854  040020                    64$:
 6855  040020  005737  037134    1$:     TST     $TKCNT          ;;WAIT ON A CHARACTER
 6856  040024  001775                    BEQ     1$
 6857  040026  005337  037134            DEC     $TKCNT          ;;DECREMENT THE COUNTER
 6858  040032  117766  177102  000004    MOVB    @$TKQOUT,4(SP)  ;;GET ONE CHARACTER
 6859  040040  005237  037140            INC     $TKQOUT         ;;UPDATE THE POINTER
 6860  040044  023727  037140  037143    CMP     $TKQOUT,#$TKQEND ;;DID IT GO OFF OF THE END?
 6861  040052  001003                    BNE     2$              ;;BRANCH IF NO
 6862  040054  012737  037142  037140    MOV     #$TKQSRT,$TKQOUT ;;RESET THE POINTER
 6863  040062  000002            2$:     RTI                     ;;RETURN
 6864                          ;;*****************************************************************
 6865                          ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
 6866                          ;*CALL:
 6867                          ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
 6868                          ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
 6869                          ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
 6870
 6871  040064  010346            $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
 6872  040066  005046                    CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
 6873  040070  012703  040320    1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
 6874  040074  022703  040330    2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
 6875  040100  101456                    BLOS    4$              ;;BR IF YES
 6876  040102  104410                    RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
 6877  040104  112613                    MOVB    (SP)+,(R3)      ;;GET CHARACTER
 6878  040106  122713  000177    10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
 6879  040112  001022                    BNE     5$              ;;BR IF NO
 6880  040114  005716                    TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
 6881  040116  001007                    BNE     6$              ;;BR IF NO
 6882  040120  112737  000134  040316    MOVB    #'\,9$          ;;TYPE A BACK SLASH
 6883  040126  104401  040316            TYPE    ,9$
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 6884  040132  012716  177777                    MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
 6885  040136  005303                    6$:     DEC     R3              ;;BACKUP BY ONE
 6886  040140  020327  040320                    CMP     R3,#$TTYIN      ;;STACK EMPTY?
 6887  040144  103434                            BLO     4$              ;;BR IF YES
 6888  040146  111337  040316                    MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
 6889  040152  104401  040316                    TYPE    ,9$             ;;GO TYPE
 6890  040156  000746                            BR      2$              ;;GO READ ANOTHER CHAR.
 6891  040160  005716                    5$:     TST     (SP)            ;;RUBOUT KEY SET?
 6892  040162  001406                            BEQ     7$              ;;BR IF NO
 6893  040164  112737  000134  040316            MOVB    #'\,9$          ;;TYPE A BACK SLASH
 6894  040172  104401  040316                    TYPE    ,9$
 6895  040176  005016                            CLR     (SP)            ;;CLEAR THE RUBOUT KEY
 6896  040200  122713  000025            7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
 6897  040204  001003                            BNE     8$              ;;BR IF NO
 6898  040206  104401  040335                    TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
 6899  040212  000726                            BR      1$              ;;GO START OVER
 6900  040214  122713  000022            8$:     CMPB    #22,(R3)        ;;IS CHARACTER A "^R"?
 6901  040220  001011                            BNE     3$              ;;BRANCH IF NO
 6902  040222  105013                            CLRB    (R3)            ;;CLEAR THE CHARACTER
 6903  040224  104401  001211                    TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
 6904  040230  104401  040320                    TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
 6905  040234  000717                            BR      2$              ;;GO PICKUP ANOTHER CHACTER
 6906  040236  104401  001210            4$:     TYPE    ,$QUES          ;;TYPE A '?'
 6907  040242  000712                            BR      1$              ;;CLEAR THE BUFFER AND LOOP
 6908  040244  111337  040316            3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
 6909  040250  104401  040316                    TYPE    ,9$
 6910  040254  122723  000015                    CMPB    #15,(R3)+       ;;CHECK FOR RETURN
 6911  040260  001305                            BNE     2$              ;;LOOP IF NOT RETURN
 6912  040262  105063  177777                    CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
 6913  040266  104401  001212                    TYPE    ,$LF            ;;TYPE A LINE FEED
 6914  040272  005726                            TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
 6915  040274  012603                            MOV     (SP)+,R3        ;;RESTORE R3
 6916  040276  011646                            MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
 6917  040300  016666  000004  000002            MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
 6918  040306  012766  040320  000004            MOV     #$TTYIN,4(SP)
 6919  040314  000002                            RTI                     ;;RETURN
 6920  040316     000                    9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
 6921  040317     000                            .BYTE   0               ;;TERMINATOR
 6922  040320  000010                    $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
 6923  040330  041536  005015     000    $CNTLC: .ASCIZ  /^C/<15><12>    ;;CONTROL "C"
 6924  040335     136  006525  000012    $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
 6925  040342  043536  005015     000    $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
 6926  040347     015  051412  051127    $MSWR:  .ASCIZ  <15><12>/SWR = /
 6927  040354  036440  000040
 6928  040360  020040  042516  020127    $MNEW:  .ASCIZ  /  NEW = /
 6929  040366  020075     000
 6930          040372                    .EVEN
 6931                                    .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
 6932
 6933                                    ;;**************************************************************
 6934                                    ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
 6935                                    ;*CHANGE IT TO BINARY.
 6936                                    ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
 6937                                    ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
 6938                                    ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
 6939                                    ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
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```
                                        ;*CALL:
                                        ;*      RDOCT                   ;;READ AN OCTAL NUMBER
                                        ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
                                        ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT

040372  011646                 $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
040374  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
040402  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
040404  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
040406  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
040410  104411                  1$:     RDLIN                   ;;READ AN ASCIZ LINE
040412  012600                          MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
040414  010037  040520                  MOV     R0,5$           ;;AND SAVE IT
040420  005001                          CLR     R1              ;;CLEAR DATA WORD
040422  005002                          CLR     R2
040424  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
040426  001420                          BEQ     3$              ;;IF ZERO GET OUT
040430  122716  000060                  CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
040434  003026                          BGT     4$              ;;IS AN OCTAL DIGIT
040436  122716  000067                  CMPB    #'7,(SP)
040442  002423                          BLT     4$
040444  006301                          ASL     R1              ;;*2
040446  006102                          ROL     R2
040450  006301                          ASL     R1              ;;*4
040452  006102                          ROL     R2
040454  006301                          ASL     R1              ;;*8
040456  006102                          ROL     R2
040460  042716  177770                  BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
040464  062601                          ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
040466  000756                          BR      2$              ;;LOOP
040470  005726                  3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
040472  010166  000012                  MOV     R1,12(SP)       ;;SAVE THE RESULT
040476  010237  040530                  MOV     R2,$HIOCT
040502  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
040504  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
040506  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
040510  000002                          RTI                     ;;RETURN
040512  005726                  4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
040514  105010                          CLRB    (R0)            ;;SET A TERMINATOR
040516  104401                          TYPE                    ;;TYPE UP THRU THE BAD CHAR.
040520  000000                  5$:     .WORD   0
040522  104401  001210                  TYPE    ,$QUES          ;;"?" "CR" & "LF"
040526  000730                          BR      1$              ;;TRY AGAIN
040530  000000                  $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
                                .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES

                                ;;**************************************************************
                                ;*SAVE R0-R5
                                ;*CALL:
                                ;*      SAVREG
                                ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
                                ;*
                                ;*TOP---(+16)
                                ;* +2---(+18)
                                ;* +4---R5
                                ;* +6---R4
```

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                                        ;* +8---R3
                                        ;**10---R2
                                        ;**12---R1
                                        ;**14---R0
                                        
040532                                  $SAVREG:
040532  010046                                 MOV     R0,-(SP)        ;;PUSH R0 ON STACK
040534  010146                                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
040536  010246                                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
040540  010346                                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
040542  010446                                 MOV     R4,-(SP)        ;;PUSH R4 ON STACK
040544  010546                                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
040546  016646  000022                         MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
040552  016646  000022                         MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
040556  016646  000022                         MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
040562  016646  000022                         MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
040566  000002                                 RTI
                                        
                                        ;*RESTORE R0-R5
                                        ;*CALL:
                                        ;*      RESREG
040570                                  $RESREG:
040570  012666  000022                         MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
040574  012666  000022                         MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
040600  012666  000022                         MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
040604  012666  000022                         MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
040610  012605                                 MOV     (SP)+,R5        ;;POP STACK INTO R5
040612  012604                                 MOV     (SP)+,R4        ;;POP STACK INTO R4
040614  012603                                 MOV     (SP)+,R3        ;;POP STACK INTO R3
040616  012602                                 MOV     (SP)+,R2        ;;POP STACK INTO R2
040620  012601                                 MOV     (SP)+,R1        ;;POP STACK INTO R1
040622  012600                                 MOV     (SP)+,R0        ;;POP STACK INTO R0
040624  000002                                 RTI
                                        
                                        .SBTTL  POWER DOWN AND UP ROUTINE
                                        
                                        ;;**************************************************************
                                        
                                        ;POWER DOWN ROUTINE
040626  017737  140306  003312         $PWRDN: MOV     @SWR,SAVSWR     ;SAVE SWITCH REGISTER
040634  012737  040654  000024                 MOV     #$PWRUP,PWRVEC  ;SET UP VECTOR
040642  012737  000340  000026                 MOV     #PR7,PWRVEC+2
040650  000000                                 HALT
040652  000776                                 BR      .-2     ;HANG UP
                                        
                                        ;;**************************************************************
                                        
                                        ;POWER UP ROUTINE
040654  005037  040744                 $PWRUP: CLR     $PWRCT          ;LOAD WAIT COUNT
040660  012737  000144  040746                 MOV     #100.,$PWRCT+2
040666  005237  040744                 1$:     INC     $PWRCT          ;WAIT FOR TELETYPE
040672  001375                                 BNE     1$
040674  005337  040746                         DEC     $PWRCT+2
040700  001372                                 BNE     1$
040702  012737  040626  000024                 MOV     #$PWRDN,PWRVEC  ;SET UP FOR POWER DOWN VECTOR
040710  012737  000340  000026                 MOV     #PR7,PWRVEC+2
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 7052  040716  012706  001100                  MOV     #STACK,SP       ;FORCE STACK
 7053  040722  104401  040750                  TYPE    ,$POWER         ;TYPE POWER
 7054  040726  013777  003312  140204          MOV     SAVSWR,@SWR     ;RESTORE SWITCH REGISTER
 7055  040734  013702  001270                  MOV     $BASE,R2        ;REINITIALISE R2 FOR '611 BASE
 7056  040740  000177  140142                  JMP     @$LPADR ;GO BACK TO LAST TEST
 7057
 7058  040744  000000  000000          $PWRCT: .WORD   0,0             ;TELETYPE TIME OUT
 7059  040750  047520  042527  000122  $POWER: .ASCIZ  /POWER/
 7060                                          .EVEN
 7061                                  .SBTTL  TRAP DECODER
 7062
 7063                                  ;;**************************************************************
 7064                                  ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
 7065                                  ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 7066                                  ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 7067                                  ;*GO TO THAT ROUTINE.
 7068
 7069  040756  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
 7070  040760  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
 7071  040764  005740                          TST     -(R0)           ;;BACKUP BY 2
 7072  040766  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
 7073  040770  006300                          ASL     R0              ;;POSITION FOR INDEXING
 7074  040772  016000  041012                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
 7075  040776  000200                          RTS     R0              ;;GO TO ROUTINE
 7076
 7077
 7078                                  ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
 7079
 7080  041000  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
 7081  041002  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
 7082  041010  000002                          RTI                     ;;RESTORE THE PSW
 7083
 7084                                  .SBTTL  TRAP TABLE
 7085
 7086                                  ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
 7087                                  ;*BY THE "TRAP" INSTRUCTION.
 7088
 7089                                  ;       ROUTINE
 7090                                  ;       -------
 7091  041012  041000                  $TRPAD: .WORD   $TRAP2
 7092  041014  036200                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
 7093  041016  036506                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 7094  041020  036462                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 7095  041022  036522                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 7096  041024  036710                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
 7097
 7098  041026  037522                          $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
 7099
 7100  041030  037432                          $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
 7101  041032  037774                          $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
 7102  041034  040064                          $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
 7103  041036  040372                          $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
 7104  041040  040532                          $SAVREG ;;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
 7105  041042  040570                          $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
 7106  041044  033676                          SCOP1$  ;;CALL=SCOP1    TRAP+15(104415) INTERNAL LOOP ON ERROR
 7107                                  .SBTTL  DATA TABLE FOR PRINT OUT
```

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7108
7109  041046  001220  003244          DT000:  .WORD   $TESTN,TRAPPC
7110  041052  001220  001116  003224  DT002:  .WORD   $TESTN,$ERRPC,E.MR1,T.MR1,P1.BIT,PR.BIT,M1.BIT,M2.BIT,BITCNT
7111  041060  003164  003252  003254
7112  041066  003256  003260  003262
7113  041074  001220  001116  003200  DT003:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,E.MR2,T.MR2,E.MR3,T.MR3
7114  041102  003140  003226  003166
7115  041110  003230  003170
7116  041114  001220  001116  003200  DT041:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,E.CS2,T.CS2,E.ER,T.ER,E.BA,T.BA,E.WC,T.WC
7117  041122  003140  003210  003150
7118  041130  003214  003154  003204
7119  041136  003144  003202  003142
7120  041144  001220  001116  003200  DT046:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,E.CS2,T.CS2,E.ER,T.ER
7121  041152  003140  003210  003150
7122  041160  003214  003154
7123  041164  001220  001116  003222  DT051:  .WORD   $TESTN,$ERRPC,E.DB,T.DB,WRDCNT
7124  041172  003162  003264
7125  041176  001220  001116  003200  DT052:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,T.CS2,T.ER
7126  041204  003140  003150  003154
7127  041212  001220  001116  003224  DT053:  .WORD   $TESTN,$ERRPC,E.MR1,T.MR1
7128  041220  003164
7129  041222  001220  001116  003220  DT054:  .WORD   $TESTN,$ERRPC,E.DCYL,T.DCYL,E.DA,T.DA
7130  041230  003160  003206  003146
7131  041236  001220  001116  003200  DT071:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,E.CS2,T.CS2,E.ER,T.ER
7132  041244  003140  003210  003150
7133  041252  003214  003154
7134  041256  053564  053566  053570          .WORD   VRCHDR,VRCHDR+2,VRCHDR+4
7135  041264  001220  001116  003200  DT074:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,E.CS2,T.CS2,E.ER,T.ER,HDRCNT
7136  041272  003140  003210  003150
7137  041300  003214  003154  003310
7138  041306  001220  001116  003224  DT077:  .WORD   $TESTN,$ERRPC,E.MR1,T.MR1,HDRCNT
7139  041314  003164  003310
7140  041320  001220  001116  003234  DT134:  .WORD   $TESTN,$ERRPC,E.ECPT,T.ECPT,BITCNT
7141  041326  003174  003262
7142  041332  001220  001116  003200  DT144:  .WORD   $TESTN,$ERRPC,E.CS1,T.CS1,E.CS2,T.CS2,E.ER,T.ER
7143  041340  003140  003210  003150
7144  041346  003214  003154
7145  041352  003204  003144  003202          .WORD   E.BA,T.BA,E.WC,T.WC,E.DCYL,T.DCYL,E.DA,T.DA
7146  041360  003142  003220  003160
7147  041366  003206  003146
7148  041372  001220  001116  003234  DT151:  .WORD   $TESTN,$ERRPC,E.ECPT,T.ECPT
7149  041400  003174
7150                                  .SBTTL  DATA FORMAT FOR PRINT OUT
7151
7152  041402  000001                  DF000:  .WORD   1
7153  041404     002      000                 .BYTE   2,0
7154  041406  000005                  DF002:  .WORD   5
7155  041410     000      000                 .BYTE   0,0
7156  041412  042455                          .WORD   DH000A
7157  041414     000      000                 .BYTE   0,0
7158  041416  042473                          .WORD   DH000B
7159  041420     002      000                 .BYTE   2,0
7160  041422  042537                          .WORD   DH002A
7161  041424     000      000                 .BYTE   0,0
7162  041426  042623                          .WORD   DH002B
7163  041430     007      000                 .BYTE   7,0
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 7164  041432  00005                DF003:  .WORD   5               ;ERROR 3-24
 7165  041434    000     000                .BYTE   0,0
 7166  041436  042455                       .WORD   DH000A
 7167  041440    000     000                .BYTE   0,0
 7168  041442  042473                       .WORD   DH000B
 7169  041444    002     000                .BYTE   2,0
 7170  041446  042711                       .WORD   DH003A
 7171  041450    000     000                .BYTE   0,0
 7172  041452  042770                       .WORD   DH003B
 7173  041454    006     000                .BYTE   6,0
 7174  041456  000005                DF025:  .WORD   5               ;ERROR 25-40
 7175  041460    000     000                .BYTE   0,0
 7176  041462  042455                       .WORD   DH000A
 7177  041464    000     000                .BYTE   0,0
 7178  041466  042473                       .WORD   DH000B
 7179  041470    002     000                .BYTE   2,0
 7180  041472  043047                       .WORD   DH025A
 7181  041474    000     000                .BYTE   0,0
 7182  041476  043126                       .WORD   DH025B
 7183  041500    006     000                .BYTE   6,0
 7184  041502  000007                DF041:  .WORD   7
 7185  041504    000     000                .BYTE   0,0
 7186  041506  042455                       .WORD   DH000A
 7187  041510    000     000                .BYTE   0,0
 7188  041512  042473                       .WORD   DH000B
 7189  041514    002     000                .BYTE   2,0
 7190  041516  043206                       .WORD   DH041A
 7191  041520    000     000                .BYTE   0,0
 7192  041522  043265                       .WORD   DH041B
 7193  041524    006     000                .BYTE   6,0
 7194  041526  043342                       .WORD   DH041C
 7195  041530    000     000                .BYTE   0,0
 7196  041532  043401                       .WORD   DH041D
 7197  041534    004     000                .BYTE   4,0
 7198  041536  000005                DF046:  .WORD   5
 7199  041540    000     000                .BYTE   0,0
 7200  041542  042455                       .WORD   DH000A
 7201  041544    000     000                .BYTE   0,0
 7202  041546  042473                       .WORD   DH000B
 7203  041550    002     000                .BYTE   2,0
 7204  041552  043206                       .WORD   DH041A
 7205  041554    000     000                .BYTE   0,0
 7206  041556  043265                       .WORD   DH041B
 7207  041560    006     000                .BYTE   6,0
 7208  041562  000005                DF051:  .WORD   5
 7209  041564    000     000                .BYTE   0,0
 7210  041566  042455                       .WORD   DH000A
 7211  041570    000     000                .BYTE   0,0
 7212  041572  042473                       .WORD   DH000B
 7213  041574    002     000                .BYTE   2,0
 7214  041576  043436                       .WORD   DH051A
 7215  041600    000     000                .BYTE   0,0
 7216  041602  043463                       .WORD   DH051B
 7217  041604    003     000                .BYTE   3,0
 7218  041606  000005                DF052:  .WORD   5
 7219  041610    000     000                .BYTE   0,0
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 7220  041612  042455                        .WORD   DH000A
 7221  041614     000      000               .BYTE   0,0
 7222  041616  042473                        .WORD   DH000B
 7223  041620     002      000               .BYTE   2,0
 7224  041622  043511                        .WORD   DH052A
 7225  041624     000      000               .BYTE   0,0
 7226  041626  043530                        .WORD   DH052B
 7227  041630     004      000               .BYTE   4,0
 7228  041632  000005                DF053:  .WORD   5
 7229  041634     000      000               .BYTE   0,0
 7230  041636  042455                        .WORD   DH000A
 7231  041640     000      000               .BYTE   0,0
 7232  041642  042473                        .WORD   DH000B
 7233  041644     002      000               .BYTE   2,0
 7234  041646  043565                        .WORD   DH053A
 7235  041650     000      000               .BYTE   0,0
 7236  041652  043604                        .WORD   DH053B
 7237  041654     002      000               .BYTE   2,0
 7238  041656  000005                DF054:  .WORD   5               ;ERROR-54-61
 7239  041660     000      000               .BYTE   0,0
 7240  041662  042455                        .WORD   DH000A
 7241  041664     000      000               .BYTE   0,0
 7242  041666  042473                        .WORD   DH000B
 7243  041670     002      000               .BYTE   2,0
 7244  041672  043622                        .WORD   DH054A
 7245  041674     000      000               .BYTE   0,0
 7246  041676  043661                        .WORD   DH054B
 7247  041700     004      000               .BYTE   4,0
 7248  041702  000007                DF071:  .WORD   7               ;ERRORS 71-73
 7249  041704     000      000               .BYTE   0,0
 7250  041706  042455                        .WORD   DH000A
 7251  041710     000      000               .BYTE   0,0
 7252  041712  042473                        .WORD   DH000B
 7253  041714     002      000               .BYTE   2,0
 7254  041716  043206                        .WORD   DH041A
 7255  041720     000      000               .BYTE   0,0
 7256  041722  043265                        .WORD   DH041B
 7257  041724     006      000               .BYTE   6,0
 7258  041726  043716                        .WORD   DH071A
 7259  041730     000      000               .BYTE   0,0
 7260  041732  043737                        .WORD   DH071B
 7261  041734     003      000               .BYTE   3,0
 7262  041736  000005                DF074:  .WORD   5
 7263  041740     000      000               .BYTE   0,0
 7264  041742  042455                        .WORD   DH000A
 7265  041744     000      000               .BYTE   0,0
 7266  041746  042473                        .WORD   DH000B
 7267  041750     002      000               .BYTE   2,0
 7268  041752  043766                        .WORD   DH074A
 7269  041754     000      000               .BYTE   0,0
 7270  041756  044055                        .WORD   DH074B
 7271  041760     007      000               .BYTE   7,0
 7272  041762  000005                DF077:  .WORD   5
 7273  041764     000      000               .BYTE   0,0
 7274  041766  042455                        .WORD   DH000A
 7275  041770     000      000               .BYTE   0,0
```

```
 7276  041772  042473                          .WORD   DH000B
 7277  041774     002     000                  .BYTE   2,0
 7278  041776  044141                          .WORD   DH077A
 7279  042000     000     000                  .BYTE   0,0
 7280  042002  044170                          .WORD   DH077B
 7281  042004     003     000                  .BYTE   3,0
 7282  042006  000005                  DF134:  .WORD   5
 7283  042010     000     000                  .BYTE   0,0
 7284  042012  042455                          .WORD   DH000A
 7285  042014     000     000                  .BYTE   0,0
 7286  042016  042473                          .WORD   DH000B
 7287  042020     002     000                  .BYTE   2,0
 7288  042022  044214                          .WORD   DH134A
 7289  042024     000     000                  .BYTE   0,0
 7290  042026  044240                          .WORD   DH134B
 7291  042030     003     000                  .BYTE   3,0
 7292  042032  000007                  DF144:  .WORD   7
 7293  042034     000     000                  .BYTE   0,0
 7294  042036  042455                          .WORD   DH000A
 7295  042040     000     000                  .BYTE   0,0
 7296  042042  042473                          .WORD   DH000B
 7297  042044     002     000                  .BYTE   2,0
 7298  042046  043206                          .WORD   DH041A
 7299  042050     000     000                  .BYTE   0,0
 7300  042052  043265                          .WORD   DH041B
 7301  042054     006     000                  .BYTE   6,0
 7302  042056  044266                          .WORD   DH144A
 7303  042060     000     000                  .BYTE   0,0
 7304  042062  044365                          .WORD   DH144B
 7305  042064     010     000                  .BYTE   10,0
 7306  042066  000005                  DF151:  .WORD   5
 7307  042070     000     000                  .BYTE   0,0
 7308  042072  042455                          .WORD   DH000A
 7309  042074     000     000                  .BYTE   0,0
 7310  042076  042473                          .WORD   DH000B
 7311  042100     002     000                  .BYTE   2,0
 7312  042102  043511                          .WORD   DH052A
 7313  042104     000     000                  .BYTE   0,0
 7314  042106  044462                          .WORD   DH151A
 7315  042110     002     000                  .BYTE   2,0
 7316                                  .SBTTL  ASCII MESSAGES
 7317
 7318  042112  005015  045522  030466  OPR001: .ASCIZ  <15><12>/RK611 BUS ADDRESS ( /
 7319  042120  020061  052502  020123
 7320  042126  042101  051104  051505
 7321  042134  020123  020050     000
 7322  042141     040  020051  020075  OPR002: .ASCIZ  / ) = /
 7323  042146     000
 7324  042147     122  033113  030461  OPR003: .ASCIZ  /RK611 VECTOR ADDRESS ( /
 7325  042154  053040  041505  047524
 7326  042162  020122  042101  051104
 7327  042170  051505  020123  020050
 7328  042176     000
 7329  042177     122  033113  030461  OPR004: .ASCIZ  /RK611 PRIORITY ( /
 7330  042204  050040  044522  051117
 7331  042212  052111  020131  020050
```

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 7332  042220     000
 7333  042221     015  025012  025052  OPR005: .ASCIZ  <15><12>/***** PROGRAM HALTED *****/<15><12>
 7334  042226  025052  020040  051120
 7335  042234  043517  040522  020115
 7336  042242  040510  052114  042105
 7337  042250  025040  025052  025052
 7338  042256  005015     000
 7339  042261     015  051412  041505  OPR006: .ASCIZ  <15><12>/SECOND PASS RUN TIME IS APPROX 3:15 MINUTES/<15><12>
 7340  042266  047117  020104  040520
 7341  042274  051523  051040  047125
 7342  042302  052040  046511  020105
 7343  042310  051511  040440  050120
 7344  042316  047522  020130  035063
 7345  042324  032461  046440  047111
 7346  042332  052125  051505  005015
 7347  042340     000
 7348  042341     040  000040          SPACE2: .ASCIZ  / /
 7349  042344  005015  051120  043517  ABORT:  .ASCIZ  <15><12>/PROGRAM ABORTED BECAUSE ERROR THRESHOLD EXCEEDED/<15><12>
 7350  042352  040522  020115  041101
 7351  042360  051117  042524  020104
 7352  042366  042502  040503  051525
 7353  042374  020105  051105  047522
 7354  042402  020122  044124  042522
 7355  042410  044123  046117  020104
 7356  042416  054105  042503  042105
 7357  042424  042105  005015     000
 7358  042431     015  052012  051505  TSTBY1: .ASCIZ  <15><12>/TEST /
 7359  042436  020124     000
 7360  042441     040  054502  040520  TSTBY2: .ASCIZ  / BYPASSED/<15><12>
 7361  042446  051523  042105  005015
 7362  042454     000
 7363                                  .SBTTL  DATA HEADERS
 7364
 7365  042455     124  051505  020124  DH000A: .ASCIZ  /TEST    ERROR/
 7366  042462  020040  042440  051122
 7367  042470  051117     000
 7368  042473     116  046525  020040  DH000B: .ASCIZ  /NUM     PC/
 7369  042500  020040  050040  000103
 7370  042506  042524  052123  020040  DH000C: .ASCII  /TEST    TRAP/<15><12>
 7371  042514  020040  051124  050101
 7372  042522  005015
 7373  042524  052516  020115  020040          .ASCIZ  /NUM     PC/
 7374  042532  020040  041520     000
 7375  042537     105  050130  041505  DH002A: .ASCIZ  /EXPECT  ACTUAL  PRESENT PRESENT PRESENT PRESENT BIT/
 7376  042544  020124  040440  052103
 7377  042552  040525  020114  050040
 7378  042560  042522  042523  052116
 7379  042566  050040  042522  042523
 7380  042574  052116  050040  042522
 7381  042602  042523  052116  050040
 7382  042610  042522  042523  052116
 7383  042616  041040  052111     000
 7384  042623     122  046513  030522  DH002B: .ASCIZ  /RKMR1   RKMR1   BIT+1   BIT     BIT-1   BIT-2   COUNT/
 7385  042630  020040  051040  046513
 7386  042636  030522  020040  041040
 7387  042644  052111  030453  020040
```

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 7388  042652  041040  052111  020040
 7389  042660  020040  041040  052111
 7390  042666  030455  020040  041040
 7391  042674  052111  031055  020040
 7392  042702  041440  052517  052116
 7393  042710     000
 7394  042711     105  050130  041505  DH003A: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL  EXPECT  ACTUAL/
 7395  042716  020124  040440  052103
 7396  042724  040525  020114  042440
 7397  042732  050130  041505  020124
 7398  042740  040440  052103  040525
 7399  042746  020114  042440  050130
 7400  042754  041505  020124  040440
 7401  042762  052103  040525  000114
 7402  042770  045522  051503  020061  DH003B: .ASCIZ  /RKCS1   RKCS1   MESS A  MESS A  MESS B  MESS B/
 7403  042776  020040  045522  051503
 7404  043004  020061  020040  042515
 7405  043012  051523  040440  020040
 7406  043020  042515  051523  040440
 7407  043026  020040  042515  051523
 7408  043034  041040  020040  042515
 7409  043042  051523  041040     000
 7410  043047     105  050130  041505  DH025A: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL  EXPECT  ACTUAL/
 7411  043054  020124  040440  052103
 7412  043062  040525  020114  042440
 7413  043070  050130  041505  020124
 7414  043076  040440  052103  040525
 7415  043104  020114  042440  050130
 7416  043112  041505  020124  040440
 7417  043120  052103  040525  000114
 7418  043126  045522  051503  020061  DH025B: .ASCIZ  /RKCS1   RKCS1   HD WD 1 HD WD 1 HD WD 2 HD WD 2/
 7419  043134  020040  045522  051503
 7420  043142  020061  020040  042110
 7421  043150  053440  020104  020061
 7422  043156  042110  053440  020104
 7423  043164  020061  042110  053440
 7424  043172  020104  020062  042110
 7425  043200  053440  020104  000062
 7426  043206  054105  042520  052103  DH041A: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL  EXPECT  ACTUAL/
 7427  043214  020040  041501  052524
 7428  043222  046101  020040  054105
 7429  043230  042520  052103  020040
 7430  043236  041501  052524  046101
 7431  043244  020040  054105  042520
 7432  043252  052103  020040  041501
 7433  043260  052524  046101     000
 7434  043265     122  041513  030523  DH041B: .ASCIZ  /RKCS1   RKCS1   RKCS2   RKCS2   RKER    RKER/
 7435  043272  020040  051040  041513
 7436  043300  030523  020040  051040
 7437  043306  041513  031123  020040
 7438  043314  051040  041513  031123
 7439  043322  020040  051040  042513
 7440  043330  020122  020040  051040
 7441  043336  042513  000122
 7442  043342  054105  042520  052103  DH041C: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL/
 7443  043350  020040  041501  052524
```

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 7444  043356  046101  020040  054105
 7445  043364  042520  052103  020040
 7446  043372  041501  052524  046101
 7447  043400     000
 7448  043401     122  041113  020101  DH041D: .ASCIZ  /RKBA    RKBA    RKWC    RKWC/
 7449  043406  020040  051040  041113
 7450  043414  020101  020040  051040
 7451  043422  053513  020103  020040
 7452  043430  051040  053513  000103
 7453  043436  040504  040524  020040  DH051A: .ASCIZ  /DATA    DATA    WORD/
 7454  043444  020040  040504  040524
 7455  043452  020040  020040  047527
 7456  043460  042122     000
 7457  043463     105  050130  041505  DH051B: .ASCIZ  /EXPECT  READ    COUNT/
 7458  043470  020124  051040  040505
 7459  043476  020104  020040  041440
 7460  043504  052517  052116     000
 7461  043511     105  050130  041505  DH052A: .ASCIZ  /EXPECT  ACTUAL/
 7462  043516  020124  040440  052103
 7463  043524  040525  000114
 7464  043530  045522  051503  020061  DH052B: .ASCIZ  /RKCS1   RKCS1   RKCS2   RKER/
 7465  043536  020040  045522  051503
 7466  043544  020061  020040  045522
 7467  043552  051503  020062  020040
 7468  043560  045522  051105     000
 7469  043565     105  050130  041505  DH053A: .ASCIZ  /EXPECT  ACTUAL/
 7470  043572  020124  040440  052103
 7471  043600  040525  000114
 7472  043604  045522  051115  020061  DH053B: .ASCIZ  /RKMR1   RKMR1/
 7473  043612  020040  045522  051115
 7474  043620  000061
 7475  043622  054105  042520  052103  DH054A: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL/
 7476  043630  020040  041501  052524
 7477  043636  046101  020040  054105
 7478  043644  042520  052103  020040
 7479  043652  041501  052524  046101
 7480  043660     000
 7481  043661     122  042113  054503  DH054B: .ASCIZ  /RKDCYL  RKDCYL  RKDA    RKDA/
 7482  043666  020114  051040  042113
 7483  043674  054503  020114  051040
 7484  043702  042113  020101  020040
 7485  043710  051040  042113  000101
 7486  043716  042510  042101  051105  DH071A: .ASCIZ  /HEADER SIMULATED/
 7487  043724  051440  046511  046125
 7488  043732  052101  042105     000
 7489  043737     127  051117  020104  DH071B: .ASCIZ  /WORD 1  WORD 2  WORD 3/
 7490  043744  020061  053440  051117
 7491  043752  020104  020062  053440
 7492  043760  051117  020104  000063
 7493  043766  054105  042520  052103  DH074A: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL  EXPECT  ACTUAL  HEADER/
 7494  043774  020040  041501  052524
 7495  044002  046101  020040  054105
 7496  044010  042520  052103  020040
 7497  044016  041501  052524  046101
 7498  044024  020040  054105  042520
 7499  044032  052103  020040  041501
```

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7500  044040  052524  046101  020040
7501  044046  042510  042101  051105
7502  044054     000
7503  044055     122  041513  030523  DH074B: .ASCIZ  /RKCS1   RKCS1   RKCS2   RKCS2   RKER    RKER    NUM/
7504  044062  020040  051040  041513
7505  044070  030523  020040  051040
7506  044076  041513  031123  020040
7507  044104  051040  041513  031123
7508  044112  020040  051040  042513
7509  044120  020122  020040  051040
7510  044126  042513  020122  020040
7511  044134  047040  046525     000
7512  044141     105  050130  041505  DH077A: .ASCIZ  /EXPECT  ACTUAL  HEADER/
7513  044146  020124  040440  052103
7514  044154  040525  020114  044040
7515  044162  040505  042504  000122
7516  044170  045522  051115  020061  DH077B: .ASCIZ  /RKMR1   RKMR1   NUM/
7517  044176  020040  045522  051115
7518  044204  020061  020040  052516
7519  044212  000115
7520  044214  054105  042520  052103  DH134A: .ASCIZ  /EXPECT  ACTUAL  BIT/
7521  044222  020040  041501  052524
7522  044230  046101  020040  044502
7523  044236  000124
7524  044240  045522  041505  052120  DH134B: .ASCIZ  /RKECPT  RKECPT  COUNT/
7525  044246  020040  045522  041505
7526  044254  052120  020040  047503
7527  044262  047125  000124
7528  044266  054105  042520  052103  DH144A: .ASCIZ  /EXPECT  ACTUAL  EXPECT  ACTUAL  EXPECT  ACTUAL  FXPECT  ACTUAL/
7529  044274  020040  041501  052524
7530  044302  046101  020040  054105
7531  044310  042520  052103  020040
7532  044316  041501  052524  046101
7533  044324  020040  054105  042520
7534  044332  052103  020040  041501
7535  044340  052524  046101  020040
7536  044346  054105  042520  052103
7537  044354  020040  041501  052524
7538  044362  046101     000
7539  044365     122  041113  020101  DH144B: .ASCIZ  /RKBA    RKBA    RKWC    RKWC    RKDCYL  RKDCYL  RKDA    RKDA/
7540  044372  020040  051040  041113
7541  044400  020101  020040  051040
7542  044406  053513  020103  020040
7543  044414  051040  053513  020103
7544  044422  020040  051040  042113
7545  044430  054503  020114  051040
7546  044436  042113  054503  020114
7547  044444  051040  042113  020101
7548  044452  020040  051040  042113
7549  044460  000101
7550  044462  045522  041505  052120  DH151A: .ASCIZ  /RKECPT  RKECPT/
7551  044470  020040  045522  041505
7552  044476  052120     000
7553                               .SBTTL  ERROR MESSAGES
7554
7555  044501     125  042516  050130  EM000:  .ASCIZ  /UNEXPECTED MEMORY PARITY ENABLE TRAP/
```

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 7556  044506  041505  042524  020104
 7557  044514  042515  047515  054522
 7558  044522  050040  051101  052111
 7559  044530  020131  047105  041101
 7560  044536  042514  052040  040522
 7561  044544  000120
 7562  044546  052101  042524  050115  EM300:  .ASCIZ  /ATTEMPTING TO CHECK SEEK MESS FROM READ DATA/
 7563  044554  044524  043516  052040
 7564  044562  020117  044103  041505
 7565  044570  020113  042523  045505
 7566  044576  046440  051505  020123
 7567  044604  051106  046517  051040
 7568  044612  040505  020104  040504
 7569  044620  040524     000
 7570  044623     101  052124  046505  EM301:  .ASCIZ  /ATTEMPTING TO CHECK SEEK MESS FROM WRITE DATA/
 7571  044630  052120  047111  020107
 7572  044636  047524  041440  042510
 7573  044644  045503  051440  042505
 7574  044652  020113  042515  051523
 7575  044660  043040  047522  020115
 7576  044666  051127  052111  020105
 7577  044674  040504  040524     000
 7578  044701     101  052124  046505  EM302:  .ASCIZ  /ATTEMPTING TO CHECK SEEK MESS FROM WRITE CHECK/
 7579  044706  052120  047111  020107
 7580  044714  047524  041440  042510
 7581  044722  045503  051440  042505
 7582  044730  020113  042515  051523
 7583  044736  043040  047522  020115
 7584  044744  051127  052111  020105
 7585  044752  044103  041505  000113
 7586  044760  052101  042524  050115  EM303:  .ASCIZ  /ATTEMPTING TO CHECK CLEAR MESS FROM READ DATA/
 7587  044766  044524  043516  052040
 7588  044774  020117  044103  041505
 7589  045002  020113  046103  040505
 7590  045010  020122  042515  051523
 7591  045016  043040  047522  020115
 7592  045024  042522  042101  042040
 7593  045032  052101  000101
 7594  045036  052101  042524  050115  EM304:  .ASCIZ  /ATTEMPTING TO CHECK CLEAR MESS FROM WRITE DATA/
 7595  045044  044524  043516  052040
 7596  045052  020117  044103  041505
 7597  045060  020113  046103  040505
 7598  045066  020122  042515  051523
 7599  045074  043040  047522  020115
 7600  045102  051127  052111  020105
 7601  045110  040504  040524     000
 7602  045115     101  052124  046505  EM305:  .ASCIZ  /ATTEMPTING TO CHECK CLEAR MESS FROM WRITE CHECK/
 7603  045122  052120  047111  020107
 7604  045130  047524  041440  042510
 7605  045136  045503  041440  042514
 7606  045144  051101  046440  051505
 7607  045152  020123  051106  046517
 7608  045160  053440  044522  042524
 7609  045166  041440  042510  045503
 7610  045174     000
 7611  045175     101  052124  046505  EM306:  .ASCII  /ATTEMPTING TO CHECK HEAD GENERATION/<15><12>
```

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 7612  045202  052120  047111  020107
 7613  045210  047524  041440  042510
 7614  045216  045503  044040  040505
 7615  045224  020104  042507  042516
 7616  045232  040522  044524  047117
 7617  045240  005015
 7618  045242  044527  044124  053040          .ASCIZ  /WITH VARIOUS CYLINDER VALUES/
 7619  045250  051101  047511  051525
 7620  045256  041440  046131  047111
 7621  045264  042504  020122  040526
 7622  045272  052514  051505     000
 7623  045277     101  052124  046505  EM307:  .ASCII  /ATTEMPTING TO CHECK HEAD GENERATION/<15><12>
 7624  045304  052120  047111  020107
 7625  045312  047524  041440  042510
 7626  045320  045503  044040  040505
 7627  045326  020104  042507  042516
 7628  045334  040522  044524  047117
 7629  045342  005015
 7630  045344  044527  044124  053040          .ASCIZ  /WITH VARIOUS TRACK VALUES/
 7631  045352  051101  047511  051525
 7632  045360  052040  040522  045503
 7633  045366  053040  046101  042525
 7634  045374  000123
 7635  045376  052101  042524  050115  EM308:  .ASCII  /ATTEMPTING TO CHECK HEAD GENERATION/<15><12>
 7636  045404  044524  043516  052040
 7637  045412  020117  044103  041505
 7638  045420  020113  042510  042101
 7639  045426  043440  047105  051105
 7640  045434  052101  047511  006516
 7641  045442     012
 7642  045443     127  052111  020110          .ASCIZ  /WITH VARIOUS SECTOR VALUES/
 7643  045450  040526  044522  052517
 7644  045456  020123  042523  052103
 7645  045464  051117  053040  046101
 7646  045472  042525  000123
 7647  045476  052101  042524  050115  EM309:  .ASCII  /ATTEMPTING TO CHECK HEAD GENERATION/<15><12>
 7648  045504  044524  043516  052040
 7649  045512  020117  044103  041505
 7650  045520  020113  042510  042101
 7651  045526  043440  047105  051105
 7652  045534  052101  047511  006516
 7653  045542     012
 7654  045543     127  052111  020110          .ASCIZ  /WITH VARIOUS FORMAT VALUES/
 7655  045550  040526  044522  052517
 7656  045556  020123  047506  046522
 7657  045564  052101  053040  046101
 7658  045572  042525  000123
 7659  045576  052101  042524  050115  EM310:  .ASCIZ  /ATTEMPTING TO CHECK NPR DATA TRANSFER FOR WRITE DATA/
 7660  045604  044524  043516  052040
 7661  045612  020117  044103  041505
 7662  045620  020113  050116  020122
 7663  045626  040504  040524  052040
 7664  045634  040522  051516  042506
 7665  045642  020122  047506  020122
 7666  045650  051127  052111  020105
 7667  045656  040504  040524     000
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 7668  045663     101  052124  046505  EM311:  .ASCIZ  /ATTEMPTING TO CHECK HEADER RECOGNITION/
 7669  045670  052120  047111  020107
 7670  045676  047524  041440  042510
 7671  045704  045503  044040  040505
 7672  045712  042504  020122  042522
 7673  045720  047503  047107  052111
 7674  045726  047511  000116
 7675  045732  052101  042524  050115  EM312:  .ASCIZ  /ATTEMPTING TO CHECK SECTOR INCREMENT/
 7676  045740  044524  043516  052040
 7677  045746  020117  044103  041505
 7678  045754  020113  042523  052103
 7679  045762  051117  044440  041516
 7680  045770  042522  042515  052116
 7681  045776     000
 7682  045777     101  052124  046505  EM313:  .ASCIZ  /ATTEMPTING TO CHECK TRACK INCREMENT/
 7683  046004  052120  047111  020107
 7684  046012  047524  041440  042510
 7685  046020  045503  052040  040522
 7686  046026  045503  044440  041516
 7687  046034  042522  042515  052116
 7688  046042     000
 7689  046043     101  052124  046505  EM314:  .ASCIZ  /ATTEMPTING TO CHECK CYLINDER INCREMENT
 7690  046050  052120  047111  020107
 7691  046056  047524  041440  042510
 7692  046064  045503  041440  046131
 7693  046072  047111  042504  020122
 7694  046100  047111  051103  046505
 7695  046106  047105  000124
 7696  046112  052101  042524  050115  EM315:  .ASCII  /ATTEMPTING TO CHECK SECTOR PULSE DETECTION/<15><12>
 7697  046120  044524  043516  052040
 7698  046126  020117  044103  041505
 7699  046134  020113  042523  052103
 7700  046142  051117  050040  046125
 7701  046150  042523  042040  052105
 7702  046156  041505  044524  047117
 7703  046164  005015
 7704  046166  044527  044124  053440          .ASCIZ  /WITH WRITE DATA/
 7705  046174  044522  042524  042040
 7706  046202  052101  000101
 7707  046206  052101  042524  050115  EM316:  .ASCIZ  /ATTEMPTING TO FORCE BAD SECTOR ERROR/
 7708  046214  044524  043516  052040
 7709  046222  020117  047506  041522
 7710  046230  020105  040502  020104
 7711  046236  042523  052103  051117
 7712  046244  042440  051122  051117
 7713  046252     000
 7714  046253     101  052124  046505  EM317:  .ASCII  /ATTEMPTING TO FORCE HEADER VRC ERROR/<15><12>
 7715  046260  052120  047111  020107
 7716  046266  047524  043040  051117
 7717  046274  042503  044040  040505
 7718  046302  042504  020122  051126
 7719  046310  020103  051105  047522
 7720  046316  006522     012
 7721  046321     127  052111  020110          .ASCIZ  /WITH BAD SECTOR PRESENT/
 7722  046326  040502  020104  042523
 7723  046334  052103  051117  050040
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 7724  046342  042522  042523  052116
 7725  046350     000
 7726  046351     101  052124  046505  EM318:  .ASCIZ  /ATTEMPTING TO FORCE HVRC ERROR/
 7727  046356  052120  047111  020107
 7728  046364  047524  043040  051117
 7729  046372  042503  044040  051126
 7730  046400  020103  051105  047522
 7731  046406  000122
 7732  046410  052101  042524  050115  EM319:  .ASCIZ  /ATTEMPTING TO FORCE OPERATION INCOMPLETE/
 7733  046416  044524  043516  052040
 7734  046424  020117  047506  041522
 7735  046432  020105  050117  051105
 7736  046440  052101  047511  020116
 7737  046446  047111  047503  050115
 7738  046454  042514  042524     000
 7739  046461     101  052124  046505  EM320:  .ASCIZ  /ATTEMPING TO FORCE OPI WITH HVRC ERROR ON HEADER 57/
 7740  046466  044520  043516  052040
 7741  046474  020117  047506  041522
 7742  046502  020105  050117  020111
 7743  046510  044527  044124  044040
 7744  046516  051126  020103  051105
 7745  046524  047522  020122  047117
 7746  046532  044040  040505  042504
 7747  046540  020122  033463     000
 7748  046545     101  052124  046505  EM321:  .ASCIZ  /ATTEMPING TO FORCE OPI WITH HVRC ERROR ON HEADER 36/
 7749  046552  044520  043516  052040
 7750  046560  020117  047506  041522
 7751  046566  020105  050117  020111
 7752  046574  044527  044124  044040
 7753  046602  051126  020103  051105
 7754  046610  047522  020122  047117
 7755  046616  044040  040505  042504
 7756  046624  020122  033063     000
 7757  046631     101  052124  046505  EM322:  .ASCIZ  /ATTEMPING TO FORCE OPI WITH HVRC ERROR ON HEADER 0/
 7758  046636  044520  043516  052040
 7759  046644  020117  047506  041522
 7760  046652  020105  050117  020111
 7761  046660  044527  044124  044040
 7762  046666  051126  020103  051105
 7763  046674  047522  020122  047117
 7764  046702  044040  040505  042504
 7765  046710  020122  000060
 7766  046714  044103  041505  044513  EM323:  .ASCIZ  /CHECKING HEADER RECOGNITION WITH PREVIOUS BAD SECTOR ERROR/
 7767  046722  043516  044040  040505
 7768  046730  042504  020122  042522
 7769  046736  047503  047107  052111
 7770  046744  047511  020116  044527
 7771  046752  044124  050040  042522
 7772  046760  044526  052517  020123
 7773  046766  040502  020104  042523
 7774  046774  052103  051117  042440
 7775  047002  051122  051117     000
 7776  047007     103  042510  045503  EM324.  .ASCIZ  /CHECKING HEADER RECOGNITION WITH PREVIOUS HEADER VRC ERROR/
 7777  047014  047111  020107  042510
 7778  047022  042101  051105  051040
 7779  047030  041505  043517  044516
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  7780  047036  044524  047117  053440
  7781  047044  052111  020110  051120
  7782  047052  053105  047511  051525
  7783  047060  044040  040505  042504
  7784  047066  020122  051126  020103
  7785  047074  051105  047522  000122
  7786  047102  047506  041522  047111  EM325:  .ASCIZ  /FORCING BAD SECTOR ERROR WITH PREVIOUS HEADER VRC ERROR/
  7787  047110  020107  040502  020104
  7788  047116  042523  052103  051117
  7789  047124  042440  051122  051117
  7790  047132  053440  052111  020110
  7791  047140  051120  053105  047511
  7792  047146  051525  044040  040505
  7793  047154  042504  020122  051126
  7794  047162  020103  051105  047522
  7795  047170  000122
  7796  047172  047506  041522  047111  EM326:  .ASCIZ  /FORCING HEAD VRC ERROR WITH PREVIOUS BAD SECTOR ERROR/
  7797  047200  020107  042510  042101
  7798  047206  053040  041522  042440
  7799  047214  051122  051117  053440
  7800  047222  052111  020110  051120
  7801  047230  053105  047511  051525
  7802  047236  041040  042101  051440
  7803  047244  041505  047524  020122
  7804  047252  051105  047522  000122
  7805  047260  052101  042524  050115  EM327:  .ASCIZ  /ATTEMPTING TO WRITE SYNCH WITH WRITE DATA/
  7806  047266  044524  043516  052040
  7807  047274  020117  051127  052111
  7808  047302  020105  054523  041516
  7809  047310  020110  044527  044124
  7810  047316  053440  044522  042524
  7811  047324  042040  052101  000101
  7812  047332  052101  042524  050115  EM328:  .ASCIZ  /ATTEMPTING TO WRITE DATA FIELD WITH WRITE DATA/
  7813  047340  044524  043516  052040
  7814  047346  020117  051127  052111
  7815  047354  020105  040504  040524
  7816  047362  043040  042511  042114
  7817  047370  053440  052111  020105
  7818  047376  051127  052111  020105
  7819  047404  040504  040524     000
  7820  047411     101  052124  046505  EM329:  .ASCIZ  /ATTEMPTING TO CHECK ECC PATTERN CLEARING/
  7821  047416  052120  047111  020107
  7822  047424  047524  041440  042510
  7823  047432  045503  042440  041503
  7824  047440  050040  052101  042524
  7825  047446  047122  041440  042514
  7826  047454  051101  047111  000107
  7827  047462  052101  042524  050115  EM330:  .ASCIZ  /ATTEMPTING TO CHECK ECC GENERATION/
  7828  047470  044524  043516  052040
  7829  047476  020117  044103  041505
  7830  047504  020113  041505  020103
  7831  047512  042507  042516  040522
  7832  047520  044524  047117     000
  7833  047525     101  052124  046505  EM331:  .ASCIZ  /ATTEMPTING BAD SECTOR ERROR SETTING CONTROLLER ERROR/
  7834  047532  052120  047111  020107
  7835  047540  040502  020104  042523
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 7836  047546  052103  051117  042440
 7837  047554  051122  051117  051440
 7838  047562  052105  044524  043516
 7839  047570  041440  047117  051124
 7840  047576  046117  042514  020122
 7841  047604  051105  047522  000122
 7842  047612  052101  042524  050115  EM332:  .ASCIZ  /ATTEMPTING HEADER VRC ERROR SETTING CONTROLLER ERROR/
 7843  047620  044524  043516  044040
 7844  047626  040505  042504  020122
 7845  047634  051126  020103  051105
 7846  047642  047522  020122  042523
 7847  047650  052124  047111  020107
 7848  047656  047503  052116  047522
 7849  047664  046114  051105  042440
 7850  047672  051122  051117     000
 7851  047677     101  052124  046505  EM333:  .ASCIZ  /ATTEMPTING TO WRITE ECC WORDS/
 7852  047704  052120  047111  020107
 7853  047712  047524  053440  044522
 7854  047720  042524  042440  041503
 7855  047726  053440  051117  051504
 7856  047734     000
 7857  047735     101  052124  046505  EM334:  .ASCIZ  /ATTEMPTING TO WRITE POSTAMBLE/
 7858  047742  052120  047111  020107
 7859  047750  047524  053440  044522
 7860  047756  042524  050040  051517
 7861  047764  040524  041115  042514
 7862  047772     000
 7863  047773     101  052124  046505  EM335:  .ASCIZ  /ATTEMPTING COMPLETE EXECUTION OF WRITE DATA/
 7864  050000  052120  047111  020107
 7865  050006  047503  050115  042514
 7866  050014  042524  042440  042530
 7867  050022  052503  044524  047117
 7868  050030  047440  020106  051127
 7869  050036  052111  020105  040504
 7870  050044  040524     000
 7871  050047     101  052124  046505  EM336:  .ASCIZ  /ATTEMPTING ERROR CLEAR WITH CONTROLLER CLEAR/
 7872  050054  052120  047111  020107
 7873  050062  051105  047522  020122
 7874  050070  046103  040505  020122
 7875  050076  044527  044124  041440
 7876  050104  047117  051124  046117
 7877  050112  042514  020122  046103
 7878  050120  040505  000122
 7879  050124  052101  042524  050115  EM337:  .ASCIZ  /ATTEMPTING PARTIAL SECTOR WRITE WITH ZERO FILL/
 7880  050132  044524  043516  050040
 7881  050140  051101  044524  046101
 7882  050146  051440  041505  047524
 7883  050154  020122  051127  052111
 7884  050162  020105  044527  044124
 7885  050170  055040  051105  020117
 7886  050176  044506  046114     000
 7887  050203     101  052124  046505  EM338:  .ASCIZ  /ATTEMPTING TO WRITE 18 BIT DATA FIELD WITH WRITE DATA/
 7888  050210  052120  047111  020107
 7889  050216  047524  053440  044522
 7890  050224  042524  030440  020070
 7891  050232  044502  020124  040504
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7892  050240  040524  043040  042511
7893  050246  042114  053440  052111
7894  050254  020110  051127  052111
7895  050262  020105  040504  040524
7896  050270     000
7897  050271     101  052124  046505  EM339:  .ASCII  /ATTEMPTING TO WRITE BIT 16-17 OF 18 BIT/
7898  050276  052120  047111  020107
7899  050304  047524  053440  044522
7900  050312  042524  041040  052111
7901  050320  030440  026466  033461
7902  050326  047440  020106  034061
7903  050334  041040  052111
7904  050340  005015  040504  040524          .ASCIZ  <15><12>/DATA FIELD WITH WRITE DATA/
7905  050346  043040  042511  042114
7906  050354  053440  052111  020110
7907  050362  051127  052111  020105
7908  050370  040504  040524     000
7909  050375     101  052124  046505  EM340:  .ASCIZ  /ATTEMPTING WRITE DATA IN 18 BIT MODE/
7910  050402  052120  047111  020107
7911  050410  051127  052111  020105
7912  050416  040504  040524  044440
7913  050424  020116  034061  041040
7914  050432  052111  046440  042117
7915  050440  000105
7916  050442  051503  020061  047111  EM4000: .ASCIZ  /CS1 INCORRECT/
7917  050450  047503  051122  041505
7918  050456  000124
7919  050460  042515  051523  040440  EM4001: .ASCIZ  /MESS A INCORRECT/
7920  050466  044440  041516  051117
7921  050474  042522  052103     000
7922  050501     115  051505  020123  EM4002: .ASCIZ  /MESS B INCORRECT/
7923  050506  020102  047111  047503
7924  050514  051122  041505  000124
7925  050522  020115  042101  051105  EM4003: .ASCIZ  /HEADER WORD 1 INCORRECT/
7926  050536  020040  051117  020104
7927  050536  020061  047111  047503
7928  050544  051122  041505  000124
7929  050552  042510  042101  051105  EM4004: .ASCIZ  /HEADER WORD 2 INCORRECT/
7930  050560  053440  051117  020104
7931  050566  020062  047111  047503
7932  050574  051122  041505  000124
7933  050602  051503  020062  047111  EM4005: .ASCIZ  /CS2 INCORRECT/
7934  050610  047503  051122  041505
7935  050616  000124
7936  050620  051105  047522  020122  EM4006: .ASCIZ  /ERROR REG INCORRECT/
7937  050626  042522  020107  047111
7938  050634  047503  051122  041505
7939  050642  000124
7940  050644  052502  020123  042101  EM4007: .ASCIZ  /BUS ADDRESS INCORRECT/
7941  050652  051104  051505  020123
7942  050660  047111  047503  051122
7943  050666  041505  000124
7944  050672  047527  042122  041440  EM4008: .ASCIZ  /WORD COUNT INCORRECT/
7945  050700  052517  052116  044440
7946  050706  041516  051117  042522
7947  050714  052103     000
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 7948  050717     103  030523  044440  EM4009:  ASCIZ  /CS1 INCORRECT AFTER READING DATA BUFFER/
 7949  050724  041516  051117  042522
 7950  050732  052103  040440  052106
 7951  050740  051105  051040  040505
 7952  050746  044504  043516  042040
 7953  050754  052101  020101  052502
 7954  050762  043106  051105     000
 7955  050767     103  031123  044440  EM4010: .ASCIZ  /CS2 INCORRECT AFTER READING DATA BUFFER/
 7956  050774  041516  051117  042522
 7957  051002  052103  040440  052106
 7958  051010  051105  051040  040505
 7959  051016  044504  043516  042040
 7960  051024  052101  020101  052502
 7961  051032  043106  051105     000
 7962  051037     105  051122  051117  EM4011: .ASCIZ  /ERROR REG INCORRECT AFTER READING DATA BUFFER/
 7963  051044  051040  043505  044440
 7964  051052  041516  051117  042522
 7965  051060  052103  040440  052106
 7966  051066  051105  051040  040505
 7967  051074  044504  043'16  042040
 7968  051102  052101  020101  052502
 7969  051110  043106  051105     000
 7970  051115     104  052101  020101  EM4012: .ASCIZ  /DATA READ FROM MEMORY INCORRECT/
 7971  051122  042522  042101  043040
 7972  051130  047522  020115  042515
 7973  051136  047515  054522  044440
 7974  051144  041516  051117  042522
 7975  051152  052103     000
 7976  051155     115  030522  044440  EM4013: .ASCIZ  /MR1 INCORRECT AFTER GAP IN WRITE DATA/
 7977  051162  041516  051117  042522
 7978  051170  052103  040440  052106
 7979  051176  051105  043440  050101
 7980  051204  044440  020116  051127
 7981  051212  052111  020105  040504
 7982  051220  040524     000
 7983  051223     104  051511  020113  EM4014: .ASCIZ  /DISK ADDRESS REG. INCORRECT/
 7984  051230  042101  051104  051505
 7985  051236  020123  042522  027107
 7986  051244  044440  041516  051117
 7987  051252  042522  052103     000
 7988  051257     103  046131  047111  EM4015: .ASCIZ  /CYLINDER ADDRESS REG. INCORRECT/
 7989  051264  042504  020122  042101
 7990  051272  051104  051505  020123
 7991  051300  042522  027107  044440
 7992  051306  041516  051117  042522
 7993  051314  052103     000
 7994  051317     115  030522  044440  EM4016: .ASCIZ  /MR1 INCORRECT/
 7995  051324  041516  051117  042522
 7996  051332  052103     000
 7997  051335     105  041503  050040  EM4017: .ASCIZ  /ECC PAT REG INCORRECT/
 7998  051342  052101  051040  043505
 7999  051350  044440  041516  051117
 8000  051356  042522  052103     000
 8001  051363     115  030522  044440  EMW2:   .ASCIZ  /MR1 INCORRECT ON 1ST DOWNWARD TRANSISION OF MAINT CLOCK/
 8002  051370  041516  051117  042522
 8003  051376  052103  047440  020116
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 8004  051404  051461  020124  047504
 8005  051412  047127  040527  042122
 8006  051420  052040  040522  051516
 8007  051426  051511  047511  020116
 8008  051434  043117  046440  044501
 8009  051442  052116  041440  047514
 8010  051450  045503     000
 8011  051453     115  030522  044440  EMW4:   .ASCIZ  /MR1 INCORRECT ON 2ND DOWNWARD TRANSITION OF MAINT CLOCK/
 8012  051460  041516  051117  042522
 8013  051466  052103  047440  020116
 8014  051474  047062  020104  047504
 8015  051502  047127  040527  042122
 8016  051510  052040  040522  051516
 8017  051516  052111  047511  020116
 8018  051524  043117  046440  044501
 8019  051532  052116  041440  047514
 8020  051540  045503     000
 8021                          .SBTTL  DATA BUFFERS
 8022
 8023          051544          .EVEN
 8024  051544                  NPRBUF:
 8025  051544     000     000          .BYTE   0,0
 8026  051546     001     001          .BYTE   1,1
 8027  051550     002     002          .BYTE   2,2
 8028  051552     003     003          .BYTE   3,3
 8029  051554     004     004          .BYTE   4,4
 8030  051556     005     005          .BYTE   5,5
 8031  051560     006     006          .BYTE   6,6
 8032  051562     007     007          .BYTE   7,7
 8033  051564     010     010          .BYTE   10,10
 8034  051566     011     011          .BYTE   11,11
 8035  051570     012     012          .BYTE   12,12
 8036  051572     013     013          .BYTE   13,13
 8037  051574     014     014          .BYTE   14,14
 8038  051576     015     015          .BYTE   15,15
 8039  051600     016     016          .BYTE   16,16
 8040  051602     017     017          .BYTE   17,17
 8041  051604     020     020          .BYTE   20,20
 8042  051606     021     021          .BYTE   21,21
 8043  051610     022     022          .BYTE   22,22
 8044  051612     023     023          .BYTE   23,23
 8045  051614     024     024          .BYTE   24,24
 8046  051616     025     025          .BYTE   25,25
 8047  051620     026     026          .BYTE   26,26
 8048  051622     027     027          .BYTE   27,27
 8049  051624     030     030          .BYTE   30,30
 8050  051626     031     031          .BYTE   31,31
 8051  051630     032     032          .BYTE   32,32
 8052  051632     033     033          .BYTE   33,33
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 8054  051636     035     035          .BYTE   35,35
 8055  051640     036     036          .BYTE   36,36
 8056  051642     037     037          .BYTE   37,37
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 8058  051646     041     041          .BYTE   41,41
 8059  051650     042     042          .BYTE   42,42
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 8070  051676  055     055                    .BYTE   55,55
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 8072  051702  057     057                    .BYTE   57,57
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 8077  051714  064     064                    .BYTE   64,64
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 8084  051732  073     073                    .BYTE   73,73
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 8086  051736  075     075                    .BYTE   75,75
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 8091  051750  102     102                    .BYTE   102,102
 8092  051752  103     103                    .BYTE   103,103
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8504  053454  000040                    .WORD   000040
8505  053456  140000                    .WORD   140000
8506  053460  140040                    .WORD   140040
8507  053462  000040                    .WORD   000040
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 8508  053464  140000                          .WORD   140000
 8509  053466  140040                          .WORD   140040
 8510  053470  000040                          .WORD   000040
 8511  053472  140000                          .WORD   140000
 8512  053474  140040                          .WORD   140040
 8513  053476  000040                          .WORD   000040
 8514  053500  140000                          .WORD   140000
 8515  053502  140040                          .WORD   140040
 8516  053504  000040                          .WORD   000040
 8517  053506  140000                          .WORD   140000
 8518  053510  140040                          .WORD   140040
 8519  053512  000040                          .WORD   000040
 8520  053514  140000                          .WORD   140000
 8521  053516  140040                          .WORD   140040
 8522  053520  000040                          .WORD   000040
 8523  053522  140000                          .WORD   140000
 8524  053524  140040                          .WORD   140040
 8525  053526  000040                          .WORD   000040
 8526  053530  140000                          .WORD   140000
 8527  053532  140040                          .WORD   140040
 8528  053534  000040                          .WORD   000040
 8529  053536  140000                          .WORD   140000
 8530  053540  140040                          .WORD   140040
 8531  053542  000040                          .WORD   000040
 8532  053544  140000                          .WORD   140000
 8533  053546  140040                          .WORD   140040
 8534  053550  000040                          .WORD   000040
 8535  053552  140000                          .WORD   140000
 8536  053554  140040                          .WORD   140040
 8537  053556  000040                          .WORD   000040
 8538  053560  140000                          .WORD   140000
 8539  053562  140040                          .WORD   140040
 8540  053564  001253                  VRCHDR. .WORD   001253
 8541  053566  141123                          .WORD   141123
 8542  053570  140370                          .WORD   140370
 8543  053572  177777  177777  177777  MOD2BF: .WORD   177777,177777,177777,177777,177777,177777
 8544  053600  177777  177777  177777
 8545  053606  000400                  BUFF:   .BLKW   400
 8546  054606  125252  125252  125252  ECCBUF: .WORD   125252,125252,125252,125252,125252,125252
 8547  054614  125252  125252  125252
 8548  054622  125252  125252  177777          .WORD   125252,125252,177777,177777,177777,177777
 8549  054630  177777  177777  177777
 8550  054636  177777  177777  177777          .WORD   177777,177777,177777,177777,000000,000000
 8551  054644  177777  000000  000000
 8552  054652  000000  000000  000000          .WORD   000000,000000,000000,000000,000000,000000
 8553  054660  000000  000000  000000
 8554  054666  052525  052525  052525          .WORD   052525,052525,052525,025252,052525,052525
 8555  054674  025252  052525  052525
 8556  054702  052525  052525  121105          .WORD   052525,052525,121105,150442,064221,132110
 8557  054710  150442  064221  132110
 8558  054716  055044  026422  013211          .WORD   055044,026422,013211,105504,042642,021321
 8559  054724  105504  042642  021321
 8560  054732  110550  044264  022132          .WORD   110550,044264,022132,011055,104426,042213
 8561  054740  011055  104426  042213
 8562  054746  133333  066666  155555          .WORD   133333,066666,155555,155555,133333,066666
 8563  054754  155555  133333  066666
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 8565  054770  133333  133333  133333
 8566  054776  133333  133333  133333          .WORD   133333,133333,133333,133333,177777,177777
 8567  055004  133333  177777  177777
 8568  055012  177777  052525  052525          .WORD   177777,052525,052525,052525,177777,177777
 8569  055020  052525  177777  177777
 8570  055026  052525  052525  177777          .WORD   052525,052525,177777,052525,177252,177252
 8571  055034  052525  177252  177252
 8572  055042  172765  172765  072307          .WORD   172765,172765,072307,135143.156461,167230
 8573  055050  135143  156461  167230
 8574  055056  073514  035646  016723          .WORD   073514,035646,016723,107351,143564,061672
 8575  055064  107351  143564  061672
 8576  055072  030735  114356  046167          .WORD   030735,114356,046167,123073,151453,164616
 8577  055100  123073  151453  164616
 8578  055106  125252  125252  125252          .WORD   125252,125252,125252,125252,125252,125252
 8579  055114  125252  125252  125252
 8580  055122  125252  125252  177777          .WORD   125252,125252,177777,177777,177777,177777
 8581  055130  177777  177777  177777
 8582  055136  177777  177777  177777          .WORD   177777,177777,177777,177777,000000,000000
 8583  055144  177777  000000  000000
 8584  055152  000000  000000  000000          .WORD   000000,000000,000000,000000,000000,000000
 8585  055160  000000  000000  000000
 8586  055166  052525  052525  052525          .WORD   052525,052525,052525,025252,052525,052525
 8587  055174  025252  052525  052525
 8588  055202  052525  052525  121105          .WORD   052525,052525,121105,150442,064221,132110
 8589  055210  150442  064221  132110
 8590  055216  055044  026422  013211          .WORD   055044,026422,013211,105504,042642,021321
 8591  055224  105504  042642  021321
 8592  055232  110550  044264  022132          .WORD   110550,044264,022132,011055,104426,042213
 8593  055240  011055  104426  042213
 8594  055246  133333  066666  155555          .WORD   133333,066666,155555,155555,133333,066666
 8595  055254  155555  133333  066666
 8596  055262  066666  155555  155555          .WORD   066666,155555,155555,133333,133333,133333
 8597  055270  133333  133333  133333
 8598  055276  133333  133333  133333          .WORD   133333,133333,133333,133333,177777,177777
 8599  055304  133333  177777  177777
 8600  055312  177777  052525  052525          .WORD   177777,052525,052525,052525,177777,177777
 8601  055320  052525  177777  177777
 8602  055326  052525  052525  177777          .WORD   052525,052525,177777,052525,177252,177252
 8603  055334  052525  177252  177252
 8604  055342  172765  172765  072307          .WORD   172765,172765,072307,135143,156461,167230
 8605  055350  135143  156461  167230
 8606  055356  073514  035646  016723          .WORD   073514,035646,016723,107351,143564,061672
 8607  055364  107351  143564  061672
 8608  055372  030735  114356  046167          .WORD   030735,114356,046167,123073,151453,164616
 8609  055400  123073  151453  164616
 8610  055406  125252  125252  125252          .WORD   125252,125252,125252,125252,125252,125252
 8611  055414  125252  125252  125252
 8612  055422  125252  125252  177777          .WORD   125252,125252,177777,177777,177777,177777
 8613  055430  177777  177777  177777
 8614  055436  177777  177777  177777          .WORD   177777,177777,177777,177777,000000,000000
 8615  055444  177777  000000  000000
 8616  055452  000000  000000  000000          .WORD   000000,000000,000000,000000,000000,000000
 8617  055460  000000  000000  000000
 8618  055466  052525  052525  052525          .WORD   052525,052525,052525,025252,052525,052525
 8619  055474  025252  052525  052525
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 8620  055502  052525  052525  121105          .WORD   052525,052525,121105,150442,064221,132110
 8621  055510  150442  064221  132110
 8622  055516  055044  026422  013211          .WORD   055044,026422,013211,105504,042642,021321
 8623  055524  105504  042642  021321
 8624  055532  110550  044264  022132          .WORD   110550,044264,022132,011055,104426,042213
 8625  055540  011055  104426  042213
 8626  055546  177777  177777  177777          .WORD   177777,177777,177777,177777,177777,177777
 8627  055554  177777  177777  177777
 8628  055562  177777  177777  177777          .WORD   177777,177777,177777,177777,177777,177777
 8629  055570  177777  177777  177777
 8630  055576  177777  177777  177777          .WORD   177777,177777,177777,177777
 8631  055604  177777
 8632  055606  177777  177777  177777          .WORD   177777,177777,177777,177777,177777,177777
 8633  055614  177777  177777  177777
 8634          000001                  .END
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ABASE = 177440          1002#   1237    1278
ABORT   042344          6123    7349#
ACDW1 = 000000          1237    1280
ACDW2 = 000000          1237    1281
ACLO  = 000010          1097#
ACPUOP= 000000          1237    1252
ADDW0 = 000000          1237
ADDW1 = 000000          1237
ADDW10= 000000          1237
ADDW11= 000000          1237
ADDW12= 000000          1237
ADDW13= 000000          1237
ADDW14= 000000          1237
ADDW15= 000000          1237
ADDW2 = 000000          1237
ADDW3 = 000000          1237
ADDW4 = 000000          1237
ADDW5 = 000000          1237
ADDW6 = 000000          1237
ADDW7 = 000000          1237
ADDW8 = 000000          1237
ADDW9 = 000000          1237
ADEVCT= 000000          1237    1243
ADEVM = 000000          1237    1279
AENV  = 000000          1237    1248
AENVM = 000000          1237    1249
AFATAL= 000000          1237    1240
AMADR1= 000000          1237    1265
AMADR2= 000000          1237    1269
AMADR3= 000000          1237    1272
AMADR4= 000000          1237    1275
AMAMS1= 000000          1237    1259
AMAMS2= 000000          1237    1267
AMAMS3= 000000          1237    1270
AMAMS4= 000000          1237    1273
AMSGAD= 000000          1237    1245
AMSGLG= 000000          1237    1246
AMSGTY= 000000          1237    1239
AMTYP1= 000000          1237    1260
AMTYP2= 000000          1237    1268
AMTYP3= 000000          1237    1271
AMTYP4= 000000          1237    1274
APASS = 000000          1237    1242
APRIOR= 000240          1001#   1237
APTCSU= 000040          6396#   6482
APTENV= 000001          6352    6394#   6428    6475
APTSIZ= 000200          2131    6393#
APTSPO= 000100          6354    6395#   6477
ASWREG= 000000          1237    1250
ATESTN= 000000          1237    1241
AUNIT = 000000          1237    1244
AUSWR = 000000          1237    1251
AVECT1= 000210          1000#   1237    1276
AVECT2= 000000          1237    1277
BAI   = 000020          1060#
BA16  = 000400          1045#
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BA17   = 001000          1046#
BITCNT  003262           2061#  2845*  2851*  2859*  2875*  4869*  4873*  4879*  4901*  4981*  4985*  4991*  5015*
                         5095*  5099*  5105*  5129*  5201*  5206*  5215*  5236*  5247*  5263*  5274*  5282*  5394*
                         5399*  5408*  5429*  5444*  5460*  5471*  5479*  56..*  5611*  5619*  5642*  5732*  5736*
                         5744*  5767*  5801*  5816*  5837*  5843*  5851*  7110   7140
BIT0   = 000001           985#  1042   1075   1094
BIT00  = 000001           975#   985
BIT01  = 000002           974#   984
BIT02  = 000004           973#   983
BIT03  = 000010           972#   982
BIT04  = 000020           971#   981
BIT05  = 000040           970#   980
BIT06  = 000100           969#   979
BIT07  = 000200           968#   978
BIT08  = 000400           967#   977   5960
BIT09  = 001000           966#   976   5978   6439
BIT1   = 000002           984#  1076
BIT10  = 002000           965#  1047   1066   1085   1118   1133   6218   6220   6416
BIT11  = 004000           964#  1048   1067   1086   1103   1119   1134   5985
BIT12  = 010000           963#  1050   1068   1087   1120
BIT13  = 020000           962#  1051   1069   1088   1104   1121   6214   6216   6423
BIT14  = 040000           961#  1052   1070   1089   1105   1122   5946
BIT15  = 100000           960#  1053   1054   1071   1090   1106   1123
BIT2   = 000004           983#  1077   1096
BIT3   = 000010           982#  1059   1078   1097
BIT4   = 000020           981#  1060   1079   1098   1112   1127   6214   6216
BIT5   = 000040           980#  1061   1080   1099   1113   1128
BIT6   = 000100           979#  1043   1062   1081   1100   1114   1129
BIT7   = 000200           978#  1044   1063   1082   1101   1115   1130
BIT8   = 000400           977#  1045   1064   1083   1102   1116   1131   6218   6220
BIT9   = 001000           976#  1046   1065   1084   1117   1132   6183
BPTVEC= 000014            992#
BSE    = 000200          1082#  3288   3370   3968   4512
BUFF    053606           2233   2279   2326   2372   2418   2465   2523   2580   2634   2689   2832   2923   3002
                         3083   3164   3243   3325   3403   3524   3607   3694   3797   3901   4005   4110   4236
                         4355   4459   4549   4639   4729   8545#
CALHDR  034402           2519   2576   2630   2685   6163#
CCLR   = 100000          1054#  2230   2253   2276   2299   2323   2346   2369   2392   2415   2438   2462   2485
                         2520   2538   2577   2595   2631   2649   2686   2704   2736   2759   2789   2829   2917
                         2997   3078   3159   3238   3320   3398   3479   3512   3602   3692   3795   3899   4003
                         4105   4186   4231   4312   4350   4431   4457   4522   4547   4612   4637   4702   4727
                         4792   4820   4932   5046   5153   5346   5549   5674   5917
CDT    = 002000          1047#  2237   2247   2283   2293   2330   2340   2376   2386   2422   2432   2469   2479
                         3504   3528
CERR   = 100000          1053#  3475   4182   4308   4427   4510   4600   4690   4780
CFMT   = 010000          1050#  2237   2247   2283   2293   2330   2340   2376   2386   2422   2432   2469   2479
                         2714   2716   3407   3416   3504   3528   5557   5682   6181
CKSWR  = 104407          5945   6412   6438   7100#
CLEAR  = 000005          1027#
COE    = 001000          1084#
CR     = 000015           900#  6521   6531
CRLF   = 000200           901#  2156   6492   6531
CTO    = 004000          1048#
CTRHLT  033170           5916#  6717   6800
CYLN    003300           2069#  2990*  2999   3071*  3080   3152*  3161   3213*  3214   6135   6148
DCK    = 100000          1090#
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DDD	= 000104	8024#	8025	8026#	8027#	8028#	8029#	8030#	8031#	8032#	8033#	8034#	8035#	8036#
		8037#	8038#	8039#	8040#	8041#	8042#	8043#	8044#	8045#	8046#	8047#	8048#	8049#
		8050#	8051#	8052#	8053#	8054#	8055#	8056#	8057#	8058#	8059#	8060#	8061#	8062#
		8063#	8064#	8065#	8066#	8067#	8068#	8069#	8070#	8071#	8072#	8073#	8074#	8075#
		8076#	8077#	8078#	8079#	8080#	8081#	8082#	8083#	8084#	8085#	8086#	8087#	8088#
		8089#	8090#	8091#	8092#	8093#								
DDISP	= 177570	907#	1210	2119										
DDT	= 000400	1102#												
DF000	041402	1303	7152#											
DF002	041406	1308	7154#											
DF003	041432	1314	1320	1326	1332	1338	1344	1350	1356	1362	1368	1374	1380	1386
		1392	1398	1404	1410	1416	7164#							
DF025	041456	1423	1430	1437	1444	1451	1458	1465	1472	1479	1486	1493	1500	7174#
DF041	041502	1506	1512	1518	1524	1530	7184#							
DF046	041536	1536	1542	1548	1615	1621	1627	1634	1641	1648	1876	1882	1888	1894
		1900	1906	7198#										
DF051	041562	1554	7208#											
DF052	041606	1560	1954	7218#										
DF053	041632	1566	1609	7228#										
DF054	041656	1572	1578	1584	1590	1596	1602	7238#						
DF071	041702	1654	1660	1666	7248#									
DF074	041736	1672	1678	1684	1696	1702	1708	1720	1726	1732	1744	1750	1756	1768
		1774	1780	1792	1798	1804	1816	1822	1828	1840	1846	1852	7262#	
DF077	041762	1690	1714	1738	1762	1786	1810	1834	1858	7272#				
DF134	042006	1864	1870	2008	7282#									
DF144	042032	1912	1918	1924	1930	1936	1942	1948	1960	1966	1972	1978	1984	1990
		1996	7292#											
DF151	042066	2002	7306#											
DH000A	042455	7156	7166	7176	7186	7200	7210	7220	7230	7240	7250	7264	7274	7284
		7294	7308	7365#										
DH000B	042473	7158	7168	7178	7188	7202	7212	7222	7232	7242	7252	7266	7276	7286
		7296	7310	7368#										
DH000C	042506	1301	7370#											
DH002A	042537	7160	7375#											
DH002B	042623	7162	7384#											
DH003A	042711	7170	7394#											
DH003B	042770	7172	7402#											
DH025A	043047	7180	7410#											
DH025B	043126	7182	7418#											
DH041A	043206	7190	7204	7254	7298	7426#								
DH041B	043265	7192	7206	7256	7300	7434#								
DH041C	043342	7194	7442#											
DH041D	043401	7196	7448#											
DH051A	043436	7214	7453#											
DH051B	043463	7216	7457#											
DH052A	043511	7224	7312	7461#										
DH052B	043530	7226	7464#											
DH053A	043565	7234	7469#											
DH053B	043604	7236	7472#											
DH054A	043622	7244	7475#											
DH054B	043661	7246	7481#											
DH071A	043716	7258	7486#											
DH071B	043737	7260	7489#											
DH074A	043766	7268	7493#											
DH074B	044055	7270	7503#											
DH077A	044141	7278	7512#											

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DH077B  044170            7280    7516#
DH134A  044214            7288    7520#
DH134B  044240            7290    7524#
DH144A  044266            7302    7528#
DH144B  044365            7304    7539#
DH151A  044462            7314    7550#
DI    = 040000            1052#
DISPLA  001142            1210#   2119*   2127*   6000*   6415*
DISPRE  000174            1142#   2127
DLT   = 100000            1071#
DMD   = 000040            1113#   2231    2240    2241    2277    2286    2287    2324    2333    2334    2370    2379    2380
                          2416    2425    2426    2463    2472    2473    2521    2528    2529    2578    2585    2586    2632
                          2639    2640    2687    2694    2695    2737    2742    2743    2830    2836    2837    2840    2841
                          2887    2921    2927    2928    2932    2933    2934    2937    2969    2998    3006    3007    3010
                          3011    3079    3087    3088    3091    3092    3160    3168    3169    3172    3173    3239    3247
                          3248    3251    3252    3321    3329    3330    3333    3334    3402    3410    3411    3419    3421
                          3422    3516    3530    3531    3534    3535    3603    3611    3612    3615    3616    3693    3701
                          3702    3710    3712    3713    3761    3796    3804    3805    3813    3815    3816    3864    3900
                          3908    3909    3917    3919    3920    4004    4012    4013    4021    4023    4024    4109    4117
                          4118    4126    4128    4129    4235    4243    4244    4252    4254    4255    4354    4362    4363
                          4371    4373    4374    4458    4466    4467    4470    4471    4503    4504    4548    4556    4557
                          4560    4561    4593    4594    4638    4646    4647    4650    4651    4683    4684    4728    4736
                          4737    4740    4741    4773    4774    4821    4827    4828    4831    4832    4870    4933    4939
                          4940    4943    4944    4982    5047    5053    5054    5057    5058    5096    5154    5160    5161
                          5164    5165    5203    5286    5287    5347    5353    5354    5357    5358    5396    5483    5484
                          5554    5560    5561    5565    5566    5608    5679    5685    5686    5690    5691    5733    6228
                          6245    6246    6259    6260    6286    6287    6299    6300    6326    6329    6330    6331    6332
                          6335    6336    6337    6338
DRA   = 000001            1094#
DRDY  = 000200            1101#
DROT  = 000040            1099#
DRPAR = 000010            1078#
DRVMSK= 000007            1058#
DSC   = 040000            1105#
DSWR  = 177570             906#   1209    2118
DTE   = 010000            1087#
DTYE  = 000040            1080#
DT000   041046            1302    7109#
DT002   041052            1307    7110#
DT003   041074            1313    1319    1325    1331    1337    1343    1349    1355    1361    1367    1373    1379    1385
                          1391    1397    1403    1409    1415    1422    1429    1436    1443    1450    1457    1464    1471
                          1478    1485    1492    1499    7113#
DT041   041114            1505    1511    1517    1523    1529    7116#
DT046   041144            1535    1541    1547    1614    1620    1626    1633    1640    1647    1875    1881    1887    1893
                          1899    1905    7120#
DT051   041164            1553    7123#
DT052   041176            1559    1953    7125#
DT053   041212            1565    1608    7127#
DT054   041222            1571    1577    1583    1589    1595    1601    7129#
DT071   041236            1653    1659    1665    7131#
DT074   041264            1671    1677    1683    1695    1701    1707    1719    1725    1731    1743    1749    1755    1767
                          1773    1779    1791    1797    1803    1815    1821    1827    1839    1845    1851    7135#
DT077   041306            1689    1713    1737    1761    1785    1809    1833    1857    7138#
DT134   041320            1863    1869    2007    7140#
DT144   041332            1911    1917    1923    1929    1935    1941    1947    1959    1965    1971    1977    1983    1989
                          1995    7142#
```

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DT151   041372          2001   7148#
ECCBUF  054606          5155   5217   5302   5348   5410   5439   5499   5680   5745   8546#
ECCGEN  034526          5011   5125   5231   5424   5638   5763   5797   6198#
ECCHI   003266          2063#  4993*  5107*  5212*  5249   5405*  5446   5617*  5742*  5817   6200   6206   6211*
                        6219   6220*  6221*  6222
ECCLO   003270          2064#  4994*  5108*  5213*  5406*  5618*  5743*  6210*  6215   6216*  6217*
ECCW  = 020000          1121#  2887   2969   3419   3710   3761   3813   3864   3917   4021   4126   4252   4371
                        4870   4982   5096   5203   5241   5268   5396   5434   5465   5608   5733   5804   5836
ECCXOR  003272          2065#  6202*  6208*  6212
ECC1    052100          4822   4882   8135#
ECC2    052120          4934   4995   8138#
ECC3    052140          5048   5109   9146#
ECH   = 000100          1081#
EMTVEC= 000030           995#  2102*  2103*
EMW     001310          1305#  4864*  4880*  4976*  4992*  5090*  5106*  5200*  5214*  5246*  5273*  5393*  5407*
                        5443*  5470*  5602*  5623*  5649*  5727*  5748*  5774*  5781*  5812*  5815*  5842*  6251*
                        6265*  6292*  6305*
EMW2    051363          6251   6292   8001#
EMW4    051453          6265   6305   8011#
EM000   044501          1300   7555#
EM300   044546          1311   1317   1323   7562#
EM301   044623          1329   1335   1341   7570#
EM302   044701          1347   1353   1359   7578#
EM303   044760          1365   1371   1377   7586#
EM304   045036          1383   1389   1395   7594#
EM305   045115          1401   1407   1413   7602#
EM306   045175          1420   1427   1434   7611#
EM307   045277          1441   1448   1455   7623#
EM308   045376          1462   1469   1476   7635#
EM309   045476          1483   1490   1497   7647#
EM310   045576          1503   1509   1515   1521   1527   1533   1539   1545   1551   7659#
EM311   045663          1557   1563   7668#
EM312   045732          1569   1575   7675#
EM313   045777          1581   1587   7682#
EM314   046043          1593   1599   7689#
EM315   046112          1606   7696#
EM316   046206          1612   1618   1624   7707#
EM317   046253          1631   1638   1645   7714#
EM318   046351          1651   1657   1663   7726#
EM319   046410          1669   1675   1681   1687   7732#
EM320   046461          1693   1699   1705   1711   7739#
EM321   046545          1717   1723   1729   1735   7748#
EM322   046631          1741   1747   1753   1759   7757#
EM323   046714          1765   1771   1777   1783   7766#
EM324   047007          1789   1795   1801   1807   7776#
EM325   047102          1813   1819   1825   1831   7786#
EM326   047172          1837   1843   1849   1855   7796#
EM327   047260          4864   4976   5090   5200   5393   5602   5727   7805#
EM328   047332          4880   4992   5106   5214   5407   7812#
EM329   047411          1861   7820#
EM330   047462          1867   7827#
EM331   047525          1873   1879   1885   7833#
EM332   047612          1891   1897   1903   7842#
EM333   047677          5246   5443   5815   7851#
EM334   047735          5273   5470   5842   7857#
EM335   047773          1909   1915   1921   1927   1933   1939   1945   7863#
```

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EM336   050047          1951    7871#
EM337   050124          1957    1963    1969    1975    1981    1987    1993    7879#
EM338   050203          5623    5748    5781    7887#
EM339   050271          5649    5774    5812    7897#
EM340   050375          1999    2005    7909#
EM4000  050442          1312    1330    1348    1366    1384    1402    1421    1442    1463    1484    1504    1558    1613
                        1632    1652    1670    1694    1718    1742    1766    1790    1814    1838    1874    1892    1910
                        1952    1958    7916#
EM4001  050460          1318    1336    1354    1372    1390    1408    7919#
EM4002  050501          1324    1342    1360    1378    1396    1414    7922#
EM4003  050522          1428    1449    1470    1491    7925#
EM4004  050552          1435    1456    1477    1498    7929#
EM4005  050602          1510    1619    1639    1658    1676    1700    1724    1748    1772    1796    1820    1844    1880
                        1898    1916    1964    7933#
EM4006  050620          1516    1625    1646    1664    1682    1706    1730    1754    1778    1802    1826    1850    1886
                        1904    1922    1970    7936#
EM4007  050644          1522    1928    1976    7940#
EM4008  050672          1528    1934    1982    7944#
EM4009  050717          1534    7948#
EM4010  050767          1540    7955#
EM4011  051037          1546    7962#
EM4012  051115          1552    7970#
EM4013  051155          1564    1688    1712    1736    1760    1784    1808    1832    1856    7976#
EM4014  051223          1570    1582    1594    1946    1994    7983#
EM4015  051257          1576    1588    1600    1940    1988    7988#
EM4016  051317          1607    7994#
EM4017  051335          1862    1868    2000    2006    7997#
ERRCNT  003250          2056#   2135*   6118*   6121
ERRVEC= 000004           988#   2116    2117*   2128*   5951    5952*   5954*   5957*
E.ASOF  003216          2038#
E.BA    003204          2033#   2754*   2765    5302*   5313    5499*   5510    7116    7145
E.CS1   003200          2031#   2247*   2250    2293*   2296    2340*   2343    2386*   2389    2432*   2435    2479*   2482
                        2514*   2526    2535    2571*   2583    2592    2625*   2637    2646    2680*   2692    2701    2714
                        2716*   2751*   2756    2786    2842*   2849    2857    2873    3286*   3289    3368*   3371    3416*
                        3457    3474*   3475*   3483*   3484    3504*   3569    3650*   3653    3707*   3747    3810*   3850
                        3914*   3954    4018*   4058    4123*   4164    4181*   4182*   4190*   4191    4249*   4290    4307*
                        4308*   4316*   4317    4368*   4409    4426*   4427*   4435*   4436    4510*   4513    4526*   4527
                        4600*   4603    4616*   4617    4690*   4693    4706*   4707    4780*   4783    4796*   4797    5293*
                        5304    5490*   5501    6181    7113    7116    7120    7125    7131    7135    7142
E.CS2   003210          2035#   2752*   2762    2777*   2792    2804*   3287*   3292    3369*   3374    3417*   3460    3505*
                        3572    3651*   3656    3708*   3750    3811*   3853    3915*   3957    4019*   4061    4124*   4167
                        4250*   4293    4369*   4412    4511*   4516    4601*   4606    4691*   4696    4781*   4786    5294*
                        5307    5491*   5504    7116    7120    7131    7135    7142
E.DA    003206          2034#   2513*   2525    2570*   2582    2605*   2606    2624*   2636    2659*   2660    2679*   2691
                        3044    3125    3206    5301*   5322    5498*   5519    6149*   6150*   6151    6153*   6154*   6155
                        6157*   6172    6179    7129    7145
E.DB    003222          2040#   2778*   2798    7123
E.DCYL  003220          2039#   2512*   2524    2548*   2549    2551*   2552    2569*   2581    2623*   2635    2678*   2690
                        3047    3128    3209    5300*   5319    5497*   5516    6148*   6158*   6164    7129    7145
E.DS    003212          2036#
E.ECPS  003232          2044#
E.ECPT  003234          2045#   4881*   4898    5012    5126    5233    5426    5639    5764    5798    5854*   5856    6222*
                        6223*   7140    7148
E.ER    003214          2037#   2755*   2771    2795    3288*   3295    3370*   3377    3418*   3463    3473*   3506*   3575
                        3652*   3659    3709*   3753    3812*   3856    3916*   3960    3968*   4020*   4064    4072*   4125*
                        4170    4180*   4251*   4296    4306*   4370*   4415    4425*   4512*   4519    4602*   4609    4692*
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                    4699    4782*   4789    5295*   5310    5492*   5507    7116    7120    713'    7135    7142
E.MR1   003224      2041#   2887*   2888    2969*   2970    3419*   3467    3710*   3757    3761*   3813*   3860    3864*
                    3917*   3964    4021*   4068    4126*   4174    4252*   4300    4371*   441o    4870*   498'*   5096*
                    5203*   5241*   5268*   5396*   5434*   5465*   5608*   5733*   5804*   583o*   6228*   622y*   6234*
                    6239*   6244*   6248    6258*   6262    6280*   6285*   6289    6298*   6302    7110    7127    7138
E.MR2   003226      2042#   2248*   2256    2294*   2302    2341*   2349    2387*   2395    2433*   2441    2480*   2488
                    2541    2598    2652    2707    6171*   7113
E.MR3   003230      2043#   2249*   2259    2295*   2305    2342*   2352    2388*   2398    2434*   2444    2481*   2491
                    2544    2601    2655    2710    6192*   7113
E.SPAR  003236      2046#
E.WC    003202      2032#   2753*   2768    5303*   5316    5500*   5513    7116    7145
FMTE  = 000020      1079#
GNS   = ****** U    1141    2155    5883    5890    7092    7093    7094    7095    7096    7098    7100    7101    7102
                    7103    7104    7105    7106
GO    = 000001      1042#   3474    4181    4307    4426    4510    4600    4690    4780    5293    5490
GTSWR = 104406      2150    7098#
HDRCNT  003310      2071#   3420*   3423    3470*   3471    3711*   3760*   3814*   3863*   3918*   3967*   4022*   4071*
                    4127*   4130    4177*   4178    4253*   4256    4303*   4304    4372*   4375    4422*   4423    7135
                    7138
HEADER  003302      2070#   3020    3101    3182    6135*   6136*   6137*   6138*   6139*   6140*   6141*   6142*   6143
                    6144*   6145*   6146    6147*
HEAD1   051754      2860    2946    4842    4954    5068    5174    5367    8093#
HEAD10  052064      4570    4660    4750    8129#
HEAD11  052072      5579    5704    8132#
HEAD2   051762      3261    4480    8096#
HEAD3   051770      3343    8099#
HEAD4   051776      3625    8102#
HEAD5   052004      3706    8105#
HEAD6   052020      3809    8111#
HEAD7   052034      3913    8117#
HEAD8   052050      4017    8123#
HT    = 000011       898#   6490    6531
HVRC  = 000400      1083#   3506    3652    4072    4180    4306    4425    4602    4692    4782
IDAE  = 002000      1085#
IE    = 000100      1043#
ILF   = 000001      1075#
INCHDR  034220      2996    3077    3158    6135#
INTR  = 000300      1038#
IO1VEC= 000020       993#   2100*   2101*
IR    = 000100      1062#   2777    2804    3287    3369    3417    3505    3651    3708    3811    3915    4019    4124
                    4250    4369    4511    4601    4691    4781    5294    5491
LF    = 000012       899#   6525    6531
MCLK  = 000400      1116#   2240    2286    2333     379    2425    2472    2528    2585    2639    2694    2742    2836
                    2927    2933    3006    3087    3168    3247    3329    3410    3530    3611    3701    3804    3908
                    4012    4117    4243    4362    4466    4503    4556    4593    4646    4683    4736    4773    4827
                    4939    5053    5160    5286    5353    5483    5560    5685    6245    6259    6286    6299    6326
                    6329    6331    6335    6337
MDS   = 001000      1065#
MEMPAR  003274      2066#
MERD  = 001000      1117#   6329    6337
MESMSK= 000017      1110#
MEWD  = 002000      1118#   2887    2969    3419    3710    3761    3813    3864    3917    4021    4126    4252    4371
                    4870    4982    5096    5203    5396    5608    5733    6228    6234    6258    6298
MIND  = 000200      1115#   2932    2933    2934
MOD2BF  053572      5555    5620    8543#
MSP   = 000100      1114#   2840    3010    3091    3172    3251    3333    3421    3534    3615    3712    3815    3919
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                        4023    4128    4254    4373    4470    4560    4650    4740    4831    4943    5057    5164    5357
                        5565    5690
M1.BIT  003256          2059#   2844*   2864*   2881*   2939*   2950*   2963*   3013*   3024*   3037*   3094*   3105*   3118*
                        3175*   3186*   3199*   3254*   3265*   3278*   3336*   3347*   3360*   3426*   3436*   3449*   3537*
                        3548*   3561*   3618*   3629*   3642*   3715*   3725*   3739*   3818*   3828*   3842*   3922*   3932*
                        3946*   4026*   4036*   4050*   4133*   4143*   4156*   4259*   4269*   4282*   4378*   4388*   4401*
                        4473*   4484*   4497*   4563*   4574*   4587*   4653*   4664*   4677*   4743*   4754*   4767*   4834*
                        4845*   4858*   4867*   4886    4887*   4946*   4957*   4970*   4979*   4999    5000*   5060*   5071*
                        5084*   5093*   5113    5114*   5167*   5178*   5191*   5198*   5220    5221*   5252    5253*   5276
                        5277*   5360*   5371*   5384*   5391*   5413    5414*   5449    5450*   5473    5474*   5569*   5583*
                        5596*   5605*   5625    5626*   5694*   5708*   5721*   5730*   5750    5751*   5784    5785*   5821
                        5822*   5845    5846*   6232    6278    6283    6324    7110
M2.BIT  003260          2060#   4868*   4886*   4980*   4999*   5094*   5113*   5199*   5220*   5252*   5276*   5392*   5413*
                        5449*   5473*   5606*   5625*   5731*   5750*   5784*   5821*   5845*   6237    6242    7110
NED     = 010000        1068#
NEM     = 004000        1067#
NEWPAS  004300          2212#
NPRBUF  051544          2739    2754    2774    8024#
NXF     = 000004        1077#
OFFSET= 000015          1031#
OFST    = 000004        1096#
OPI     = 020000        1088#   3473    4180    4306    4425
OPI1    052164          3415    8156#
OPI2    052464          4122    8252#
OPI3    052764          4248    8348#
OPI4    053264          4367    8444#
OPR001  042112          2162    7318#
OPR002  042141          2165    2176    2192    7322#
OPR003  042147          2172    7324#
OPR004  042177          2183    7329#
OPR005  042221          5918    7333#
OPR006  042261          2159    7339#
OR      = 000200        1063#   2752    2777    3287    3369    3417    3505    3651    3708    3811    3915    4019    4124
                        4250    4369    4511    4601
PACK    = 000003        1026#
PARM    003316          1148    2076#
PAT     = 000020        1112#
PCA     = 004000        1119#   6229    6244    6280
PCD     = 010000        1120#   6229    6239    6285
PGE     = 002000        1066#
PIP     = 020000        1104#
PIRQ    = 177772         905#
PIRQVE= 000240          999#
PR.BIT  003254          2058#   2843*   2854*   2864    2867*   2870*   2881    2882*   2938*   2944*   2950    2953*   2956*
                        2963    2964*   3012*   3018*   3024    3027*   3030*   3037    3038*   3093*   3099*   3105    3108*
                        3111*   3118    3119*   3174*   3180*   3186    3189*   3192*   3199    3200*   3253*   3259*   3265
                        3268*   3271*   3278    3279*   3335*   3341*   3347    3350*   3353*   3360    3361*   3425*   3431*
                        3436    3439*   3442*   3449    3450*   3536*   3542*   3548    3551*   3554*   3561    3562*   3617*
                        3623*   3629    3632*   3635*   3642    3643*   3714*   3720*   3725    3728*   3731*   3739    3740*
                        3817*   3823*   3828    3831*   3834*   3842    3843*   3921*   3927*   3932    3935*   3938*   3946
                        3947*   4025*   4031*   4036    4039*   4042*   4050    4051*   4132*   4138*   4143    4146*   4149*
                        4156    4157*   4258*   4264*   4269    4272*   4275*   4282    4283*   4377*   4383*   4388    4391*
                        4394*   4401    4402*   4472*   4478*   4484    4487*   4490*   4497    4498*   4562*   4568*   4574
                        4577*   4580*   4587    4588*   4652*   4658*   4664    4667*   4670*   4677    4678*   4742*   4748*
                        4754    4757*   4760*   4767    4768*   4833*   4839*   4845    4848*   4851*   4858    4859*   4866*
                        4887    4888*   4945*   4951*   4957    4960*   4963*   4970    4971*   4978*   5000    5001*   5059*
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                    5065* 5071  5074* 5077* 5084  5085* 5092* 5114  5115* 5166* 5172* 5178  5181*
                    5184* 5191  5192* 5197* 5221  5222* 5253  5254* 5277  5278* 5359* 5365* 5371
                    5374* 5377* 5384  5385* 5390* 5414  5415* 5450  5451* 5474  5475* 5568* 5576*
                    5583  5586* 5589* 5596  5597* 5604* 5626  5627* 5693* 5701* 5708  5711* 5714*
                    5721  5722* 5729* 5751  5752* 5785  5786* 5822  5823* 5846  5847* 6230  6322
                    7110
PR0    = 000000      922# 2212
PR1    = 000040      923#
PR2    = 000100      924#
PR3    = 000140      925#
PR4    = 000200      926#
PR5    = 000240      927# 1001  2050
PR6    = 000300      928#
PR7    = 000340      929# 2087  7037  7051
PS     = 177776      902#  903
PSW    = 177776      903#
PURVEC= 000024       994# 2105* 2107* 7036* 7037* 7050* 7051*
P1.BIT  003252      2057# 4865* 4876* 4888  4891* 4894* 4977* 4988* 5001  5004* 5007* 5091* 5102*
                    5115  5118* 5121* 5196* 5209* 5222  5225* 5228* 5254  5257* 5260* 5278  5279*
                    5389* 5402* 5415  5418* 5421* 5451  5454* 5457* 5475  5476* 5603* 5614* 5627
                    5631* 5634* 5728* 5739* 5752  5756* 5759* 5786  5790* 5793* 5823  5826* 5829*
                    5847  5848* 6198  6235  6276  7110
RDBIT   035422      2847  2855  2871  2883  2941  2945  2957  2965  3015  3019  3031  3039  3096
                    3100  3112  3120  3177  3181  3193  3201  3256  3260  3272  3280  3338  3342
                    3354  3362  3428  3432  3443  3451  3539  3543  3555  3563  3620  3624  3636
                    3644  3717  3721  3732  3741  3820  3824  3835  3844  3924  3928  3939  3948
                    4028  4032  4043  4052  4135  4139  4150  4158  4261  4265  4276  4284  4380
                    4384  4395  4403  4475  4479  4491  4499  4565  4569  4581  4589  4655  4659
                    4671  4679  4745  4749  4761  4769  4836  4840  4852  4860  4948  4952  4964
                    4972  5062  5066  5078  5086  5169  5173  5185  5193  5362  5366  5378  5386
                    5572  5577  5590  5598  5697  5702  5715  5723  6322#
RDCHR  = 104410     6876  7101#
RDDATA= 000021      1033# 2237  2247  2376  2386  2514  2571  2625  2680  4643  4690
RDGATE= 100000      1123# 6229
RDHEAD= 000025      1035#
RDLIN  = 104411     6950  7102#
RDOCT  = 104412     2166  2177  2193  7103#
RDY    = 000200     1044# 3475  3483  4182  4190  4308  4316  4427  4435  4510  4600  4690  4780
                    5293  5490
RECAL  = 000013     1030#
RESREG= 104414      6117  7105#
RESTRT  003326      1146  2079#
RESVEC= 000010       989#
RKASOF= 000016      1013#
RKBA   = 000004     1008# 2233* 2279* 2326* 2372* 2418* 2465* 2523* 2580* 2634* 2689* 2739* 2749
                    2832* 2923* 3002* 3083* 3164* 3243* 3325* 3403* 3524* 3607* 3694* 3797* 3901*
                    4005* 4110* 4236* 4355* 4459* 4549* 4639* 4729* 4822* 4934* 5048* 5155* 5298
                    5348* 5495  5555* 5680*
RKCS1  = 000000     1006# 2230* 2237* 2244  2253* 2276* 2283* 2290  2299* 2323* 2330* 2337  2346*
                    2369* 2376* 2383  2392* 2415* 2422* 2429  2438* 2462* 2469* 2476  2485* 2520*
                    2526* 2532  2538* 2577* 2583* 2589  2595* 2631* 2637* 2643  2649* 2686* 2692*
                    2698  2704* 2736* 2740* 2746  2759* 2783  2789* 2829* 2833* 2848  2856  2872
                    2917* 2924* 2997* 3003* 3078* 3084* 3159* 3165* 3238* 3244* 3283  3320* 3326*
                    3365  3398* 3407* 3454  3479* 3480  3512* 3528* 3566  3602* 3608* 3647  3692*
                    3698* 3744  3795* 3801* 3847  3899* 3905* 3951  4003* 4009* 4055  4105* 4114*
                    4161  4186* 4187  4231* 4240* 4287  4312* 4313  4350* 4359* 4406  4431* 4432
```

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                        4457* 4463* 4507  4522* 4523  4547* 4553* 4597  4612* 4613  4637* 4643* 4687
                        4702* 4703  4727* 4733* 4777  4792* 4793  4820* 4824* 4932* 4936* 5046* 5050*
                        5153* 5157* 5290  5346* 5350* 5487  5549* 5557* 5674* 5682* 5917*
RKCS2 = 000010          1010# 2236* 2262* 2329* 2375* 2421* 2468* 2747  2784  2893  3284  3366  3455
                        3481  3567  3648  3745  3848  3952  4056  4162  4188  4288  4314  4407  4433
                        4508  4524  4598  4614  4688  4704  4778  4794  5291  5488
RKDA  = 000006          1009# 2235* 2281* 2328* 2374* 2420* 2467* 2525* 2582* 2636* 2691* 3000* 3042
                        3081* 3123  3162* 3204  3241* 3323* 3406* 3526* 3605* 3696* 3799* 3903* 4007*
                        4113* 4239* 4358* 4462* 4552* 4642* 4732* 5297  5494
RKDB  = 000024          1015# 2779
RKDCYL= 000020          1014# 2234* 2280* 2327* 2373* 2419* 2466* 2524* 2581* 2635* 2690* 2999* 3043
                        3080* 3124  3161* 3205  3240* 3322* 3405* 3527* 3604* 3697* 3800* 3904* 4008*
                        4112* 4238* 4357* 4461* 4551* 4641* 4731* 5296  5493
RKDS  = 000012          1011#
RKECPS= 000030          1019#
RKECPT= 000032          1020# 4897  5010  5124  5232  5425  5637  5762  5796  5855
RKER  = 000014          1012# 2750  2785  2894  3285  3367  3456  3482  3568  3649  3746  3849  3953
                        4057  4163  4189  4289  4315  4408  4434  4509  4525  4599  4615  4689  4705
                        4779  4795  5292  5489
RKMR1 = 000026          1016# 2231* 2240* 2241* 2277* 2286* 2287* 2324* 2333* 2334* 2370* 2379* 2380*
                        2416* 2425* 2426* 2463* 2472* 2473* 2521* 2528* 2529* 2578* 2585* 2586* 2632*
                        2639* 2640* 2687* 2694* 2695* 2737* 2742* 2743* 2830* 2836* 2837* 2840* 2841*
                        2886  2921* 2927* 2928* 2932* 2933* 2934* 2937* 2968  2998* 3006* 3007* 3010*
                        3011* 3079* 3087* 3088* 3091* 3092* 3160* 3168* 3169* 3172* 3173* 3239* 3247*
                        3248* 3251* 3252* 3321* 3329* 3330* 3333* 3334* 3402* 3410* 3411* 3421* 3422*
                        3466  3516* 3530* 3531* 3534* 3535* 3603* 3611* 3612* 3615* 3616* 3693* 3701*
                        3702* 3712* 3717* 3756  3796* 3804* 3805* 3815* 3816* 3859  3900* 3908* 3909*
                        3919* 3920* 3962 4004* 4012* 4013* 4023* 4024* 4067  4109* 4117* 4118* 4128*
                        4129* 4177 4235* 4243* 4244* 4254* 4255* 4299  4354* 4362* 4363* 4373* 4374*
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                        4593* 4594* 4638* 4646* 4647* 4650* 4651* 4683* 4684* 4728* 4736* 4737* 4740*
                        4741* 4773* 4774* 4821* 4827* 4828* 4831* 4832* 4933* 4939* 4940* 4943* 4944*
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                        5686* 5690* 5691* 6245* 6246* 6247  6259* 6260* 6261  6286* 6287* 6288  6299*
                        6300* 6301  6326* 6329* 6330* 6331* 6332* 6335* 6336* 6337* 6338*
RKMR2 = 000034          1017# 2245  2291  2338  2384  2430  2477  2533  2590  2644  2699
RKMR3 = 000036          1018# 2246  2292  2339  2385  2431  2478  2534  2591  2645  2700
RKPRI   003242          2050# 2209*
RKSPAR= 000022          1021#
RKVEC   003240          2049# 2207* 2208*
RKWC  = 000002          1007# 2232* 2278* 2325* 2371* 2417* 2464* 2522* 2579* 2633* 2688* 2738* 2748
                        2831* 2922* 3001* 3082* 3163* 3242* 3324* 3404* 3525* 3606* 3695* 3798* 3902*
                        4006* 4111* 4237* 4356* 4460* 4550* 4640* 4730* 4823* 4935* 5049* 5156* 5299
                        5349* 5496  5556* 5681*
RLS   = 000010          1059#
SAVREG= 104413          6064  7104#
SAVSWR  003312          2072# 7035* 7054
SCLR  = 000040          1061#
SCOP1 = 104415          2547  2604  2658  2713  3050  3131  3212  3578  7106#
SCOP1S  033676          6047# 7106
SECTOR  003276          2067# 2991* 3000  3051* 3052  3072* 3081  3153* 3162  6141  6149
SEC24   003314          2073# 5543
SEEK  = 000017          1032#
SELDRV= 000001          1025#
SKI   = 000002          1076#
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SPACE2  042341            6100    6112    7348#
SPAR   = 020000           1051#
SPDLSS= 000020            1098#
SRTFLG  003246            2052#   2076*   2079*   2082*   2160
SRTSPL= 000011            1029#
STACK  = 001100            893#   2085    2098    5919    6128    6316    7052
START   003336            1145    2082#
START1  003342            2077    2080    2083#   5928
STKLMT= 177774             904#
SVAL   = 100000           1106#
SWR     001140            1209#   2096    2118*   2120    2126*   2133*   2148    5946    5960    5963    5978    5985    6047
                          6119    6254    6269    6296    6309    6416    6423    6435    6439    6720    6759    6814*   7035
                          7054*
SWREG   000176            1143#   2126    2148    6720    6759    6782
SW0    = 000001            957#
SW00   = 000001            947#    957
SW01   = 000002            946#    956
SW02   = 000004            945#    955
SW03   = 000010            944#    954
SW04   = 000020            943#    953
SW05   = 000040            942#    952
SW06   = 000100            941#    951
SW07   = 000200            940#    950
SW08   = 000400            939#    949
SW09   = 001000            938#    948
SW1    = 000002            956#
SW10   = 002000            937#
SW11   = 004000            936#
SW12   = 010000            935#    6119
SW13   = 020000            934#
SW14   = 040000            933#
SW15   = 100000            932#
SW2    = 000004            955#
SW3    = 000010            954#
SW4    = 000020            953#
SW5    = 000040            952#
SW6    = 000100            951#
SW7    = 000200            950#
SW8    = 000400            949#
SW9    = 001000            948#    6047    6254    6269    6296    6309
S.CLR  = 000400           1131#    2387    2433    2480
S.FMT  = 001000           1132#    2248    2294    2341    2387    2433    2480
S.PACK= 004000            1134#
S.RECL= 000040            1128#
S.RTC  = 000200           1130#    2294
S.SEEK= 000020            1127#    2248    2294    2341
S.STSP= 000100            1129#
S.UNLD= 002000            1133#
TBITVE= 000014             990#
TKVEC  = 000060            997#    6697*   6698*
TPVEC  = 000064            998#
TRACK   003277            2068#   3132*   3133    6137
TRAPPC  003244            2051#   7109
TRAPVE= 000034             996#    2104*   2105*
TRTVEC= 000014             991#
TSTBY1  042431            7358#
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TSTBY2  042441            7360#
TST1    004312            2213    2227#   5906    6005
TST10   006424            2566#   6012
TST11   006674            2620#   6013
TST12   007144            2675#   6014
TST13   007420            2715    2733#   6015
TST14   010070            2760    2790    2826#   6016
TST15   010514            2889    2891    2914#   6017
TST16   011054            2971    2987#   6018
TST17   011446            3068#   6019
TST2    004544            2254    2260    2273#   6006
TST20   012042            3149#   6020
TST21   012436            3235#   6021
TST22   013032            3296    3317#   6022
TST23   013426            3378    3395#   6023
TST24   014214            3485    3501#   6024
TST25   014704            3580    3599#   6025
TST26   015300            3660    3689#   6026
TST27   015752            3763    3792#   6027
TST3    004776            2300    2306    2320#   6007
TST30   016424            3866    3896#   6028
TST31   017076            3970    4000#   6029
TST32   017550            4074    4102#   6030
TST33   020336            4192    4228#   6031
TST34   021124            4318    4347#   6032
TST35   021712            4437    4454#   6033
TST36   022402            4528    4544#   6034
TST37   023072            4618    4634#   6035
TST4    005230            2347    2353    2366#   6008
TST40   023562            4708    4724#   6036
TST41   024252            4798    4817#   6037
TST42   024766            4929#   6038
TST43   025512            5043#   6039
TST44   026236            5149#   6040
TST45   027474            5323    5342#   6041
TST46   030744            5520    5541#   6042
TST47   031542            5669#   6043
TST5    005460            2393    2399    2412#   6009
TST6    005710            2439    2445    2459#   6010
TST7    006140            2486    2492    2509#   6011
TYPDS = 104405            5887    5894    7096#
TYPE  = 104401            2142    2159    2162    2165    2172    2176    2183    2192    5881    5888    5895    5918    6076
                          6077    6081    6082    6089    6100    6102    6112    6113    6115    6123    6418    6426    6495
                          6591    6666    6714    6726    6780    6781    6784    6795    6805    6816    6835    6883    6889
                          6894    6898    6903    6904    6906    6909    6913    6979    6981    7053    7092#
TYPERR  033722            6064#   6425
TYPOC = 104402            2164    2175    2191    6097    6783    7093#
TYPON = 104404            7095#
TYPOS = 104403            7094#
T.ASOF  003156            2019#
T.BA    003144            2014#   2749*   2765    5298*   5313    5495*   5510    7116    7145
T.CS1   003140            2012#   2244*   2250    2290*   2296    2337*   2343    2383*   2389    2429*   2435    2476*   2482
                          2532*   2535    2589*   2592    2643*   2646    2698*   2701    2746*   2756    2783*   2786    2848*
                          2849    2856*   2857    2872*   2873    3283*   3289    3365*   3371    3454*   3457    3480*   3484
                          3566*   3569    3647*   3653    3744*   3747    3847*   3850    3951*   3954    4055*   4058    4161*
                          4164    4187*   419-    4287*   4290    4313*   4317    4406*   4409    4432*   4436    4507*   4513
```

			4523*	4527	4597*	4603	4613*	4617	4687*	4693	4703*	4707	4777*	4783	4793*
			4797	5290*	5304	5487*	5501	7113	7116	7120	7125	7131	7135	7142	
T.CS2	003150		2016#	2747*	2762	2784*	2792	2893*	3284*	3292	3366*	3374	3455*	3460	3481*
			3567*	3572	3648*	3656	3745*	3750	3848*	3853	3952*	3957	4056*	4061	4162*
			4167	4188*	4288*	4293	4314*	4407*	4412	4433*	4508*	4516	4524*	4598*	4606
			4614*	4688*	4696	4704*	4778*	4786	4794*	5291*	5307	5488*	5504	7116	7120
			7125	7131	7135	7142									
T.DA	003146		2015#	3042*	3044	3123*	3125	3204*	3206	5297*	5322	5494*	5519	7129	7145
T.DB	003162		2021#	2779*	2798	7123									
T.DCYL	003160		2020#	3043*	3047	3124*	3128	3205*	3209	5296*	5319	5493*	5516	7129	7145
T.DS	003152		2017#												
T.ECPS	003172		2025#												
T.ECPT	003174		2026#	4897*	4898	5010*	5012	5124*	5126	5232*	5233	5425*	5426	5637*	5639
			5762*	5764	5796*	5798	5855*	5856	7140	7148					
T.ER	003154		2018#	2750*	2771	2785*	2795	2894*	3285*	3295	3367*	3377	3456*	3463	3482*
			3568*	3575	3649*	3659	3746*	3753	3849*	3856	3953*	3960	4057*	4064	4163*
			4170	4189*	4289*	4296	4315*	4408*	4415	4434*	4509*	4519	4525*	4599*	4609
			4615*	4689*	4699	4705*	4779*	4789	4795*	5292*	5310	5489*	5507	7116	7120
			7125	7131	7135	7142									
T.MR1	003164		2022#	2886*	2888	2968*	2970	3466*	3467	3756*	3757	3859*	3860	3963*	3964
			4067*	4068	4173*	4174	4299*	4300	4418*	4419	6247*	6248	6261*	6262	6288*
			6289	6301*	6302	7110	7127	7138							
T.MR2	003166		2023#	2245*	2256	2291*	2302	2338*	2349	2384*	2395	2430*	2441	2477*	2488
			2533*	2541	2590*	2598	2644*	2652	2699*	2707	7113				
T.MR3	003170		2024#	2246*	2259	2292*	2305	2339*	2352	2385*	2398	2431*	2444	2478*	2491
			2534*	2544	2591*	2601	2645*	2655	2700*	2710	7113				
T.SPAR	003176		2027#												
T.WC	003142		2013#	2748*	2768	5299*	5316	5496*	5513	7116	7145				
UFE =	000400		1064#												
UNLOAD=	000007		1028#												
UNS =	040000		1089#												
UPE =	020000		1069#												
VRCHDR	053564		3517*	3518	3520*	3523*	3544	7134	8540#						
VV =	000100		1100#												
WCE =	040000		1070#												
WLE =	004000		1086#												
WRDATA=	000023		1034#	2283	2293	2422	2432	2740	2751	2833	2842	2924	3003	3084	3165
			3244	3286	3326	3368	3407	3416	3504	3528	3608	3650	3698	3707	3801
			3810	3905	3914	4009	4018	4114	4123	4240	4249	4359	4368	4463	4510
			4553	4600	4824	4936	5050	5157	5293	5350	5490	5557	5682		
WRDCNT	003264		2062#	2776*	2801*	7123									
WRHEAD=	000027		1036#												
WRL =	004000		1103#												
WRTBIT	034674		4871	4877	4895	4983	4989	5008	5097	5103	5122	5204	5210	5229	5261
			5280	5397	5403	5422	5458	5477	5609	5615	5635	5734	5740	5760	5794
			5830	5849	6228#										
WRTCHK=	000031		1037#	2330	2340	2469	2479	4733	4780						
WRTGAT=	040000		1122#	2887	3761	3864	4870	4982	5096	5203	5396	5608	5733	6228	
$APTHD	001000		1169	1175#											
$ASTAT=	******	U	6374	6389											
$ATYC	035556		6345	6347#											
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$ATY4	035550		6346#	6431											
$AUTOB	001134		1206#	2152*	6773	6930									
$BASE	001270		1278#	2163	2171*	2210	2229	2275	2322	2368	2414	2461	2511	2568	2622

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                    2677    2735    2828    2916    2989    3070    3151    3237    3319    3397    3503    3601    3691
                    3794    3898    4002    4104    4230    4349    4456    4546    4636    4726    4819    4931    5045
                    5152    5345    5548    5673    5916    7055
$BDADR  001122      1201#
$BDDAT  001126      1203#
$BELL   001204      1229#   6418    6451    6726    6923
$CDW1   001274      1280#
$CDW2   001276      1281#
$CHARC  036456      6497*   6507*   6514    6523*   6528#
$CKSWR  037432      6759#   7100
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$CM3  = 000000      1219#
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$CNTLC  040330      6714    6795    6923#
$CNTLG  040342      6780    6925#
$CNTLU  040335      6805    6898    6924#
$CPUOP  001242      1252#
$CRLF   001211      1231#   5895    6076    6081    6089    6102    6115    6426    6451    6496    6531    6816    6903
                    6923    6984
$DBLK   037124      6632    6666    6674#
$DEVCT  001224      1243#
$DEVM   001272      1279#
$DOAGN  033160      5877    5898    5904#
$DTBL   037114      6635    6670#
$ENDAD  033150      1155    2140    5900#   6446
$ENDCT  033014      2108    5879#
$ENULL  033164      5907#
$ENV    001234      1248#   2146    6352    6376    6428    6475
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$EOP    032760      5545    5869#   5925    6129
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$ERFLG  001103      1192#   2084*   5921*   5935    5974    5976    5982*   6004    6049    6413*   6451
$ERMAX  001115      1198#   2111*   5976    5999*   6004
$ERROR  036000      2102    6411#
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                    7131    7135    7138    7140    7142    7148
$ERRTB  001300      1298#   6073
$ERTTL  001112      1196#   5892    5896*   6419*   6451
$ESCAP  001202      1228#   2110*   2211*   5920*   5998*   6250*   6264*   6271*   6291*   6304*   6311*   6315*   6442
                    6444    6451
$ETABL  001234      1247#
$ETEND  001300      1181    1282#
$FATAL  001216      1240#   6380*
$FFLG   035776      6343*   6346*   6374    6383*   6391#
$FILLC  001156      1217#   6500    6531
$FILLS  001155      1216#   6531
$GDADR  001120      1200#
$GDDAT  001124      1202#
$GET42  033140      5897#
$GTSWR  037522      6781#   7098
$HD   = 000000       878
$HIBTS  001000      1176#
$HIOCT  040530      6972*   6983#
$ICNT   001104      1193#   5989*   5990    5992*   6003
$INTAG  001135      1207#   6778*   6797    6817    6930
$ITEMB  001114      1197#   6067    6422*   6430    6451
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$LF     001212            1232#  6451   6531   6913   6923   6984
$LFLG   035775            6384*  6390#
$LPADR  001106            1194#  2112*  5971*  5980*  5996*  6001   6003   7056
$LPERR  001110            1195#  2113*  2515*  2572*  2626*  2681*  2992*  3073*  3154*  3508*  5980   5997*  6003
                          6051   6317   6441
$MADR1  001246            1265#
$MADR2  001252            1269#
$MADR3  001256            1272#
$MADR4  001262            1275#
$MAIL   001214            1177   1181   1238#  2130   2146   5995   6428   6475
$MAMS1  001244            1259#
$MAMS2  001250            1267#
$MAMS3  001254            1270#
$MAMS4  001260            1273#
$MBADR  001002            1177#
$MFLG   035774            6344*  6350   6385*  6389#
$MNEW   040360            6784   6928#
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$MSGLG  001232            1246#  6365*
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$MSWR   040347            6781   6926#
$MTYP1  001245            1260#
$MTYP2  001251            1268#
$MTYP3  001255            1271#
$MTYP4  001261            1274#
$MXCNT  033556            5993   6003#
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$NWTST= 000001            2217#  2219   2263#  2265   2309#  2311   2356#  2358   2402#  2404   2448#  2450   2497#
                          2499   2555#  2557   2609#  2611   2663#  2665   2721#  2723   2809#  2811   2897#  289^
                          2974#  2976   3055#  3057   3136#  3138   3217#  3219   3299#  3301   3381#  3383   348 #
                          3490   3583#  3585   3663#  3665   3766#  3768   3869#  3871   3973#  3975   4077#  4079
                          4195#  4197   4321#  4323   4441#  4443   4531#  4533   4621#  4623   4711#  4713   4804#
                          4806   4907#  4909   5021#  5023   5135#  5137   5328#  5330   5529#  5531   5656#  5658
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$OMODE  036706            6558*  6562*  6567   6570*  6581*  6607#
$OVER   033542            5947   5972   5981   5991   6000#
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$PASTM  001006            1179#
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$PWRCT  040744            7044*  7045*  7046*  7048*  7058#
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$PWRUP  040654            7036   7044#
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$RDCHR  037774            6848#  7101
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$R2A  = ****** U          7106
$SAVRE  040532            7001#  7104
$SCOPE  033246            2100   5944#
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$STUP = 177777            2076#
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                        2676    2734    2827    2915    2988    3069    3150    3236    3318    3396    3502    3600    3690
                        3793    3897    4001    4103    4229    4348    4455    4545    4635    4725    4818    4930    5044
                        5150    5343    5542    5670    5866    5872    5899    5905    5907    5936    5937    5938    5939
                        5940    5946    5958    5960    5961    5974    5975    5976    5983    5984    5985    5997    6000
                        6003    6403    6404    6405    6406    6407    6416    6423    6435    6439    6451
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$SWOBT  033560          5970    6004#
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$TIMES  001200          1227#   2109*   2228*   2274*   2321*   2367*   2413*   2460*   2510*   2567*   2621*   2676*   2734*
                        2827*   2915*   2988*   3069*   3150*   3236*   3318*   3396*   3502*   3600*   3690*   3793*   3897*
                        4001*   4103*   4229*   4348*   4455*   4545*   4635*   4725*   4818*   4930*   5044*   5150*   5343*
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$TKINT  037144          2086    6694#   6715    6776
$TKQEN= 037143          6683#   6749    6860
$TKQIN  037136          6680#   6695*   6696    6747*   6748*   6749    6751*
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$TMP2   001164          1221#
$TMP3   001166          1222#
$TMP4   001170          1223#   3507*   3518    3520    3523    3579*
$TMP5   001172          1224#
$TMP6   001174          1225#
$TMP7   001176          1226#
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$TPFLG  001157          1218#   6469    6531
$TPS    001150          1213#   6518    6531
$TRAP   040756          2104    7069#
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$TYPEX  036460          6524    6526    6529#
$TYPOC  036506          6561#   7093
$TYPON  036522          6560    6563#   7095
$TYPOS  036462          6556#   7094
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$UNITM  001010          1180#
$USWR   001240          1251#
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$VECT2  001266          1277#
$XTSTR  033260          5949#
$$GET4= 000000          5899#
$$SW08= 000050          6004#   6005    6006#   6007#   6008#   6009#   6010#   6011#   6012#   6013#   6014#   6015#   6016#
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                        6030#   6031#   6032#   6033#   6034#   6035#   6036#   6037#   6038#   6039#   6040#   6041#   6042#
                        6043#   6044#
$OFILL  036705          6557*   6561*   6571    6606#
$40CAT= ****** U        5946    6425
.       = 055622        1137#   1141#   1147#   1153    1154#   1156#   1158#   1159#   1165    1166#   1168#   1170#   1188#
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                        6674#   6678    6682#   6683    6684#   6922#   6923    6930#   6984    7039    8023#   8545#
.$ASTA= ****** U        6344    6347
.$X     = 001000        1165#   1170
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CLRPSW  1182#
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        8054   8055  8056  8057  8058  8059  8060  8061  8062  8063  8064  8065  8066  8067  8068
        8069   8070  8071  8072  8073  8074  8075  8076  8077  8078  8079  8080  8081  8082  8083
        8084   8085  8086  8087  8088  8089  8090  8091  8092
ECCTST  1182#  4931  5045
ENDCOM     1#  1000#
ERROR    894#  2252  2258  2261  2298  2304  2307  2345  2351  2354  2391  2397  2400  2437  2443
        2446   2484  2490  2493  2537  2543  2546  2594  2600  2603  2648  2654  2657  2703  2709
        2712   2758  2764  2767  2770  2773  2788  2794  2797  2800  2890  2895  2972  3046  3049
        3127   3130  3208  3211  3291  3294  3297  3373  3376  3379  3459  3462  3465  3469  3486
        3571   3574  3577  3655  3658  3661  3749  3752  3755  3759  3852  3855  3858  3862  3956
        3959   3962  3966  4060  4063  4066  4070  4166  4169  4172  4176  4193  4292  4295  4298
        4302   4319  4411  4414  4417  4421  4438  4515  4518  4521  4529  4605  4608  4611  4619
        4695   4698  4701  4709  4785  4788  4791  4799  4872  4878  4896  4900  4984  4990  5009
        5014   5098  5104  5123  5128  5205  5211  5230  5235  5262  5281  5306  5309  5312  5315
        5318   5321  5324  5398  5404  5423  5428  5459  5478  5503  5506  5509  5512  5515  5518
        5521   5610  5616  5636  5641  5735  5741  5761  5766  5795  5800  5831  5850  5858
ESCAPE     1#  1000#
GETPRI     1#  1000#
GETSWR     1#  1000#  2143#
HDRERR  1182#  4456  4546  4636  4726
HDRGEN  1182#  2511  2568  2622  2677
INCHD   1182#  2989  3070  3151
LDLPER  1182#  2515  2572  2626  2681  2992  3073  3154  3208
MSG     2217#  2219  2263#  2265  2309#  2311  2356#  2358  2402#  2404  2448#  2450  2497#  2499  2555#
        2557   2609#  2611  2663#  2665  2721#  2723  2809#  2811  2897#  2899  2974#  2976  3055#  3057
        3136#  3138  3217#  3219  3299#  3301  3381#  3383  3488#  3490  3583#  3585  3663#  3665  3766#
        3768   3869#  3871  3973#  3975  4077#  4079  4195#  4197  4321#  4323  4440#  4443  4531#  4533
        4621#  4623  4711#  4713  4804#  4806  4907#  4909  5021#  5023  5135#  5137  5328#  5330  5529#
        5531   5656#  5658
MULT       1#  1000#
NEWTST     1#  1000#  2217  2263  2309  2356  2402  2448  2497  2555  2609  2663  2721  2809  2897
        2974   3055  3136  3217  3299  3381  3488  3583  3663  3766  3869  3973  4077  4195  4321
        4441   4531  4621  4711  4804  4907  5021  5135  5328  5529  5656
OPITST  1182#  3397  4104  4230  4349
POP        1#  1000#  6386  6387  6661  6973  7022
PUSH       1#  1000#  6347  6349  6370  6620  6947  7002
REPORT     1#  1000#
SCOPE    895#  2227  2273  2320  2366  2412  2459  2509  2566  2620  2675  2733  2826  2914  2987
        3068   3149  3235  3317  3395  3501  3599  3689  3792  3896  4000  4102  4228  4347  4454
        4544   4634  4724  4817  4929  5043  5149  5342  5541  5669  5870
SEKMSG  1182#  2229  2275  2322
SETPRI     1#  1000#  6851
SETTRA  7084#  7093  7094  7095  7096  7098  7100  7101  7102  7103  7104  7105  7106
SETUP      1#  1000#  2091
SKIP       1#  1000#  2254  2260  2300  2306  2347  2353  2393  2399  2439  2445  2486  2492  2715
        2760   2790  2889  2891  2971  3296  3378  3485  3580  3660  3763  3866  3970  4074  4192
        4318   4437  4528  4618  4708  4798  5323  5520
SLASH      1#  1000#
SPACE   1000#
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STARS      1#   1000#  1151   1162   1164   1171   1184   1233   1236   2217   2226   2263   2272   2309   2319
          2356  2365   2402   2411   2448   2458   2497   2508   2555   2565   2609   2619   2663   2674   2721
          2732  2809   2825   2897   2913   2974   2986   3055   3067   3136   3148   3217   3234   3299   3316
          3381  3394   3488   3500   3583   3598   3663   3688   3766   3791   3869   3895   3973   3999   4077
          4101  4195   4227   4321   4346   4441   4453   4531   4543   4621   4633   4711   4723   4804   4816
          4907  4928   5021   5042   5135   5148   5328   5341   5529   5540   5656   5668   5862   5932   6044
          6054  6063   6195   6225   6319   6342   6399   6454   6533   6610   6677   6754   6769   6840   6864
          6933  6986   7032   7041   7063
SWRSU      1#   1000#  2114#
TRMTRP    7084#
TWOHD     1182#  3691   3794   3898   4002
TYPBIN     1#   1000#
TYPDEC     1#   1000#  5885   5892
TYPNAM     1#   1000#  2136
TYPNUM     1#   1000#
TYPOCS     1#   1000#
TYPOCT     1#   1000#  2163   6782
TYPTXT     1#   1000#  5881   5888
WRT18B    1182#  5547   5672
$$CMRE    1182#
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$$ESCA     1#   1000#
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          4441  4531   4621   4711   4804   4907   5021   5135   5328   5529   5656
$$SET     7084#  7093   7094   7095   7096   7098   7100   7101   7102   7103   7104   7105   7106
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$$SKIP     1#   1000#  2254   2260   2300   2306   2347   2353   2393   2399   2439   2445   2486   2492   2715
          2760  2790   2889   2891   2971   3296   3378   3485   3580   3660   3763   3866   3970   4074   4192
          4318  4437   4528   4618   4708   4798   5323   5520
.EQUAT     1#    867#   890
.HEADE     1#    867#   869
.KT11      1#    867#
.SETUP     1#    867#  2076
.SWRHI     1#    867#   878
.SWRLO    867#   890#
.$ACT1     1#    867#  1149
.$APTB     1#   1234#
.$APTH     1#    867#  1160
.$APTY     1#    867#  6340
.$ASTA     1#
.$CATC     1#    867#  1135
.$CMTA     1#    867#  1182
.$DB2D     1#
.$DB2O     1#
.$DIV      1#
.$EOP      1#    867#  5860
.$ERRO     1#    867#  6397
.$ERRT     1#    867#
.$MULT     1#
.$POWE     1#    867#
.$RAND     1#
.$RDDE     1#
.$RDOC     1#    867#  6931
.$READ     1#    867#  6675
.$R2AZ     1#
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.$SB2O      1#
.$SCOP      1#    867#   5930
.$SIZE      1#    867#
.$SUPR      1#
.$TRAP      1#    867#   7061
.$TYPB      1#
.$TYPD      1#    867#   6608
.$TYPE      1#    867#   6452
.$TYPO      1#    867#   6531
.$4CLA      1#
.1170       1#


. ABS.  055622     000


 ERRORS DETECTED:  0

 DSKZ:CZR6DC.BIN,DSKZ:CZR6DC.LST/CRF/SOL/NL:TOC=DSKZ:CZR6DC.SML,CZR6DC.P11
 RUN-TIME: 67 97 8 SECONDS
 RUN-TIME RATIO: 322/173=1.8
 CORE USED:  40K  (79 PAGES)
```