RK611
RK06,RK07

RK6 FCTNL CTRL
CZR6KG0

AH-9130G-MC
FICHE 1 OF 2

MAR 1982
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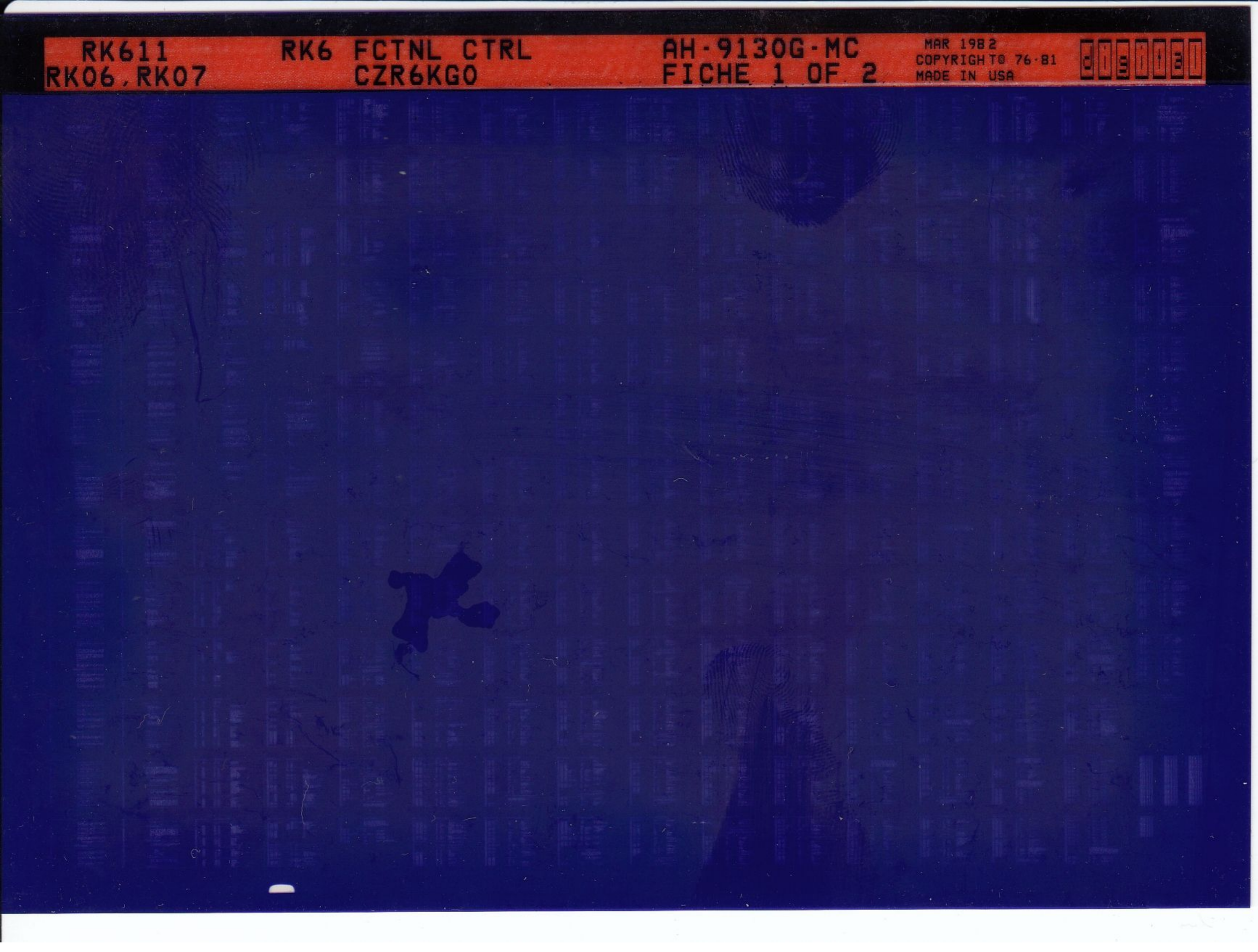

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IDENTIFICATION

PRODUCT CODE:	AC-9128G-MC
PRODUCT NAME:	CZR6KGO RK611 FCTNL CTRL
DATE:	AUGUST 10 1981
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	BRIAN LEBLANC

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1.0 ABSTRACT

THE RK611 FUNCTIONAL CONTROLLER DIAGNOSTIC (CZR6K) IS A SERIES OF TESTS THAT COMPLETES THE TESTING OF AN RK611/RK06-RK07 SUBSYSTEM. THE DISKLESS CONTROLLER DIAGNOSTIC AND THE RK06-RK07 DRIVE DIAGNOSTIC ARE PREREQUISITES TO THE RUNNING OF THIS PROGRAM. THE PURPOSE OF THIS PROGRAM IS TO TEST THOSE AREAS IN THE CONTROLLER THAT COULD NOT BE TESTED IN A DISKLESS ENVIRONMENT AND THOSE AREAS OF THE DRIVE THAT COULD NOT BE TESTED UNTIL CONTROLLER OPERATION IN A DIAGNOSTIC OR MAINTENANCE MODE HAS BEEN TESTED.

THE TESTS PERFORMED ARE MAINLY FUNCTIONALLY ORIENTED BUT DIAGNOSTIC MODE IS USED IN NUMEROUS OCCASSIONS TO ACCOMPLISH THE OBJECTIVES, MAINLY THE FORCING OF ERRORS. IN THESE CASES, THE CONTROLLER IS PLACED IN DIAGNOSTIC MODE AND OPERATION IS CLOCKED PART WAY THROUGH. DIAGNOSTIC MODE IS THEN RESET AND THE CONTROLLER ALLOWED TO COMPLETE THE OPERATION. DEPENDING ON THE OPERATION AND HOW FAR THROUGH IT BEFORE DIAGNOSTIC MODE IS RESET VARIOUS ERROR CONDITIONS CAN BE MADE TO OCCUR. THIS DOCUMENT DOES NOT ATTEMPT TO EXPLAIN WHY THESE ERROR CONDITIONS ARE SET BUT THE INDIVIDUAL TEST DESCRIPTIONS SPECIFY WHAT ERROR IS BEING FORCED AND THE PROCEDURE USED TO FORCE IT.

C A U T I O N

THIS PROGRAM SHOULD BE HALTED ONLY BY TYPING A ^C. IF THE PROGRAM IS HALTED USING THE HALT KEY THE POSSIBILITY EXISTS THAT THE CARTRIDGE FORMAT WILL BE INCORRECT, THE CYLINDER ADDRESS IN THE DRIVE MAY BE INVALID, OR THE DRIVE MAY NOT BE READY.

2.0 REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

PDP-11 SYSTEM (16K MEMORY)
CONSOLE TERMINAL
DECTAPE, PAPERTAPE, OR DISK
LINE CLOCK (KW11-L) (OPTIONAL)
PARITY OPTION (MM11) (OPTIONAL)
RK611 CONTROLLER
AT LEAST 1 AND UP TO 8 RK06-RK07 DRIVES
FORMATTED RK06K ON EACH DRIVE

2.2 PRELIMINARY PROGRAMS

THE RK611 DISKLESS CONTROLLER DIAGNOSTIC (ALL PARTS) AND THE

UNIBUS RK06-RK07 DRIVE DIAGNOSTIC (ALL PARTS) SHOULD HAVE RUN SUCCESSFULLY.

3.0 OPERATING PROCEDURE

3.1 LOADING PROCEDURE

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

IT CAN BE LOADED AND RUN UNDER APT OR ACT AND IT CAN BE CHAINED BY XXDP.

3.2 STARTUP PROCEDURE

THE PROGRAM START LOCATION IS 200(8). THIS START WILL AUTOMATICALLY SIZE THE SYSTEM UNLESS RUNNING UNDER APT. THE PROGRAM ASSUMES THE STANDARD UNIBUS ADDRESS, VECTOR ADDRESS, AND BUS PRIORITY LEVEL (177440, 210, AND 4 RESPECTIVELY). IF STARTED AT 200 AND THE XXDP MEDIA IS RK06 (PROGRAM LOADED FROM RK06) DRIVE 0 IS NOT TESTED.

LOCATION 204(8) IS THE PROGRAM RESTART.

LOCATION 214(8) IS THE PARAMETERIZATION START LOCATION. THE OPERATOR WILL BE ASKED TO IDENTIFY THE BUS ADDRESS, VECTOR ADDRESS, AND BUS PRIORITY. IF THE PROGRAM WAS LOADED FROM RK06, THE OPERATOR WILL BE ASKED TO MOUNT A WORK CARTRIDGE ON DRIVE 0 OR TO PLACE IT OFF-LINE IF IT IS NOT TO BE TESTED.

LOCATION 220(8) IS THE PHASE LOCKED LOOP CLOCK ADJUSTMENT START. THE PROGRAM FIRST RUNS THE FIRST THREE TESTS AND THEN JUMPS TO THE ADJUSTMENT ROUTINE. THE PROGRAM WILL CONTINUE TO LOOP IN THIS ROUTINE UNTIL THE PROCESSOR IS HALTED.

ALL DRIVES THAT ARE TO BE TESTED MUST BE ON-LINE, READY, AND WRITE LOCK RESET. IF ALL THREE CONDITIONS ARE NOT MET, THAT DRIVE IS NOT TESTED.

3.3 CONSOLE SWITCH REGISTER

THE CONSOLE SWITCH REGISTER IS USED TO PROVIDE PROGRAM CONTROL AS DESCRIBED BELOW:

SW15 - HALT ON ERROR
SW14 - LOOP ON TEST
SW13 - INHIBIT ERROR REPORT
SW12 - ABORT PROGRAM AFTER 20 ERRORS
SW11 - INHIBIT ITERATIONS
SW10 - BELL ON ERROR
SW09 - LOOP ON ERROR
SW08 - EXECUTE TEST NUMBER SPECIFIED IN SW<7-0>.

SW<7-0> - EXECUTE THIS TEST IF SW08 SET.

EXECUTING A SPECIFIC TEST MUST BE USED WITH CAUTION. SOME TESTS REQUIRE OTHERS TO BE RUN TO FORMAT THE PACK IN A SPECIFIC MANNER OR WRITE SPECIFIC DATA. TESTS THAT REQUIRE OTHERS TO BE RUN INDICATE THIS IN THE TEST DESCRIPTION. IT IS SUGGESTED THAT THE PROGRAM BE RUN IN THE DEFAULT SEQUENCE THE FIRST TIME AFTER IT HAS BEEN LOADED.

NOTE: TEST 3 MUST BE RUN BEFORE ANY SUBSEQUENT TEST. THIS TEST DETERMINES WHICH DRIVES ARE ON THE DRIVE BUS FOR ALL FOLLOWING TESTS. LIKEWISE, TEST 20 MUST BE RUN BEFORE ANY TEST SUBSEQUENT TO IT. THIS TEST READS THE BAD SECTOR FILES AND BUILDS TABLES USED BY THE FOLLOWING TESTS. THESE TESTS, HAVING BEEN RUN ONCE, NEED NOT BE RUN AGAIN IF A DIFFERENT TEST IS SELECTED.

3.4 '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.

3.5 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.

3.6 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.

3.7 CONTROL Q (^Q) OPERATION

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

3.8 UNIBUS ADDRESSES

STANDARD UNIBUS ADDRESSES ARE ASSUMED FOR THE KW11-L AND MM11 OPTIONS. THESE ADDRESSES MAY BE CHANGED BY CHANGE THE APPROPRIATE MEMORY LOCATIONS. THE FOLLOWING TAGS AND LOCATIONS HAVE BEEN USED:

KW11-L	TAG	LOCATION
UNIBUS ADDRESS	KWLADD	1710
VECTOR ADDRESS	KWLVEC	1712

3.9 EXECUTION TIME

THE FIRST PASS OF THE PROGRAM FOR ONE DRIVE IS APPROXIMATELY 65 SECONDS AND EACH SUBSEQUENT PASS IS APPROXIMATELY 2 MINUTES 20 SECONDS.

THE EXECUTION TIME FOR MULTIPLE DRIVES IN THE FIRST PASS IS:

((NUMBER OF DRIVES) X 45 SEC) + 20 SEC

FOR SUBSEQUENT PASSES THE RUN TIME IS THE PRODUCT OF 2 MINUTES 20 SECONDS TIMES THE NUMBER OF DRIVES PLUS 25 SECONDS FOR EACH DRIVE AFTER THE FIRST.

4.0 PROGRAM DESCRIPTION

THE FOLLOWING TEST SEQUENCE IS EXECUTED ASSUMING TWO OR MORE DRIVES.

FIRST PASS - FIRST DRIVE:
ALL TESTS UP TO THE MULTI-DRIVE OPERATIONS ARE PERFORMED ONCE.

FIRST PASS - ALL REMAINING DRIVES:
STATUS VALID TESTS UP TO THE MULTI-DRIVE OPERATIONS ARE PERFORMED ONCE ON EACH DRIVE.

THEN MULTI-DRIVE OPERATIONS ARE PERFORMED ONCE ON EACH COMBINATION OF DRIVES.

SECOND AND ALL SUBSEQUENT PASSES:
THE SAME SEQUENCE OF TESTING IS REPEATED EXCEPT FOR TEST ITERATIONS WHICH ARE SPECIFIED FOR EACH TEST.

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                        **BASIC INTERFACE AND OPTION TESTS
                        ************************************************************

                        TEST 1  RK611 BASE ADDRESS TEST

                                CHECK THAT READING THE RK611 BASE ADDRESS (RKCS1) DOES
                                NOT CAUSE A NON-EXISTANT MEMORY TRAP.

                                TEST 2 INTERRUPT VECTOR ADDRESS TEST  CHECK  THAT  THE
                                INTERRUPT  VECTOR FOR THE RK611 IS SET TO THE EXPECTED
                                ADDRESS.

                        ************************************************************
                        **STATUS VALID TESTS
                        ************************************************************

                        TEST 3  SELECT ALL DRIVES

                                IF NOT RUNNING IN APT AUTOMATIC ENVIRONMENT, DETERMINE
                                WHAT  DRIVES  ARE ON-LINE BY SELECTING ALL DRIVES.  IF
                                NON-EXISTENT DRIVE REPORTED MAKE SURE STATUS VALID  IS
                                RESET.   IF  DRIVE  PRESENT MAKE SURE NO ERROR EXISTS,
                                DRIVE IS CYCLED UP, AND  STATUS  VALID  SET,  AND  DSC
                                RESET.

                                IF RUNNING IN APT AUTOMATIC  ENVIRONMENT,  THE  DRIVES
                                IDENTIFIED  IN  ETABLE  ARE TESTED FOR NO ERROR, DRIVE
                                CYCLED UP, AND STATUS VALID SET.

                                IF LOCATION 41 INDICATES THE  XXDP  MEDIA  IS  ON  THE
                                RK06,  DRIVE  0 WILL ONLY BE TESTED IF THE PARAM START
                                (214) WAS USED.  IF THE AUTOMATIC START (200) IS USED,
                                DRIVE  0 IS NOT TESTED.  THE RESTART (204) WILL RETAIN
                                THE TEST STATUS OF DRIVE 0.

                                IF THE PARAM START IS USED, THE OPERATOR  MUST  EITHER
                                PLACE  DRIVE  0  OFF LINE IF IT IS NOT TO BE TESTED OR
                                UNLOADED AND A SCRATCH MEDIA MOUNTED IF IT  IS  TO  BE
                                TESTED.   THE PROGRAM WILL MONITOR OFF LINE AND VOLUME
                                VALID TO DETERMINE THE TEST STATUS OF DRIVE 0.

                                ALL DRIVES TO BE TESTED MUST BE  ON-LINE,  CYCLED  UP,
                                AND WRITE LOCK RESET. ADDRESSES  OF  DRIVES  THAT  ARE
                                NON-EXISTANT EITHER BECAUSE THE DRIVE DOES  NOT  EXIST
                                OR IS OFF-LINE ARE USED TO VERIFY  NON-EXISTANT  DRIVE
                                ERROR DETECTION.  DRIVES  THAT  ARE  ON-LINE  BUT  NOT
                                CYCLED UP OR ARE WRITE LOCKED ARE NOT TESTED.

                                AT COMPLETION OF THE TEST A MESSAGE WILL  BE  GIVEN  TO
                                IDENTIFY THE DRIVES TO BE USED IN TESTING.

                        NOTE:   THIS TEST MUST BE RUN AT LEAST ONCE BEFORE  ANY
                                OTHER TEST THAT FOLLOWS.
                                 THE DETERMINATION OF WHETHER EACH DRIVE IS AN
                                 RK06 OR RK07 IS MADE IN THIS TEST, AND
```

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                                A TABLE IS FILLED ACCORDINGLY.

TEST 4  RELEASE ALL DRIVES



        RELEASE ALL DRIVES.  MAKE  SURE  NO  ERROR  SETS  AND
        STATUS VALID IS RESET.

TEST 5  NON-STANDARD MESSAGES AND SVAL

        PICK ONE OF THE AVAILABLE DRIVES AND  GET  NON-STANDAD
        MESSAGES.  MAKE SURE NO ERROR OCCURS AND STATUS VALUD
        DOES NOT SET  AND  THAT  NON-STANDARD  MESSAGES  CAUSE
        STATUS VALID TO RESET.

TEST 6  WRITING CS2 AND STATUS VALID

        SELECT AN AVAILABLE DRIVE.  MAKE SURE STATUS VALID  IS
        SET.  WRITE COMMAND AND STATUS REGISTER 2.  MAKE SURE
        STATUS VALID RESETS.

;*****************************************************************
;**CONTROLLER ERROR TESTS
;*****************************************************************

TEST 7  DRIVE TYPE ERROR

        CREATE A DRIVE TYPE ERORR MAKE SURE DRIVE  TYPE  ERROR
        SETS AND STATUS VALID SETS.

TEST 10 STATUS VALID AND PARITY ERROR

        ISSUE A SELECT TO AN AVAILIABLE DRIVE WITH BAD PARITY.
        MAKE  SURE  SPAR,  CONTROLLER  ERROR, ATTENTION, DRIVE
        STATUS CHANGES, DRPAR,  DRIVE  INTERRUPT,  AND  STATUS
        VALID  SET, ISSUE A CONTROLLER CLEAR.  MAKE SURE DRIVE
        INTERRUPT AND ATTENTION ARE STILL SET.  SELECT  DRIVE
        AGAIN  WITH  GOOD  PARITY.  MAKE SURE ATTENTION, DRIVE
        STATUS  CHANGE,  DRPAR,  CONTROLLLER  ERROR,  DRIVE
        INTERRUPT, AND STATUS VALID ARE SET AND SPAR IS RESET.
        ISSUE A CONTROLLER CLEAR.  GET  NON-STANDARD  MESSAGES
        AND  MAKE  SURE ONLY DRIVE INTERRUPT AND ATTENTION ARE
        SET.  CLEAR ATTENTION WITH DRIVE  CLEAR.  REPEAT  FOR
        ALL AVAILIABLE DRIVES.

TEST 11 UNIT FIELD ERROR ON RELEASE

        ISSUE A SUBSYSTEM CLEAR.  SELECT AN  AVAILABLE  DRIVE.
        PUT  CONTROLLER  IN  DIAGNOSTIC MODE.  ISSUE A RELEASE
        COMMAND.  CLOCK THROUGH PHASE  ADDRESS  2.  TURN  OFF
        DIAGNOSTIC MODE.  MAKE SURE UNIT FIELD ERROR SETS.

TEST 12 UNIT FIELD ERROR ON SELECT

        ISSUE A SUBSYSTEM CLEAR.  SELECT AN  AVAILABLE  DRIVE.
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427                         PUT  CONTROLLER  IN  DIAGNOSTIC  MODE.  ISSUE A SELECT
428                         COMMAND WITH MESSAGE ID = 3 AND DRIVE  SELECTED  =  0.
429                         CLOCK  THROUGH  PHASE  ADDRESS 6.  TURN OFF DIAGNOSTIC
430
431
432
433                         MODE.  MAKE SURE UNIT FIELD ERROR SETS.
434
435                 ********************************************************************
436                 **ATTENTION HANDLING BY CONTROLLER
437                 ********************************************************************
438
439                 TEST 13 DOUBLE INTERRUPT
440
441                         ISSUE A SUBSYSTEM CLEAR.  ISSUE A  RECALIBRATE.   MAKE
442                         SURE STATUS VALID IS SET.  CHECK THAT SECOND INTERRUPT
443                         OCCURS.  AFTER  SECOND  INTERRUPT  CHECK  THAT  STATUS
444                         VALID  IS  RESET.   ISSUE  SELECT AND MAKE SURE STATUS
445                         VALID SETS.  CLEAR DRIVE.   CHECK  THAT  DRIVE  STATUS
446                         CHANGE SETS (BIT 14 OF DRIVE STATUS REGISTER)
447
448                 TEST 14 SINGLE INTERRUPT FROM ATTENTION
449
450                         DO A SEEK TO CYLINDER  0.   WAIT  FOR  INTERRUPT  FROM
451                         DRIVE  ATTENTION.   LOWER PRIORITY AGAIN AND MAKE SURE
452                         ANOTHER INTERRUPT DOES NOT OCCUR.  CLEAR DRIVE.
453
454                 TEST 15 RESET ATTENTIONS WITH UNIBUS INIT
455
456                         DO A SEEK TO CYLINDER  0  ON  ALL  AVAILIABLE  DRIVES.
457                         ISSUE A RESET.  MAKE SURE ALL ATTENTION RESET.
458
459                 ********************************************************************
460                 **ILLEGAL DISK ADDRESS ERROR TESTS
461                 ********************************************************************
462
463                 TEST 16 ILLEGAL DISK ADDRESS (PART 1)
464
465                         ISSUE A SEEK TO CYLINDER 0, HEAD 3.  MAKE SURE ILLEGAL
466                         ADDRESS   ERROR   AND  SEEK  INCOMPLETE  SETS.   CLEAR
467                         CONTROLLER AND CLEAR DRIVE.   REPEAT  FOR  HEADS  4-7,
468                         CHECKING  THAT  BOTH  IDAE AND SEEK INCOMPLETE SET FOR
469                         HEAD 7 AND IDAE ALONE SETS FOR HEADS 4, 5, AND 6
470
471                 TEST 17 ILLEGAL DISK ADDRESS (PART 2)
472
473                         ISSUE A SEEK TO CYLINDER  1000,  HEAD  0.   MAKE  SURE
474                         ILLEGAL DISK ADDRESS ERROR SETS.  CLEAR CONTROLLER AND
475                         DRIVE
476                         THIS TEST IS BYPASSED BY THE RK07 CONTROLLER BECAUSE
477                         IT DOES NOT RECOGNIZE ANY ILLEGAL DISK ADDRESS.
478
479                 ********************************************************************
480                 **WRITE HEADER TESTS
481                 ********************************************************************
482
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                        TEST 20 READ BAD SECTOR INFORMATION

                                ISSUE A READ DATA OF 400 WORDS TO CYLINDER 632, TRACK
                                2 TO GET THE FACTORY DETECTED BAD SECTOR FILE, 26
                                SECTOR MODE.
                                CYLINDER 1456 IS USED FOR THE RK07.



                                IF AN ERROR OCCURS, READ SECTOR 2, 4, 6, OR 10(8)
                                UNTIL A SUCCESSFUL READ IS DONE.  IF NONE READ
                                SUCCESSFULLY REMOVE THIS DRIVE FROM TEST.  WHEN A READ
                                IS SUCCESSFUL, TEST THAT THE PACK IS NOT AN ALIGNMENT
                                PADK AND STORE THE ENTRIES FOR LATER USE.

                                REPEAT THIS SERIES OF OPERATIONS FOR FACTORY DETECTED
                                BAD SECTORS 24 SECTOR MODE, SOFTWARE DETECTED BAD
                                SECTORS 26 SECTOR MODE, AND SOFTWARE DETECTED BAD
                                SECTORS 24 SECTOR MODE.  IF THE NUMBER OF BAD SECTORS
                                FOR 24 OR 26 SECTOR MODE EXCEED 20(10) THE DRIVE IS
                                REMOVED FROM TESTING.

                                NOTE:  THIS TEST IS RUN IN THE FIRST (QUICK VERIFY)
                                PASS ONLY.

                        TEST 21 FORMAT IN 26 SECTOR FORMAT

                                FORMAT CYLINDER 312, TRACK 0 AND TRACK 1 FOR 26 SECTOR
                                FORMAT.  VERIFY FORMAT AND THAT DATA LATE DID NOT
                                OCCUR WITH WRITE HEADER ON IN READING DATA BUFFER
                                AFTER READ HEADER.

                        ********************************************************************
                        **HEADER RECOGNITION TESTS
                        ********************************************************************

                        TEST 22 BAD SECTOR ERROR

                                FORMAT CYLINDER 312, TRACK 0, ON SCRATCH PACK TO HAVE
                                SECTOR 0 (BIT 15 OR WORD 2 OF HEADER RESET) AND SECTOR
                                1 (BIT 14 OR WORD 2 OF HEADER RESET) TO BE BAD SECTORS
                                AND ALL OTHER SECTORS GOOD.

                                ISSUE A WRITE DATA OR 400 WORDS TO CYLINDER 312, TRACK
                                0,  SECTOR 0.  MAKE SURE BAD SECTOR ERROR SETS.  ISSUE
                                A WRITE DATA TO CYLINDER 0, TRACK 0, SECTOR 1  OF  400
                                WORDS.  MAKE SURE BAD SECTOR ERROR SET.  ISSUE A WRITE
                                DATA OF 400 WORDS TO CYLINDER 0, TRACK  0,  SECTOR  2.
                                MAKE SURE NO ERROR SETS.

                        TEST 23 HEADER VRC ERROR

                                FORMAT CYLINDER 312, TRACK 0, ON SCRATCH PACK TO HAVE
                                16 SECTORS WITH BAD HEADER VRC.  ISSUE A WRITE DATA OF
                                EACH OF THE SECTORS WITH A BAD HEADER VRC.  MAKE  SURE
                                HEADER  VRC  ERROR SETS.  ISSUE A WRITE DATA TO A GOOD
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                        HEADER AND MAKE SURE NO ERROR OCCURS.

                TEST 24 BAD SECTOR ERROR AND HVRC ERROR

                        FORMAT CYLINDER 312, TRACK 0 SUCH THAT SECTOR ZERO HAS
                        BOTH A BAD SECTOR ERROR AND HEADER 'RC.  ISSUE A WRITE



                        DATA TO CYLINDER 0, TRACK 0, SECTOR 0.  MAKE SURE ONLY
                        HEADER VRC ERROR SETS.

                TEST 25 OPERATION INCOMPLETE

                        FORMAT CYLINDER 312, TRACK 0 SUCH THAT SECTOR 21 HAS
                        THE WRONG FORMAT.  ISSUE A WRITE DATA OF 400 TO
                        CYLINER 0, TRACK 0, SECTOR 21.  MAKE SURE OPI SET.

                TEST 26 OPI WITH HVRC ERROR

                        FORMAT CYLINDER 312, TRACK 0 SUCH THAT A HEADER VRC
                        ERROR IS PRESENT AND SECTOR 17 HAS THE WRONG FORMAT.
                        ISSUE A WRITE DATA OF 400 WORDS TO CYLINDER 312, TRACK
                        0, SECTOR 17.  THAT BOTH OPERATION INCOMPLETE AND
                        HEADER VRC SET.

                TEST 27 HVRC IGNORE ON NON-ADDRESSED SECTOR

                        FORMAT CYLINDER 312, TRACK 0 SUCH THAT SECTOR 20 HAS
                        AN HVRC ERROR.  ISSUE A WRITE DATA OF 400 WORDS TO
                        CYLINDER 312, TRACK 0, AND SECTOR 21.  MAKE SURE HVRC
                        IS NOT SET AT THE END OF THE OPERATION.



                ;*****************************************************************
                ;**DATA TRANSFER TESTS
                ;*****************************************************************

                TEST 30 WRITE AND READ ONE SECTOR

                        FORMAT CYLINDER 312, ALL TRACKS AND CYLINDER 313,
                        TRACK 2 TO AGREED WITH BAD SECTOR INFORMATION.  ISSUE
                        A WRITE DATA OF ONE SECTOR ON CYLINDER 312, TRACK 0.
                        READ IT BACK TO MAKE SURE IT AGREES WITH WHAT IS
                        WRITTEN.

                TEST 31 WRITE DATA WITH BUS ADDRESS INCREMENT INHIBIT

                        ISSUE A WRITE DATA OF ONE SECTOR TO CYLINDER 312,
                        TRACK 2, SECTOR 12 WITH INHIBIT BUS ADDRESS INCREMENT.
                        READ DATA BACK TO MAKE SURE EVERY WORD IS THE SAME AND
                        CORRECT.

                TEST 32 WRITE DATA ADDRESS GREATER THAN 32K
```

```
                        ISSUE A WRITE DATA OF 400 WORDS WITH ADDRESS = 177770.
                        MAKE SURE CORRECT DATA IS ON DISK.

                        NOTE:  THIS TEST IS ONLY EXECUTED IF MORE THAN 32K  OF
                               MEMORY IS PRESENT.

                TEST 33 READ DATA ADDRESS GREATER THAN 32K

                        ISSUE A READ DATA OF 400 WORDS WITH ADDRESS =  177770.
                        CHECK MEMORY FOR CORRECT TRANSFER.

                        NOTE:  THIS TEST IS ONLY EXECUTED IF MORE THAN 32K  OF
                               MEMORY IS PRESENT.

                TEST 34 WRITE DATA ADDRESS GREATER THAN 64K

                        ISSUE A WRITE DATA OF 400 WORDS WITH ADDRESS = 377770.
                        MAKE SURE CORRECT DATA IS ON DISK.

                        NOTE:  THIS TEST IS ONLY EXECUTED IF MORE THAN 64K  OF
                               MEMORY IS PRESENT.

                TEST 35 READ DATA ADDRESS GREATER THAN 64K

                        ISSUE A READ DATA OF 400 WORDS WITH ADDRESS =  377770.
                        CHECK MEMORY FOR CORRECT TRANSFER.

                        NOTE:  THIS TEST IS ONLY EXECUTED IF MORE THAN 64K  OF
                               MEMORY IS PRESENT.

                TEST 36 WRITE DATA ADDRESS GREATER THAN 96K


                        ISSUE A WRITE DATA OF 400 WORDS WITH ADDRESS = 577770.
                        MAKE SURE CORRECT DATA IS ON DISK.

                        NOTE:  THIS TEST IS ONLY EXECUTED IF MORE THAN 96K  OF
                               MEMORY IS PRESENT.

                TEST 37 READ DATA ADDRESS GREATER THAN 96K

                        ISSUE A READ DATA OF 400 WORDS WITH ADDRESS = 577770.

                        CHECK MEMORY FOR CORRECT TRANSFER.

                        NOTE:  THIS TEST IS ONLY EXECUTED IF MORE THAN 96K  OF
                               MEMORY IS PRESENT.

                TEST 40 PARTIAL SECTOR WRITE DATA

                        ISSUE A WRITE DATA OF 103 WORDS TO CYLINDER 312,  HEAD
                        0,  SECTOR  0    MAKE  SURE THE SECTOR WAS ZERO FILLED
                        CORRECTLY.

                TEST 41 PARTIAL SECTOR READ DATA
```

```
651
652                         WRITE CYLINDER 312, TRACK 0, SECTOR ZERO WITH A  KNOWN
653                         CONFIGURATION.  ISSUE  A  READ  DATA  OF 103 WORDS TO
654                         CYLINDER 312, TRACK 0, SECTOR 0.  MAKE SURE  ONLY  103
655                         WORDS GET TRANSFERRED TO MEMORY.
656
657                 TEST 42 WRITE DATA WITH NON-EXISTENT MEMORY
658
659                         ISSUE A WRITE DATA OF 1  WORD  USING  ADDRESS  776000.
660                         MAKE SURE NON-EXISTENT MEMORY SETS.
661
662                 TEST 43 READ DATA WITH NON-EXISTENT MEMORY
663
664                         ISSUE A READ DATA OF  1  WORD  USING  ADDRESS  776000.
665                         MAKE SURE NON-EXISTENT MEMORY SETS.
666
667                 TEST 44 UNIBUS PARITY ERROR
668
669                         INITIALIZE A MEMORY LOCATION WITH BAD PARITY.  ISSUE A
670                         WRITE  DATA  OF  400  WORDS STARTING AT A LOCATION 112
671                         WORDS BEFORE THE LOCATION WITH BAD PARITY.  MAKE  SURE
672                         THAT UNIBUS PARITY ERROR SETS.
673
674                         NOTE:  THIS TEST IS ONLY  EXECUTED  IF  MEMORY  PARITY
675                                OPTION EXISTS FOR BUFFER. IT WILL NOT BE EXECUTED
676                                 ON 'ECC' TYPE MEMORY.
677
678
679                 ;*****************************************************************
680                 ;**MULTIPLE SECTOR OPERATIONS
681                 ;*****************************************************************
682
683                 TEST 45 TWO SECTOR WRITE DATA (PART 1)
684
685
686
687                         ISSUE A WRITE DATA OF  1000  WORDS  TO  CYLINDER  312,
688                         TRACK  0,  SECTOR  0.   READ DATA BACK ONE SECTOR AT A
689                         TIME AND MAKE SURE IT IS CORRECT.
690
691                 TEST 46 TWO SECTOR WRITE DATA (PART 2)
692
693                         ISSUE A WRITE DATA OF  1000  WORDS  TO  CYLINDER  312,
694                         TRACK  0,  SECTOR  23.  READ DATA BACK ONE SECTOR AT A
695                         TIME AND MAKE SURE A MID-TRANSFER SEEK  DID  NOT  TAKE
696                         PLACE.
697
698                 TEST 47 TWO SECTOR WRITE DATA (PART 3)
699
700                         ISSUE A WRITE DATA OF 401 WORDS TO CYLINDER 312, TRACK
701                         0, SECTOR 10.  READ DATA BACK ONE SECTOR AT A TIME AND
702                         CHECK ZERO FILL OF SECOND SECTOR.
703
704                 TEST 50 MID-TRANSFER SEEK ON WRITE (PART 1)
705
706                         ISSUE A WRITE DATA OF  1000  WORDS  TO  CYLINDER  312,
```

```
                        TRACK  0,  SECTOR  25.  PEAD DATA BACK ONE SECTOR AT A
                        TIME AND MAKE SURE A MID-TRANSFER SEEK DID TAKE PLACE.

                TEST 51 MID-TRANSFER SEEK ON WRITE (PART 2)

                        ISSUE A WRITE DATA OF  1000  WORDS  TO  CYLINDER  312,
                        TRACK  2,  SECTOR  25.  READ DATA BACK ONE SECTOR AT A
                        TIME AND MAKE SURE A MID-TRANSFER SEEK DID TAKE PLACE.

                TEST 52 TWO SECTOR READ DATA (PART 1)

                        ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312, TRACK
                        0, SECTOR 0, VERIFY THAT CORRECT DATA IS READ.

                        NOTE:  TWO SECTOR WRITE DATA (PART 1) MUST BE EXECUTED
                               BEFORE THIS TEST.

                TEST 53 TWO SECTOR READ DATA (PART 2)

                        ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312, TRACK
                        0,  SECTOR 23.  VERIFY THAT CORRECT DATA IS READ AND A
                        MID-TRANSFER SEEK DOES NOT OCCUR.

                        NOTE:  TWO SECTOR WRITE DATA (PART 2) MUST BE EXECUTED
                               BEFORE THIS TEST.

                TEST 54 TWO SECTOR READ DATA (PART 3)

                        ISSUE A READ DATA OF 401 WORDS TO CYLINDER 312,  TRACK
                        0, SECTOR 10.  VERIFY THAT ALL 401 WORDS ARE PLACED IN
                        MEMORY.

                        NOTE:  TWO SECTOR WRITE DATA (PART 3) MUST BE EXECUTED


                               BEFORE THIS TEST.

                TEST 55 MID-TRANSFER SEEK ON READ (PART 1)

                        ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312, TRACK
                        0,  SECTOR 25.  VERIFY THAT CORRECT DATA IS READ AND A
                        MID-TRANSFER SEEK DOES OCCUR.

                        NOTE:  MID-TRANSFER SEEK ON WRITE  (PART  1)  MUST  BE
                               EXECUTED BEFORE THIS TEST.

                TEST 56 MID-TRANSFER SEEK ON READ (PART 2)

                        ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312, TRACK
                        2,  SECTOR 25.  VERIFY THAT CORRECT DATA IS READ AND A
                        MID-TRANSFER SEEK DOES OCCUR.

                        NOTE:  MID-TRANSFER SEEK ON WRITE  (PART  2)  MUST  BE
                               EXECUTED BEFORE THIS TEST.
```

```
                        TEST 57 CYLINDER ADDRESS OVERFLOW (PART 1)

                                ISSUE A READ DATA OF 400 WORDS TO CYLINDER 632,  TRACK
                                2,  SECTOR  25.   MAKE  SURE CYLINDER ADDRESS OVERFLOW
                                ERROR DOES NOT OCCUR.
                                CYLINDER 1456 IS USED FOR THE RK07.

                        TEST 60 CYLINDER ADDRESS OVERFLOW (PART 2)

                                ISSUE A READ DATA OF 401 WORDS TO CYLINDER 632,  TRACK
                                2,  SECTOR  25.   MAKE  SURE CYLINDER ADDRESS OVERFLOW
                                ERROR DOES OCCUR.
                                CYLINDER 1456 IS USED FOR THE RK07.

                        ********************************************************************
                        **18 BIT DATA TRANSFER TESTS
                        ********************************************************************

                        TEST 61 FORMAT IN 24 SECTOR FORMAT

                                FORMAT CYLINDER 312, TRACK  0,  AND  TRACK  1  FOR  24
                                SECTOR  FORMAT.   VERIFY FORMAT AND THAT DATA LATE DID
                                NOT OCCUR WITH WRITE HEADER ON IN READING DATA  BUFFER
                                AFTER READ HEADER.

                        TEST 62 24 SECTOR FORMAT DATA TRANSFER (PART 1)

                                ISSUE A WRITE DATA OF 400 WORDS IN 24 SECTOR FORMAT TO
                                CYLINDER 312, TRACK 0, SECTOR 0.  READ SECTOR BACK AND
                                MAKE SURE IT IS CORRECT.

                        TEST 63 24 SECTOR FORMAT DATA TRANSFER (PART 2)

                                ISSUE A WRITE DATA OF 1000 WORDS IN 24  SECTOR  FORMAT
                                TO CYLINDER 312, TRACK 0, SECTOR 23.  READ SECTOR BACK
                                AND  MAKE  SURE  IT  IS  CORRECT.   MAKE   SURE   THAT
                                MID-TRANSFER SEEK HAS TAKEN PLACE.

                        ********************************************************************
                        **SPECIAL DATA TRANSFER TESTS
                        ********************************************************************

                        TEST 64 MULTI-SECTOR DATA TRANSFER AND BSE

                                FORMAT CYLINDER 312, TRACK 0 IN 26 SECTOR FORMAT  WITH
                                SECTOR 1 MARKED BAD.  ISSUE A WRITE DATA OF 1000 WORDS
                                TO CYLINDER 312, TRACK 0, SECTOR  0.   MAKE  SURE  BAD
                                SECTOR  ERROR SETS AND RKDA IS CORRECT.  READ SECTOR 0
                                AND MAKE SURE IT IS CORRECT.

                                ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312, TRACK
                                0,  SECTOR 0.  MAKE SURE BAD SECTOR ERROR SETS AND THE
                                PREVIOUS SECTOR IS LOADED CORRECTLY INTO MEMORY.

                        TEST 65 FORMAT TEST
```

```
                        FORMAT CYLINDER 312, TRACKS  0  AND  1  IN  26  SECTOR
                        FORMAT.   MAKE  SURE NO ERRORS SET.  READ SECTORS 0-25
                        AND MAKE SURE DATA CHECK DOES NOT OCCUR.

                ;*****************************************************************
                ;**WRITE CHECK TESTS
                ;*****************************************************************

                TEST 66 WRITE-CHECK WITH NO ERROR

                        WRITE CYLINDER 312, TRACK 0, SECTOR  0  WITH  A  KNOWN
                        PATTERN.  DO A WRITE-CHECK OF 400 WORDS.  MAKE SURE NO
                        ERROR OCCURS.

                TEST 67 WRITE CHECK ERROR (PART 1)

                        WRITE CYLINDER 312, TRACK 0, SECTOR 0 WITH ALL ZEROES.
                        WRITE CHECK CYLINDER 312, TRACK 0, SECTOR 0 WITH SAME.
                        DATA  EXCEPT  WORD  110  HAS  ONE  OF  THE   FOLLOWING
                        CONFIGURATIONS:



                            000001 000020 000400 010000
                            000002 000040 001000 020000
                            000004 000100 002000 040000
                            000010 000200 004000 100000

                        MAKE SURE WRITE  CHECK  ERROR  SET  FOR  EACH  OF  THE
                        CONFIGURATIONS AND THAT THE BUS ADDRESS AND WORD COUNT
                        IS CORRECT.

                TEST 70 WRITE CHECK ERROR (PART 2)

                        WRITE CYLINDER 312, TRACK 0, SECTOR 0  WITH  17777  IN
                        ALL  WORDS.  WRITE CHECK CYLINDER 312, TRACK 0, SECTOR
                        0 WITH THE SAME DATA EXCEPT WORD 120 HAS  ONE  OF  THE
                        FOLLWOING CONFIGURATIONS:

                            177776 177757 177377 167777
                            177775 177737 176777 157777
                            177773 177677 175777 137777
                            177767 177577 173777 077777

                        MAKE SURE WRITE  CHECK  ERROR  SET  FOR  EACH  OF  THE
                        CONFIGURATIONS AND THAT THE BUS ADDRESS AND WORD COUNT
                        IS CORRECT.

                TEST 71 WRITE CHECK OF PARTIAL SECTOR

                        WRITE CYLINDER 312,  TRACK  0,  SECTOR  WITH  A  KNOWN
                        CONFIGURATIONS.   ISSUE  A  WRITE CHECK COMMAND OF 110
                        WORDS MAKING SURE THE 111TH  WORD  IS  DIFFERENT  THAN
                        DATA  ON  DISK.   MAKE SURE WRITE CHECK ERROR DOES NOT
                        SET.
```

```
                        ********************************************************************
                        **MAXIMUM DATA TRANSFER AND CONTROLLER TIME OUT
                        ********************************************************************

                        TEST 72 MAXIMUM DATA TRANSFER (PART 1)

                                IN THE FIRST PASS OF THE PROGRAM, THE HEADERS OF THE
                                FIRST 4 CYLINDERS ARE WRITTEN.  THIS IS DONE TO INSURE
                                THE FORMAT IS CORRECT.

                                ZERO OUT THE FIRST 256 SECTORS OF THE DISK WITH ONE
                                SECTOR WRITES.  ISSUE A SEEK TO CYLINDER 0, TRACK 0.
                                ISSUE A WRITE DATA OF MAXIMUM DATA TRANSFER 200000
                                WORDS TO CYLINDER 0, TRACK 0, SECTOR 0.  MAKE SURE
                                CONTROLLER TIME OUT IS NOT SET.  CHECK CYLINDER
                                ADDRESS, DISK ADDRESS, BUS ADDRESS AND WORD COUNT.
                                READ EACH SECTOR TO MAKE SURE IT WAS WRITTEN
                                CORRECTLY.

                                NOTE:  THIS TEST IS EXECUTED ONLY IF NO BAD SECTORS



                                       ARE PRESENT IN THE FIRST 256 SECTORS ON THE
                                       PACK.

                        TEST 73 MAXIMUM DATA TRANSFER (PART 2)

                                ZERO OUT FIRST 256 SECTORS OF THE DISK WITH 200000
                                WORD WRITE.  SEEK TO CYLINDER 632.  ISSUE A WRITE OF
                                MAXIMUM DATA TRANS   200000 WORD WRITE.  MAKE SURE
                                CONTROLLER TIME      IS NOT SET.  CHECK CYLINDER
                                ADDRESS DISK ADDRESS, BUS ADDRESS AND WORD COUNT.
                                SEEK TO CYLINDER 632.  ISSUE A WRITE CHECK OF 200000
                                WORDS.  MAKE SURE NO ERROR SETS.

                                NOTE:  THIS TEST IS EXECUTED ONLY IF NO BAD SECTORS
                                       ARE PRESENT IN THE FIRST 256 SECTORS ON THE
                                       PACK.
                                        CYLINDER 1456 IS USED FOR THE RK07.

                        TEST 74 CONTROLLER TIME OUT

                                SEEK TO CYLINDER 632.  ISSUE A RECALIBRATE AND DO NOT
                                WAIT FOR SECOND INTERRUPT.  NOW ISSUE A READ HEADER OF
                                CYLINDER 0, TRACK 0.  MAKE SURE CONTROLLER TIME OUT
                                SETS.
                                CYLINDER 1456 IS USED FOR THE RK07.

                        ********************************************************************
                        **ERRORS DURING DATA TRANSFER
                        ********************************************************************

                        TEST 75 LIMIT DETECT ON DATA TRANSFER

                                ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECALIBRATE.  ISSUE
```

```
                        A  SEEK  TO CYLINDER 2 WITH BAD PARITY.  ISSUE A DRIVE
                        CLEAR.  ISSUE A WRITE DATA OF 400 WORDS TO CYLINDER 1,
                        TRACK 0, HEAD 0.  SEEK INCOMPLETE BECAUSE OF OUTER

TEST 76 PROGRAMMING ERROR

                        ISSUE A SUBSYSTEM CLEAR.  ISSUE A  READ  DATA  OF  400
                        WORDS  ON  CYLINDER 0, TRACK 0, SECTOP 0.  DURING READ
                        ISSUE A  WRITE  TO  THE  SPARE  REGISTER.   MAKE  SURE
                        PROGRAMMING ERROR SETS.

TEST 77 ECC HARD

                        ISSUE A SUBSYSTEM CLEAR.  ISSUE  A  WRITE  DATA  WORDS
                        CONSISTING OF 177777 TO CYLINDER 0, TRACK 0, SECTOR 0.
                        NOW WRITE ALL ZEROS TO CYLINDER 0, TRACK 0, SECTOR  0.
                        DURING   WRITE  ISSUE  CONTROLLER  CLEAR.   MAKE  SURE
                        PROGRAMMING ERROR IS RESET.  NOW ISSUE A READ DATA  TO
                        CYLINDER  0,  TRACK  0,  HEAD  0 AND AN ECC HARD ERROR
                        SHOULD SET.

TEST 100 DRIVE TIMING ERROR



                        ISSUE A SUBSYSTEM CLEAR.  SEEK TC CYLINDER 632.  ISSUE
                        A  RECALIBRATE  BUT  DO NOT WAIT FOR SECOND INTERRUPT.
                        PUT CONTROLLER  IN  DIAGNOSTIC  MODE.   ISSUE  A  READ
                        HEADER OF CYLINDER 0, TRACK 0.  CLOCK THROUGH SEEK AND
                        DRIVE  CLEAR  MESSAGES.   TURN  OFF  DIAGNOSTIC  MODE.
                        DRIVE  TIMING  ERROR  SHOULD  SET  BECAUSE  OF NO DATA
                        TRANSISTIONS ON DATA LINE.

;*****************************************************************
;**ERROR FORCING IN DRIVE
;*****************************************************************

TEST 101 INITIALIZE CLEARING SACK

                        ISSUE A SUBSYSTEM CLEAR.  SELECT AN  AVAILABLE  DRIVE.
                        ISSUE A SUBSYSTEM CLEAR.  PUT CONTROLLER IN DIAGNOSTIC
                        MODE.  ISSUE A SELECT COMMAND WITH MESSAGE ID = 3  AND
                        DRIVE  SELECTED  =  0.  CLOCK THROUGH PHASE ADDRESS 6.
                        TURN OFF DIAGNOSTIC MODE.  MAKE SURE UNIT FIELD  ERROR
                        DOES NOT SET.

TEST 102 DRIVE OFF TRACK

                        ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECALIBRATE.   ISSUE
                        OFFSET  OF  +1200  MICRO-INCHES.   PUT  CONTROLLER  IN
                        DIAGNOSTIC MODE.  ISSUE A WRITE  DATA  OF  1  WORD  TO
                        CYLINDER 0, TRACK 0, SECTOR 0.  CLOCK THROUGH SEEK AND
                        DRIVE  CLEAR  MESSAGES.   TURN  OFF  DIAGNOSTIC  MODE.
                        DRIVE  OFF  TRACK SHOULD SET IN DRIVE.  REPEAT FOR ALL
                        AVAILIABLE DRIVES.
```

```
                        TEST 103 FILE UNSAFE

                                ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECLAIBRATE.  ISSUE
                                A  READ  HEAD  OF  CYLINDER  0,  TRACK  0 IN 24 SECTOR
                                FORMAT.  DO A SELECT COMMAND IN 26 SECTOR FORMAT.  PUT
                                CONTROLLER  IN  DIAGNOSTIC MODE.  ISSUE A WRITE HEADER
                                TO CYLINDER 0, TRACK 0, ONE WORD IN 26 SECTOR  FORMAT.
                                CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGES.  SIMULATE
                                INDEX PULSE.  TURN OFF DIAGNOSTIC MODE.   FILE  UNSAFE
                                SHOULD  SET  BECAUSE  OF  ATTEMPTING  TO WRITE THROUGH
                                SECTOR PULSE.  REPEAT FOR ALL AVAILIABLE DRIVES.

                        TEST 104 DUMMY TEST FOR PREVIOUS TEST EXIT

                                THIS TEST IS PRESENT TO MAKE  $SW08TB  TABLE  HAVE  AN
                                ENTRY WHICH RELATES TO 'NEWDRV'.  THIS IS NECESSARY IF
                                AN ERROR OCCURS IN THE PRECEEDING TEST AND THAT  ERROR
                                ABORTS  THE  TEST.  IF THIS TEST WERE NOT PRESENT, THE
                                PROGRAM WOULD SKIP THE 'NEWDRV' ROUTINE AND GO TO  THE
                                TEST FOLLOWING 'NEWDRV'.

                                IN ADDITION, THE DRIVE IS CLEARED AND  THE  HEADS  ARE




                                ALLOWED  TO  RELOAD.   THIS  MUST  BE  DONE TO PREVENT
                                UNEXPECTED INTERRUPTS FROM THE DRIVE BECOMING READY AT
                                A LATER TIME.

                        ;*******************************************************************
                        ;**MULTI-DRIVE OPERATIONS
                        ;*******************************************************************

                        TEST 105 RESET ATTENTIONS WITH UNIBUS INIT

                                DO A RECALIBRATE ON ALL AVAILIABLE  DRIVES.   ISSUE  A
                                RESET.  MAKE SURE ALL ATTENTION RESET.

                        TEST 106 RESET ATTENTIONS WITH SUBSYSTEM CLEAR

                                DO A RECALIBRATE ON ALL  AVAILABLE  DRIVES.   ISSUE  A
                                SUBSYSTEM CLEAR.  MAKE SURE ALL ATTENTIONS RESET.

                        TEST 107 SVAL AND ATTENTION FROM OTHER DRIVE

                                DO A RECALIBRATE ON ONE AVAILABLE DRIVE.  DO A  SELECT
                                ON ANOTHER AVAILABLE DRIVE.  MAKE SURE STATUS VALID IS
                                SET.  WAIT FOR SECOND INTERRUPT FROM RECALIBRATE  MAKE
                                SURE  STATUS VALID REMAINS SET AND DRIVE STATUS CHANGE
                                REMAINS RESET.

                                REPEAT FOR ALL COMBINATIONS OF TWO AVAILIABLE DRIVES.

                                NOTE:  THIS TEST WILL ONLY BE DONE  IF  AT  LEAST  TWO
                                       DRIVES ARE AVAILABLE.
```

```
                        TEST #10 OVERLAPPED OPERATIONS

                                DO A RECALIBRATE ON BOTH DRIVE A AND DRIVE B.  ISSUE A
                                SEEK  ON  DRIVE  A TO CYLINDER 1.  IMMEDIATELY ISSUE A
                                WRITE DATA TO CYLINDER 100, TRACK 0, HEAD 0  ON  DRIVE
                                B.    AT  THE END OF THE DATA TRANSFER NO ERRORS SHOULD
                                BE SET AND DRIVE A HAS ATTENTION SET.

                                REPEAT FOR ALL COMBINATIONS OF TWO DRIVES.

                                NOTE:  IF ONLY ONE DRIVE IS AVAILABLE  THE  TEST  WILL
                                       NOT BE DONE.

                5.0     ERROR REPORTING

                        A DETAILED  DESCRIPTION  OF  THE  ERROR  FORMATS  AND  REPORTS
                        CONTENTS  IS  GIVEN HERE.  THIS IS ESSENTIALLY THE SAME AS CAN
                        BE FOUND IN THE  LISTING  COMMENTS  UNDER  THE  ERROR  POINTER
                        TABLE.

                        ERROR POINTER TABLE:



                        THIS TABLE CONTAINS THE INFORMATION FOR EACH  ERROR  THAT  CAN
                        OCCUR.   THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER
                        FOUND IN LOCATION $ITEMB.  THIS NUMBER INDICATES WHICH ITEM IN
                        THE TABLE IS PERTINENT.
                            NOTE1: IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                            NOTE2: EACH ITEM IN THE TABLE CONTAINS 4 POINTERS
                                   EXPLAINED AS FOLLOWS:
                            EM              ;;POINTS TO THE ERROR MESSAGE
                            DH              ;;POINTS TO THE DATA HEADER
                            DT              ;;POINTS TO THE DATA
                            DF              ;;POINTS TO THE DATA FORMAT
                        EM AND DH ARE ASCIZ DATA.  EM IS ALWAYS A MESSAGE BUT  DH  CAN
                        BE  A  MESSAGE  OR  A  SET OF COLUMN LABELS SPACED ACCROSS THE
                        PAGE, DT IS A STRING OF WORDS THAT POINT TO  THE  DATA  TO  BE
                        TYPED,  AND DF IS A STRING OF WORDS THAT TELL HOW THE DT WORDS
                        ARE TO BE TYPED.  IF ANY OF THE POINTERS ARE NOT NEEDED, FOR A
                        PARTICULAR  FORMAT,  IT  IS  REPLACED WITH A ZERO.  THE NORMAL
                        USAGE OF THE ERROR TABLE IS TO HAVE A  TABLE  ENTRY  FOR  EACH
                        ERROR MESSAGE THAT CAN OCCUR.  IN THE INTEREST OF ECONOMICS OF
                        CORE MEMORY, THIS PROGRAM USES THE ERROR TABLE  IN  A  SIGHTLY
                        DIFFERENT MANNER AS DESCRIBED BELOW.

                        THE ERROR TABLE ENTRIES MAKE UP A SET OF REPORT  FORMATS  THAT
```

```
1090                    ARE  USED  THROUGHOUT  THE  PROGRAM.   WHEN  AN ERROR IS TO BE
1091                    REPORTED, THF TABLE ENTRY THAT PROVIDES THE DESIRED FORMAT  IS
1092                    CHOSEN  FROM  THE DEFINED SET.  THE TABLE ENTRY CHOSEN IS THEN
1093                    ALTERED BY CHANGING THE FIRST (AND POSSIBLY THE  SECOND)  WORD
1094                    TO  CONTAIN  THE ADDRESS OF THE ASCIZ STRING THAT MAKES UP THE
1095                    MESSAGE PORTION OF THE REPORT.  THE DATA FIELDS FOR THAT ENTRY
1096                    ARE NEVER CHANGED, NOR ARE THE COLUMN LABELS OR POSITIONS.
1097
1098                    THE FORMAT THAT EACH TABLE ENTRY PROVIDES IS SHOWN BELOW  WI'H
1099                    THE  DEFINITION  OF  THE  ENTRY.  ALL DATA FIELDS ARE TYPED IN
1100                    OCTAL.
1101
1102                    ERROR ITEM 1
1103                        (MESSAGE)
1104                        TST NUM ERR PC  DRIVE
1105                        $TESTN  $ERRPC  DRVNUM
1106
1107                    ERROR ITEM 2
1108                        (MESSAGE)
1109                        (MESSAGE)
1110                        TST NUM ERR PC  DRIVE
1111                        $TESTN  $ERRPC  DRVNUM
1112                          RKCS1   RKCS2   RKDS    RKER    RKASOF  RKDCYL  RKDA
1113                          T.CS1   T.CS2   T.DS    T.ER    T.ASOF  T.DCYL  T.DA
1114                        RKBA    RKWC
1115                        T.BA    T.WC
1116
1117                    ERROR ITEM 3
1118                        (MESSAGE)
1119                        TST NUM ERR PC  DRIVE
1120
1121
1122
1123                        $TESTN  $ERRPC  DRVNUM
1124                          RKCS1   RKCS2   RKDS    RKER    RKASOF  RKMR1
1125                          T.CS1   T.CS2   T.DS    T.ER    T.ASF   T.MR1
1126
1127                    ERROR ITEMS 4,5,6, AND 7 ARE USED TO REPORT  ERRORS  THAT  ARE
1128                    THE  RESULT  OF  A HARDWARE ERROR INDICATOR BEING SET WHEN NOT
1129                    EXPECTED, NOT SET WHEN IT IS EXPECTED,  OR  BOTH.   THE  ERROR
1130                    REPORT WILL CONTAIN (1) ALL THE ERRORS THAT WERE DETECTED, (2)
1131                    ALL  THE EXPECTED ERRORS THAT DID NOT OCCUR,  OR  (3)  ALL  THE
1132                    EXPEDTED BUT NOT SET ERRORS AND THE UNEXPECTED BUT SET ERRORS.
1133
1134                    THE MESSAGE ITSELF EXPLAINS THE CIRCUMSTANCE FOR  THE  REPORT.
1135                    INCLUDED  IN  THE  REPORT WILL BE ONE OR MORE OF THE FOLLOWING
1136                    STATEMENTS:
1137
1138                    "THE ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:"
1139                    "THE ABOVE ARE UNEXPECTED ERRORS SET IN OPERATION:"
1140                    "THE ABOVE ARE ERRORS SET IN OPERATION:"
1141
1142                    PRECEEDING ANY ONE OF THESE LINES WILL BE ONE  OR  MORE  LINES
1143                    THAT SPECIFY THE EXACT ERROR.  FOLLOWING THE LAST LINE WILL BE
1144                    A LINE THAT IDENTIFIES THE OPERATION BEING PERFORMED.
1145
```

```
1146                                    EXAMPLE:
1147                                    NON-EXISTANT DRIVE
1148                                    THE ABOVE ARE ERRORS SET IN OPERATION:
1149                                    DRIVE SELECT
1150
1151                                    (ADDITIONAL LINES OF INFORMATION)
1152
1153                                    THIS IS THE RESULT OF AN ERROR SET IN A SELEC  OPERATION.
1154
1155                                    EXAMPLE:
1156                                    NON-EXISTANT DRIVE
1157                                    THE ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:
1158                                    DRIVE SELECT
1159
1160                                    (ADDITIONAL LINES OF INFORMATION)
1161
1162                                    THIS IS THE RESULT OF AN EXPECTED ERROR THAT  DID  NOT  OCCUR,
1163                                    I.E.  A NON-EXISTANT DRIVE WAS ADDRESSED BUT NED WAS NOT SET.
1164
1165                                    EXAMPLE:
1166                                    NON-EXISTANT MEMORY
1167                                    THE ABOVE ARE UNEXPECTED ERRORS SET IN OPERATION:
1168                                    UNIBUS PARITY ERROR
1169                                    THF ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:
1170                                    WRITE DATA
1171
1172                                    (ADDITIONAL LINES OF INFORMATION)
1173
1174                                    THIS IS AN EXAMPLE  OF  NON-EXISTANT  MEMORY  BEING  SET  WHEN
1175                                    UNIBUS PARITY ERROR WAS EXPECTED.
1176
1177
1178
1179                                ERROR ITEM 4
1180                                    (DESCRIPTION OF ERROR)
1181                                    ERROR IN OPERATION
1182                                    (DESCRIPTION OF OPERATION)
1183                                    TST NUM ERR PC  DRIVE
1184                                    $TESTN  $ERRPC  DRVNUM
1185                                      RKCS1   RKCS2   RKDS    RKER    RKASOF  RKDCYL  RKDA
1186                                      T.CS1   T.CS2   T.DS    T.ER    T.ASOF  T.DCYL  T.DA
1187                                    RKBA    RKWC
1188                                    T.BA    T.WA
1189                                     A00     B00    A01    B01    A02    B02    A03    B03
1190                                     $REG10  $REG11 $REG12 $REG13 $REG14 $REG15 $REG16 $REG17
1191
1192                                THE ERRORS REPORTED BY THIS FORMAT ARE:
1193                                     CONTROLLER DETECTED DRIVE BUS ERROR
1194                                     DRIVE DETECTED DRIVE BUS ERROR
1195                                     SEEK INCOMPLETE
1196                                     NON-EXECUTABLE DRIVE FUNCTION
1197                                     DRIVE TIMING ERROR
1198                                     DRIVE UNSAFE
1199                                     AC LOW
1200                                     SPINDLE SPEED LOSS
1201                                     DRIVE OFF TRACK
```

```
                                        ILLEGAL DRIVE ADDRESS ERROR
                                        CYLINDER OVERFLOW
                                        DRIVE TYPE ERROR
                                        FORMAT ERROR
                                        WRITE LOCK ERROR

                                    ERROR ITEM 5
                                    THIS ENTRY IS THE SAME AS  ITEM  4  WITH  THE  ADDITION  OF  A
                                    MESSAGE THAT FOLLOWS.  THIS MESSAGE IS:

                                    "ANY FIELD WITH ALL ONES MUST BE CONSIDERED INVALID"

                                    THIS REPORT WILL BE PRINTED WHEN THE GATHERING OF DATA FOR A00
                                    THRU B03 IS NOT ACCOMPLISHED WITHOUT ERROR.

                                    ERROR ITEM 6

                                        (DESCRIPTION OF ERROR)
                                        ERROR IN OPERATION
                                        (DESCRIPTION OF OPERATION)
                                        TST NUM ERR PC  DRIVE
                                        $TESTN  $ERRPC  DRVNUM
                                          RKCS1   RKCS2   RKDS    RKER    RKASOF  RKDCYL  RKDA
                                          T.CS1   T.CS2   T.DS    T.ER    T.ASOF  T.DCYL  T.DA
                                        RKBA    RKWC
                                        T.BA    T.WC

                                    THE ERRORS REPORTED BY THIS FORMAT ARE:
                                        DATA CHECK
                                        WRITE CHECK


                                        ECC HARD
                                        DATA LATE
                                        OPERATION INCOMPLETE
                                        HEADER VRC ERROR
                                        BAD SECTOR ERROR

                                    ERROR ITEM 7
                                        (DESCRIPTION OF ERROR)
                                        ERROR IN OPERATION
                                        (DESCRIPTION OF OPERATION)
                                        TST NUM ERR PC  DRIVE
                                        $TESTN  $ERRPC  DRVNUM
                                          RKCS1   RKCS2   RKDS    RKER    RKASOF
                                          T.CS1   T.CS2   T.DS    T.ER    T.ASOF

                                          THE ERRORS REPORTED BY THIS FORMAT ARE:
                                          NON-EXISTANT DRIVE
                                          NON-EXISTANT MEMORY
                                          CONTROLLER TIME OUT
                                          UNIT FIELD ERROR
                                          MULTIPLE DRIVE SELECT
                                          PROGRAMMING ERROR
                                          UNIBUS PARITY ERROR
```

```
                                        ILLEGAL FUNCTION CODE

DESCRIPTON OF OPERATION CAN BE ANY COMMAND,  EITHER  LEGAL  OR
ILLEGAL.

ERROR ITEM 10
    (DESCRIPTION OF ERROR)
    ERROR AT COMPLETION OF OPERATION
    (DESCRIPITON OF OPERATION)
    TST NUM ERR PC  DRIVE
    $TESTN  ERRPC   DRVNUM
      EXPT    IS
      $REG10  $REG11

THE ERRORS REPORTED BY THIS FORMAT ARE  SOFTWARE  DETECTED  BY
COMPARING  EXPECTED RESULTS WITH ACTUAL RESULTS.  THE SPECIFIC
ERRORS ARE:
        WORD COUNT INCORRECT
        BUS ADDRESS INCORRECT
        CYLINDER ADDRESS INCORRECT
        TRACK ADDRESS INCORRECT
        SECTOR ADDRESS INCORRECT

ERROR ITEM 11
    (ERROR INDICATOR OR STATUS BIT)
    NOT SET AS A RESULT OF
    (ANOTHER ERROR INDICATOR, STATUS BIT, OR OPERATION
    TST NUM ERR PC  DRIVE
    $TESTN  $ERRPC  DRVNUM
      RKCS1   RKCS2   RKDS    RKER    RKASOF  RKMR1

        T.CS1   T.CS2   T.DS    T.ER    T.ASOF  T.MR1

ERROR ITEM 12
THIS ERROR IS IDENTICAL TO ITEM 11 EXCEPT THE SECOND LINE IS:

''NOT RESET AS A RESULT OF''

ERROR ITEM 13
THIS ERROR IS IDENTICAL TO ITEM 11 EXCEPT THE SECOND LINE IS:

''SET AS A RESULT OF''

ERROR ITEM 14
THIS ERROR IS IDENTICAL TO ITEM 11 EXCEPT THE SECOND LINE IS:

''RESET AS A RESULT OF''

ERROR ITEM 15
    (HEADER WORD MISCOMPARE) OR (DATA MISCOMPARE)
    TST NUM ERR PC  DRIVE
    $TESTN  $ERRPC  DRVNUM
      GOOD    BAD     WORD NUM
      $REG10  $REG11  $REG12
```

ERROR ITEM 16
ADDITIONAL LINES OF GOOD, BAD, WORD NUM FOR ERROR 15.

6.0 SUBROUTINES

IN THE INTEREST OF CONSERVING MEMORY, IT IS NECESSARY TO MAKE EXTENSIVE USE OF SUBROUTINES. HOWEVER, IN THE INTEREST OF PRESERVING CODE READABILITY, SUBROUTINE NAMING IS DESCRIPTIVE OF THE FUNCTION PERFORMED. THE SUBROUTINE FUNCTION IS KEPT SMALL AND IN GENERAL A SUBROUTINE ONLY PERFORMS ONE FUNCTION, I.E., LOAD THE RK611 REGISTER AND START AN OPERATION (TLOADRK) OR WAIT A SPECIFIED NUMBER OF MILLISECONDS FOR AN INTERRUPT (TWATNN WHERE NN VARIES FROM CALL TO CALL AND IS THE TIME TO WAIT). THE FOLLOWING IS A DESCRIPTION OF THE SUBROUTINES NOT PROVIDED BY SYSMAC:

```
**********************************************************************
LINE CLOCK CALIBRATE
**********************************************************************

        WAITS FOR A LINE CLOCK INTERRUPT TO CALIBRATE THE
        INTERRUPTS TO A MEANINGFUL TIME VALUE.  IN ADDITION IT
        PRESETS THE TIMCNT IF THERE IS NO LINE CLOCK.  TIMCNT
        IS USED IN THE LINE CLOCK SIMULATOR.

        CALL:   JSR     PC,CLKCAL

**********************************************************************
OPTION PRESENT TEST AND SETUP



**********************************************************************

        THIS ROUTINE CHECKS IF THE MEMORU PARITY OPTION AND
        THE LINE CLOCK ARE ON THE SYSTEM.  FLAGS ARE SET IF
        PRESENT;  CLEARED OTHERWISE, AND THE APPROPRIATE
        INTERRUPT VECTORS ARE SET UP.

        CALL:   JSR     PC,OPTTST

**********************************************************************
LINE CLOCK SIMULATION ROUTINE
**********************************************************************

        THIS ROUTINE IS USED TO SIMULATE THE LINE CLOCK.  TO
        DO THIS THE VALUE STORED IN MILCNT IS USED AS THE BASE
        AND REPRESENTS THE NUMBER OF TIMES A DECREMENT AND
        BRANCH LOOP CAN BE DONE IN 1 MILLISECOND.  THE TIMCNT
        VALUE IS DECREMENTED AND IF IT REACHED 0 THE LINE
        CLOCK TICK COUNTER IS BUMPED.  THEN THE TIMCNT IS
        RESET TO 16 (REPRESENTS 16 MILLISECONDS PER LINE CLOCK
        TICK).

        THUS THE ROUTINE RETURNS TO THE CALLER AFTER 1
```

```
1370                            MILLISECOND  AND BUMPS THE LINE CLOCK TICK COUNTER FOR
1371                            EACH 16 CALLS.
1372
1373                            CALL:   JSR     PC,MYTIME
1374
1375                    ;*******************************************************************
1376                    ;WAIT FOR INTERRUPT ROUTINE
1377                    ;*******************************************************************
1378
1379                            THE ROUTINE IS ENTERED BY ONE OF FOURTEEN TRAP  CALLS.
1380                            THE  CALL  SPECIFIES  HOW MANY TICKS OF THE LINE CLOCK
1381                            ARE  TO  ELAPSE  WHILE  WAITING  FOR  INTERRUPT.    IF
1382                            INTERRUPT  DOES  NOT  OCCUR IN THAT PERIOD OF TIME, AN
1383                            ERROR MESSAGE IS PREPARED  (BUT  NOT  PRINTED  IN  THE
1384                            ROUTINE)AND THEN RETURNS TO THE LOCATION FOLLOWING THE
1385                            CALL.  IF INTERRUPT OCCURS THE RETURN IS BUMPED BY  2.
1386                            NORMALLY  AN  ERROR CALL WILL BE IN THE LOCATION AFTER
1387                            THE CALL TO INTERRUPT WAIT.
1388
1389                            CALL:   TWAT16  THROUGH   TWAT159,   TWAT1S,   TWAT2S,
1390                            TWAT8S, AND TWAT1M
1391
1392                    ;*******************************************************************
1393                    ;"L" REGISTER LOADING ROUTINE
1394                    ;*******************************************************************
1395
1396                            THE PARAMETERS FOLLOWING THE CALL ARE TRANSFERRED INTO
1397                            THE  "L"  REGISTERS L.CS1-L.DCYL.  L.MR1 IS NOT LOADED
1398                            IN THIS MANNER SINCE IT IS NOT COMMONLY LOADED FOR  AN
1399                            OPERATION.  L.CS2 IS LOADED FROM DRVNUM.
1400
1401
1402
1403                            CALL:   JSR     R4,LRLOAD
1404                                    COMMAND
1405                                    WORD COUNT
1406                                    BUS ADDRESS
1407                                    .BYTE   SECTOR ADDRESS
1408                                    .BYTE   TRACK ADDRESS
1409                                    CYLINDER ADDRESS
1410
1411                    ;*******************************************************************
1412                    ;LOAD RK611 FOR OPERATION
1413                    ;*******************************************************************
1414
1415                            THE REGISTER SETUP STORAGE IS TRANSFERRED TO THE RK611
1416                            REGISTER.    THIS  IS  A  STRAIGHT  TRANSFER  WITH  NO
1417                            CHECKING OR MANIPULATION  OF  THE  REGISTER  CONTENTS.
1418                            L.CS1  IS  TRANSFERRED  LAST AS IT SHOULD BE IF THE GO
1419                            BIT IS SET.
1420
1421                            CALL:   TLOADRK
1422
1423                    ;*******************************************************************
1424                    ;STORE RK611 REGISTERS
1425                    ;*******************************************************************
```

```
1426
1427                            ALL THE RK611 REGISTERS ARE STORED IN THE TEST TABLE T
1428                            WITH  THE  EXCEPTION  OF  THE DATA BUFFER WHICH IS NOT
1429                            STORED IN THIS ROUTINE.
1430
1431                            CALL:   TGETRK
1432
1433                    ;*******************************************************************
1434                    ;BIT COUNTER IN A WORD
1435                    ;*******************************************************************
1436
1437                            THE WORD WHOSE BITS MUST BE COUNTED IS PLACED  ON  THE
1438                            STACK  BY  THE  CALLING  ROUTINE.   THE NUMBER OF BITS
1439                            FOUND IN THE WORD ARE PASSED BACK ON THE STACK.
1440
1441                            CALL:   JSR     R4,BITCNT
1442
1443                    ;*******************************************************************
1444                    ;MAINTENANCE CLOCK ROUTINE
1445                    ;*******************************************************************
1446
1447                            THE PARAMETERS PASSED TO THIS ROUTINE ARE  LOCATED  IN
1448                            THE  ADDRESS  AFTER THE CALL.  THE FIRST BYTE CANTAINS
1449                            THE NUMBER OF PHASES  ADDRESSES  THE  CALLING  ROUTINE
1450                            WANTS  THE  CONTROLLER  CLOCKED THROUGH AND THE SECONE
1451                            BYTE CONTAINS THE NUMBER OF CLOCK TRANSITIONS (PARTIAL
1452                            PHASES) TO BE DONE.
1453
1454                            CALL:   JSR     R4,MCLOCK
1455                                    .BYTE           ;NUMBER OF CLOCK TRANSISTIONS
1456
1457
1458
1459                                    .BYTE           ;NUMBER OF PHASE ADDRESSES
1460
1461                    ;*******************************************************************
1462                    ;READ AND SORT HEADERS
1463                    ;*******************************************************************
1464
1465                            THE HEADERS IN THE CYLINDER AND TRACK SPECIFIED BY THE
1466                            FIELDS  IN  THE  "L"  REGISTERS ARE READ AND STORED IN
1467                            ASSCENDING ORDER.  CONTROLLER ERRORS  ARE  CHECKED  IN
1468                            THE  READ  HEADER  OPERATION  AND DATA LATE IS CHECKED
1469                            AFTER EACH READ OF THE DATA BUFFER.
1470
1471                            CALL:   JSR     R4,RDSTHD
1472                                    TCHKOP          ;RETURN POINT IF CERR IN READ
1473                                                    ;HDR
1474                                    ERROR   4       ;OR 5, 6, 7
1475                                    ERROR   13      ;RETURN IF DATA LATE IN DB
1476                                                    ;UNLOAD
1477                                    ERROR   2       ;RETURN IF TO SLOW OR
1478                                                    ;IF HDR 0 NOT FOUND
1479
1480                    ;*******************************************************************
1481                    ;GET DRIVE STATUS
```

```
1482
1483
1484                    THIS ROUTINE GETS ALL THE DRIVE STATUS AND PLACES IT
1485                    IN $REG10 THROUGH $REG17.  THESE REGISTORS ARE FIRST
1486                    CLEARED TO ALL ONES AND THEN IF ERROR OCCURS WHILE
1487                    GETTING STATUS, THE 1'S ARE LEFT IN THE REGISTERS.
1488
1489                    CALL:   JSR     R4,GETDRS
1490                            BR      ERROR PROCESSING        ERROR RETURN
1491                            BR      NO ERROR PROCESSING     GOOD RETURN
1492
1493
1494                SUBSYSTEM INITIALIZE AND INITIALIZE STATE TEST
1495
1496
1497                    THE SUBSYSTEM IS INITIALIZED WITH A SUBSYSTEM CLEAR
1498                    COMMAND.  CERR AND DI ARE MONITORED FOR A SHORT PEIROD
1499                    OF TIME DURING WHICH THEY SHOULD BOTH RESET.
1500
1501                    IF THEY DO RESET, READY IS TESTED TO INSURE IF SETS.
1502
1503                    IF ANY OF THESE THREE CONDITIONS ARE NOT MET AN
1504                    APPROPRIATE ERROR MESSAGE IS PREPARED AND REPORTED
1505                    WHEN THE ROUTINE RETURN TO THE CALL.  IF EVERY THING
1506                    IS GOOD, THE RETURN SKIPS OVER THE ERROR CALL AND TEST
1507                    ABORT.
1508
1509                    THE USUAL CALL TO THIS ROUTINE WILL BE FOLLOWED BY AN
1510                    ERROR MESSAGE AND BRANCH TO END OF TEST.  THIS IS DONE
1511                    BECAUSE FAILURE TO INITIALIZE CORRECTLY IS FATAL TO
1512
1513
1514
1515                    THE TEST.
1516
1517                    CALL:   TSSINIT
1518
1519
1520                WORD COUNT AT END OF OPERATION CHECK
1521
1522
1523                    THIS ROUTINE COMPARES THE CONTENTS OF THE TEST STORAGE
1524                    FOR THE WORD COUNT AGAINST THE SUPPLIED VALUE.  IF
1525                    UNEQUAL, THE ERROR FLAG (WCERR) IS SET IN GROUP 4
1526                    ERROR FLAGS (GRP4ER)
1527
1528                    CALL:   JSR     R4,CHKWC
1529                            .WORD           ;EXPECTED WC VALUE
1530
1531
1532                BUS  ADDRESS AT END OF OPERATION CHECK
1533
1534
1535                    THIS ROUTINE COMPUTES THE EXPECTED BUS ADDRESS AT THE
1536                    END OF A TRANSFER BY USING THE INITIAL BUS ADDRESS,
1537                    ADDING IN THE INITIAL WORD COUNT, AND SUBTRACTING ANY
```

```
                        RESIDUAL  WORD  COUNT.   IF  THIS COMPUTED BA DOES NOT
                        EQUAL THE CONTENTS OF RKBA AN ERROR  FLAG  (BAERR)  IS
                        SET IN GROUP 4 ERROR FIELD (GRP4ER)

                        IF BUS ADDRESS INCREMENT INHIBIT WAS SET, THE EXPECTED
                        BUS ADDRESS IS THE STARTING BUS ADDRESS.

                        CALL:   JSR     R4,CHKBA

                ;*******************************************************************
                ;CYLINDER,TRACK,SECTOR TEST AT END OF OPERATION
                ;*******************************************************************

                        THIS ROUTINE CHECKS THAT THE CONTENTS  OF  THE  RKDCYL
                        AND RKDA ARE CORRECT FOR ANY SIZE DATA TRANSFER AT THE
                        END OF  THE  OPERATION.   THE  CONTENTS  OF  THE  LOAD
                        REGISTER  STORAGE  ARE  COUNTED ON TO HAVE THE INITIAL
                        VALUES TO MAKE THE NECESSARY CALCULATION.

                        ALL THREE VALUES ARE GENERATED AND STORED IN  EXPECTED
                        VALUES  STORAGE  EXPCYL,  EXPTRK,  EXPSEC.   ALL 3 ARE
                        CHECKED  AND  IF  ONE   OR   MORE   ARE   WRONG,   THE
                        CORRESPONDING BIT IN THE ERROR FLAGS FIELD (GRP4ER) IS
                        SET.

                        CALL:   JSR     R4,CHKCTS

                ;*******************************************************************
                ;OPERATION CHECK ROUTINE
                ;*******************************************************************


                THIS IS WHERE ALL HARDWARE ERROR INDICATORS  AND  SOME
                SOFTWARE  ERRORS  ARE  CHECKED.  THE GENERAL PROCEDURE
                FLOW IS AS FOLLOWS:  THE ROUTINE IS CALLED WITH A TRAP
                (TCHKOP).   THE  LOCATION FOLLOWING THE TRAP CALL WILL
                HAVE AN ERROR TRAP WHICH THE ROUTINE WILL BYPASS IF NO
                ERROR  IS  FOUND.   IF AN ERROR IS DETECTED, THE ERROR
                TRAP CALL IS MODIFIED BY THIS ROUTINE  SUCH  THAT  THE
                ERROR  TABLE  ITEM  WILL  BE  THE  PROPER ITEM FOR THE
                FORMAT REQUIRED BY THIS ERROR.  THE ERROR TRAP WILL BE
                MADE EITHER ERROR 4,5,6, 7, OR 10.  REFER TO THE ERROR
                ITEM TABLE FOR A DESCRIPTION OF THE FORMAT  AND  WHICH
                ERRORS ARE DISPLAYED IN WHAT FORMAT.

                FOR NO EXPECTED ERRORS:
                CALL:   TCHKOP

                FOR EXPECTED ERRORS:
                CALL:   TCHKWE
                        .WORD           ;GROUP 1 EXPECTED ERRORS
                        .WORD           ;GROUP 2 EXPECTED ERRORS
                        .WORD           ;GROUP 3 EXPECTED ERRORS

                WHERE EACH BIT IN THE THREE WORDS FOLLOWING  THE  CALL
```

```
1594                                    REPRESENT  A  SPECIFIC EPROR.  THE BIT ASSIGNMENTS ARE
1595                                    GIVEN BELOW:
1596
1597                                            GROUP 1 ERRORS:
1598                                            BIT 0 - CONTROLLER DETECTED DRIVE BUS
1599                                                    PARITY ERROR
1600                                            BIT 1 - SEEK INCOMPLETE
1601                                            BIT 2 - NON-EXECUTABLE DRIVE FUNCTION
1602                                            BIT 3 - DRIVE DETECTED DRIVE BUS PARITY ERROR
1603                                            BIT 4 - FORMAT ERROR
1604                                            BIT 5 - DRIVE TYPE ERROR
1605                                            BIT 6 - AC LOW ERROR
1606                                            BIT 7 - SPEED LOSS ERROR
1607                                            BIT 8 - DRIVE OFF TRACK ERROR
1608                                            BIT 9 - CYLINDER OVERFLOW ERROR
1609                                            BIT 10 - ILLEGAL DISK ADDRESS ERROR
1610                                            BIT 11 - WRITE LOCK ERROR
1611                                            BIT 12 - DRIVE TIMING ERROR
1612                                            BIT 13 - NO CERR WITH OTHER ERROR SET ERROR
1613                                            BIT 14 - DRIVE UNSAFE ERROR
1614                                            BIT 15 - CERR BUT NO OTHER ERROR SET ERROR
1615
1616                                            GROUP 2 ERRORS:
1617                                            BIT 0 - ECC HARD ERROR
1618                                            BIT 1 - DATA CHECK ERROR
1619                                            BIT 2 - WRITE CHECK ERROR
1620                                            BIT 3 - DATA LATE ERROR
1621                                            BIT 4 - OPERATION INCOMPLETE ERROR
1622                                            BIT 5 - HEADER VRC ERROR
1623                                            BIT 6 - BAD SECTOR ERROR
1624
1625
1626
1627                                            BROUP 2 ERRORS:
1628                                            BIT 0 - NON-EXISTAND DRIVE ERROR
1629                                            BIT 1 - CONTROLLER TIMEOUT ERROR
1630                                            BIT 2 - UNIT FIELD ERROR
1631                                            BIT 3 - MULTIPLE DRIVE SELECT ERROR
1632                                            BIT 4 - PROGRAMMING ERROR
1633                                            BIT 5 - NON-EXISTANT MEMORY ERROR
1634                                            BIT 6 - UNIBUS PARITY ERROR
1635                                            BIT 7 - ILLEGAL FUNTION ERROR
1636
1637                                    ;*****************************************************************
1638                                    BAD SECTOR CHECK
1639                                    ;*****************************************************************
1640
1641                                            THE FIELD WHOSE ADDRESS IS IN THE LOCATION  AFTER  THE
1642                                            CALL  IS  CHECKED  TO  SEE  IF  ANY SECTORS ARE LISTED
1643                                            THEREIN THAT  HAVE  THE  CYLINDER  AND  TRACK  ADDRESS
1644                                            SPECIFIED IN L.DCYL AND L.DT.  IF A SECTOR IS FOUND IN
1645                                            THIS FIELD THAT IS BAD FOR THAT  CYLINDER  AND  TRACK,
1646                                            THE  SECTOR  NUMBER IS PLACED ON THE STACK.  THE TOTAL
1647                                            NUMBER OF BAD SECTORS IS PLACED ON THE STACK AFTER THE
1648                                            ENTIRE FIELD IS SEARCHED.
1649
```

```
                        CALL:   JSR     R4,BDSRCK
                                <ADDRESS OF FIELD TO BE SEARCHED>

;*****************************************************************
;DATA GENERATION AND COMPARE ROUTINE
;*****************************************************************

                        CALLS:  JSR     R4,GENCOM
                                CONTROL WORD

                                JSR     R4,GENCOM
                                CONTROL WORD
                                LENGTH

                                JSR     R4,GENCOM
                                CONTROL WORD
                                RELOCATION CONSTANT
                                LENGTH

                          RETURN:       RTS     R4

                        R4 IS ADJUSTED IN THE CODE FOR THE FOLLOWING  RETURNS:
                        THE  FIRST  CALL RETURNS TO THE LOCATION FOLLOWING THE
                        CONTROL WORD.  THIS IS UNCONDITIONAL.

                        THE SECOND CALL RETURNS TO THE LOCATION FOLLOWING  THE
                        LENGTH IF THE OPERATION REQUIRES DATA COMPARE AND DATA
                        MISCOMPARED.  IF DATA IS TO BE GENERATED  ONLY  OR  NO
                        DATA  COMPARE ERRORS OCCURRED, THE RETURN IS TO LENGTH
                        +4.


                        THE THIRD CALL IS IDENTICAL TO THE SECOND.

                        DEFINITION OF CONTROL WORD:

                        BIT 15      - DO COMPARE OPERATION OF IBUFF (SOURCE) TO
                                      OBUFF (DESTINATION).  EXPECTED VALUES ARE
                                      IN OBUFF (DESTINATION.
                        BIT 14      - RESUME COMPARE OPERATION FROM POINT  LEFT
                                      BY LAST COMPARE.
                        BIT 13      - INVOKE  MEMORY  MANAGEMENT  FOR  SOURCE
                                      (IBUFF).
                        BIT 12      - INVOKE MEMORY MANAGEMENT FOR  DESTINATION
                                      (OBUFF).
                        BIT 11      - REPEAT  FIRST  WORD  OF  SELECTED  PATTERN
                                      THROUGHOUT OBUFF.
                        BIT 10      - CLEAR IBUFF TO PATTERN SELECTED.
                        BIT 9       - BUILD HEADERS, CONSIDERING BS FILES
                        BIT 8       - BUILD HEADERS, ALL SECTORS INDICATE  GOOD
                                      SECTORS.
                        BIT 7       - HEADER   OPERATION   SPECIFIED   (EITHER
                                      COMPARE OR BUILD).
                        BIT 6 TO 0  - PATTERN SELECT FIELD, OCTAL  ENCODED.  0
                                      INDICATES  NO  DATA  GENERATION, 1 IS ALL
```

```
                        ZEROS, AND 7 IS ALL ONES.  OTHER PATTERNS
                        PROVIDED  ARE  PATTERNS 2-6, 8-16.  REFER
                        TO THE PROGRAM LISTING FOR PAT02  THROUGH
                        PAT16.

                EXPLANATION OF CALLS:
                    THE CALL WITH CONTROL WORD THE ONLY  PARAMETER  IS
                    USED FOR BUILDING OR COMPARING HEADERS OR RESUMING
                    A COMPARE OPERATION.

                    THE  CALL  WITH  CONTROL  WORD   AND   LENGTH   AS
                    PARAMETERS  IS USED FOR DATA GENERATION OR COMPARE
                    AND FOR IBUFF INITALIZATION.

                    THE CALL WITH CONTROL WORD,  RELOCATION  CONSTANT,
                    AND  LENGTH IS USED FOR DATA GENERATION OR COMPARE
                    WITH MEMORY MANAGEMENT.

                DESCRIPTION:

                THIS ROUTINE IS MULTI-PURPOSE  AND  WILL  PERFORM  THE
                FOLLOWING:

                A.  BUILD HEADERS, EITHER 20 OR 22 SECTORS/TRACK MODE.
                    THE  ROUTINE  WILL  BUILD  THE HEADERS AS ALL GOOD
                    SECTORS (BIT 8)  OR  TAKE  THE  BAD  SECTOR  FILES
                    (HARDWARE  OR  SOFTWARE)  FOR  EITHER FORMAT) INTO
                    ACCOUNT AND BUILD THE  HEADERS  WITH  THE  SECTORS
                    MARKED BAD IF ANY SECTORS FOR THE CYLINDER - TRACK
                    ARE LISTED THEREIN (BIT 9).

                B.  COMPARE THE CONTENTS OF IBUFF AND OBUFF (BIT  15).
                    THE CONTENTS OF THE BUFFER MAY BE HEADERS OR DATA.
                    A HEADER COMPARE OPERATION MAY BE  SPECIFIED  (BIT
                    7)  WHICH  WILL CAUSE THE COMPARE TO BE LIMITED TO
                    74(8) OR 102(8)  WORDS  OF  HEADERS.   THE  LENGTH
                    DEPENDS  ON THE FORMAT BIT THAT WAS LAST SPECIFIED
                    IN L.CS1.  THE HEADERS MAY  BE  BUILT  BEFORE  THE
                    COMPARE AS PART OF THE OPERATION (BIT 15 AND BIT 8
                    OR 9).  DATA CAN  ALSO  BE  GENERATED  BEFORE  THE
                    COMPARE (NON-ZERO BITS 6-0).

                C.  RESUME COMPARE OPERATION.  IF A COMPARE  OPERATION
                    DETECTS  A  MISCOMPARE,  THE  ROUTINE  RETURNS  TO
                    CALLER BUT STORES PARAMETERS SUCH THAT THE COMPARE
                    CAN  BE  RESUMED.   THIS IS DONE BY CALLING GENCOM
                    WITH BIT 14 SET IN THE CONTROL WORD.

                D.  DATA   GENERATION   OR   COMPARE   USING    MEMORY
                    MANAGEMENT.   MEMORY MANAGEMENT CAN BE INVOKED FOR
                    EITHER SOURCE OR DESTINATION BUT NOT FOR BOTH.  IN
                    THIS  MANNER, DATA GENERATION CAN BE MADE TO PLACE
                    DATA ANYWHERE IN AVAILABLE MEMORY.  LIKEWISE  DATA
                    COMPARE  WILL COMPARE THE CONTENTS OF IBUFF TO ANY
```

```
                                AREA OF AVAILABLE MEMORY.

                        ;*****************************************************************
                        ;PHASE LOCKED LOOP CLOCK ADJUSTMENT ROUTINE
                        ;*****************************************************************

                                THIS ROUTINE IS ENTERED VIA START LOCATION 220(8).
                                THE PROGRAM FIRST RUNS TEST 1, 2, AND 3 TO SET UP THE
                                INTERNAL PROGRAM VARIABLES AND THEN JUMPS TO THE CLOCK
                                ADJUST ROUTINE. THE ROUTINE SELECTS THE FIRST
                                AVAILABLE DRIVE AND SETS AND RESETS THE DIAGNOSTIC
                                MODE BIT IN RKMR1. INSTRJCTIONS ON WHERE TO SCOPE AND
                                WHAT TO ADJUST ARE TYPED ON THE CONSOLE.

                                THIS ROUTINE WILL LOOP UNTIL THE PROCESSOR IS HALTED.


                        7.0     REVISION HISTORY

                                REVF0   1) ADD CODE IN PROGRAM INITTIALIZATION TO
                                           CLEAR DATA BUFFER MEMORY LOCATIONS
                                        2) MODIFY CHAIN MODE LOOP ADDRESS IN $EOP
                                           FOR XXDP+ COMPATIBILITY
                                        3) MODIFY 'OPTTST' ROUTINE TO SUPPORT NEW
                                           PROCESSOR AND MEMORY OPTIONS
                        %
```

```
                        ;       *** REV 007 ***

                        .NLIST  CND,MD,MC,TOC
                        .LIST   ME
                        .ENABL  ABS,AMA
167400                  $SWR=   167400
000001                  $TN=    1
                        .TITLE  CZR6KG0 RK6 FCTNL CTRL DIAG
                        ;*COPYRIGHT (C) 1976,1981
                        ;*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
```

```
1844    000006          SP=     %6              ;;STACK POINTER
1845    000007          PC=     %7              ;;PROGRAM COUNTER
1846
1847                    ;*PRIORITY LEVEL DEFINITIONS
1848    000000          PR0=    0               ;;PRIORITY LEVEL 0
1849    000040          PR1=    40              ;;PRIORITY LEVEL 1
1850    000100          PR2=    100             ;;PRIORITY LEVEL 2
1851    000140          PR3=    140             ;;PRIORITY LEVEL 3
1852    000200          PR4=    200             ;;PRIORITY LEVEL 4
1853    000240          PR5=    240             ;;PRIORITY LEVEL 5
1854    000300          PR6=    300             ;;PRIORITY LEVEL 6
1855    000340          PR7=    340             ;;PRIORITY LEVEL 7
1856
1857                    ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
1858    100000          SW15=   100000
1859    040000          SW14=   40000
1860    020000          SW13=   20000
1861    010000          SW12=   10000
1862    004000          SW11=   4000
1863    002000          SW10=   2000
1864    001000          SW09=   1000
1865    000400          SW08=   400
1866    000200          SW07=   200
1867    000100          SW06=   100
1868    000040          SW05=   40
1869    000020          SW04=   20
1870    000010          SW03=   10
1871    000004          SW02=   4
1872    000002          SW01=   2
1873    000001          SW00=   1
1874                    .EQUIV  SW09,SW9
1875                    .EQUIV  SW08,SW8
1876                    .EQUIV  SW07,SW7
1877                    .EQUIV  SW06,SW6
1878                    .EQUIV  SW05,SW5
1879                    .EQUIV  SW04,SW4
1880                    .EQUIV  SW03,SW3
1881                    .EQUIV  SW02,SW2
1882                    .EQUIV  SW01,SW1
1883                    .EQUIV  SW00,SW0
1884
1885                    ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
1886    100000          BIT15=  100000
1887    040000          BIT14=  40000
1888    020000          BIT13=  20000
1889    010000          BIT12=  10000
1890    004000          BIT11=  4000
1891    002000          BIT10=  2000
1892    001000          BIT09=  1000
1893    000400          BIT08=  400
1894    000200          BIT07=  200
1895    000100          BIT06=  100
1896    000040          BIT05=  40
1897    000020          BIT04=  20
1898    000010          BIT03=  10
1899    000004          BIT02=  4
```

```
                        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
                        .SBTTL  MEMORY MANAGEMENT DEFINITIONS

                        ;*KT11 VECTOR ADDRESS

000250                  MMVEC=  250

                        ;*KT11 STATUS REGISTER ADDRESSES

177572                  SR0=    177572
177574                  SR1=    177574
177576                  SR2=    177576
172516                  SR3=    172516

                        ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS

172300                  KIPDR0= 172300
172302                  KIPDR1= 172302
172304                  KIPDR2= 172304
172306                  KIPDR3= 172306
172310                  KIPDR4= 172310
172312                  KIPDR5= 172312
172314                  KIPDR6= 172314
172316                  KIPDR7= 172316

                        ;*KERNEL "I" PAGE ADDRESS REGISTERS

172340                  KIPAR0= 172340
172342                  KIPAR1= 172342
172344                  KIPAR2= 172344
172346                  KIPAR3= 172346
```

```
                        KIPAR4= 172350
                        KIPAR5= 172352
                        KIPAR6= 172354
                        KIPAR7= 172356

                        AVECT1= 210                     ;DEFINE RK611 VECTOR INTERRUPT
                        APRIOR= PR5                     ;DEFINE RK611 PRIORITY
                        ABASE=  177440                  ;DEFINE RK611 BASE BUS ADDRESS

                        .SBTTL  RK611 CONTROLLER REGISTER DEFINITION

                        RKCS1=  0                       ;CONTROL AND STATUS REGISTER 1
                        RKWC=   2                       ;WORD COUNT REGISTER
                        RKBA=   4                       ;BUS ADDRESS REGISTER
                        RKDA=   6                       ;DESIRED TRACK SECTOR REGISTER
                        RKCS2=  10                      ;CONTROL AND STATUS REGISTER 2
                        RKDS=   12                      ;DRIVE STATUS REGISTER
                        RKER=   14                      ;ERROR REGISTER
                        RKASOF= 16                      ;ATTENTION SUMMARY AND OFFSET REGISTER
                        RKDCYL= 20                      ;DESIRED CYLINDER REGISTER
                        RKDB=   24                      ;DATA BUFFER
                        RKMR1=  26                      ;MAINTENANCE REGISTER 1
                        RKMR2=  34                      ;MAINTENANCE REGISTER 2
                        RKMR3=  36                      ;MAINTENANCE REGISTER 3
                        RKECPS= 30                      ;ECC POSITION INFORMATION
                        RKECPT= 32                      ;ECC PATTERN INFORMATION
                        RKSPAR= 22                      ;SPARE REGISTER

                        .SBTTL  DRIVE COMMANDS

                        SELDRV= 101                     ;SELECT DRIVE
                        PACK=   103                     ;PACK ACKNOWLEDGE
                        CLEAR=  105                     ;DRIVE CLEAR
                        UNLOAD= 107                     ;UNLOAD
                        SRTSPL= 111                     ;START SPINDLE
                        RECAL=  113                     ;RECALIBRATE
                        OFFSET= 115                     ;OFFSET
                        SEEK=   117                     ;SEEK
                        RDDATA= 121                     ;READ DATA
                        WRDATA= 123                     ;WRITE DATA
                        RDHEAD= 125                     ;READ HEADER
                        WRHEAD= 127                     ;WRITE HEADER AND DATA
                        WRTCHK= 131                     ;WRITE CHECK
                        INTR=   300                     ;GENERATE INTERRUPT TO CPU

                        .SBTTL  CONTROL AND STATUS REGISTER 1 BITS

                        GO=     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=   B T15                   ;CONTROLLER CLEAR

                        .SBTTL  CONTROL AND STATUS REGISTER 2 BITS

000007                  DRVMSK= 7                       ;MASK FOR DRIVE SELEC ION CODE
000010                  RLS=    BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
000020                  BAI=    BIT4                    ;BUS ADDRESS INCREMENT INHIBIT
000040                  SCLR=   BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
000100                  IR=     BIT6                    ;INPUT READY
000200                  OR=     BIT7                    ;OUTPUT READY
000400                  UFE=    BIT8                    ;UNIT FIELD ERROR
001000                  MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
002000                  PGE=    BIT10                   ;PROGRAMMING ERROR
004000                  NEM=    BIT11                   ;NON-EXISTENT MEMORY
010000                  NED=    BIT12                   ;NON-EXISTENT DRIVE
020000                  UPE=    BIT13                   ;UNIBUS PARITY ERROR
040000                  WCE=    BIT14                   ;WRITE CHECK ERROR
100000                  DLT=    BIT15                   ;DATA LATE ERROR

                        .SBTTL  ERROR REGISTER BIT DEFINITION

000001                  ILF=    BIT0                    ;ILLEGAL FUNCTION CODE
000002                  SKI=    BIT1                    ;SEEK INCOMPLETE
000004                  NXF=    BIT2                    ;NON-EXECUTABLE DRIVE FUNCTION
000010                  DRPAR=  BIT3                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
000020                  FMTE=   BIT4                    ;FORMAT ERROR
000040                  DTYE=   BIT5                    ;DRIVE TYPE ERROR
000100                  ECH=    BIT6                    ;ECC HARD
000200                  BSE=    BIT7                    ;BAD SECTOR ERROR
000400                  HVRC=   BIT8                    ;HEADER VRC ERRROR
001000                  COE=    BIT9                    ;CYLINDER ADDRESS OVERFLOW ERROR
002000                  IDAE=   BIT10                   ;INVALID DISK ADDRESS ERROR
004000                  WLE=    BIT11                   ;WRITE LOCK ERROR
010000                  DTE=    BIT12                   ;DRIVE TIMING ERROR
020000                  OPI=    BIT13                   ;OPERATION (SEARCH) INCOMPLETE
040000                  UNS=    BIT14                   ;DRIVE UNSAFE
100000                  DCK=    BIT15                   ;DATA CHECK

                        .SBTTL  STATUS REGISTER BIT DEFINITION

000001                  DRA=    BIT0                    ;DRIVE AVAILABLE (CONTROLLER IS SET IF
                                                        ;  THIS BIT IS RESET)
000004                  OFST=   BIT2                    ;DRIVE OFFSET
000010                  ACLO=   BIT3                    ;AC LOW
000020                  SPDLSS= BIT4                    ;SPEED LOSS
000040                  DROT=   BIT5                    ;DRIVE OFF TRACK
000100                  VV=     BIT6                    ;VOLUME VALID
000200                  DRDY=   BIT7                    ;DRIVE READY
000400                  DDT=    BIT8                    ;DRIVE TYPE (0=RK06)
004000                  WRL=    BIT11                   ;WRITE LOCK
020000                  PIP=    BIT13                   ;POSITIONING IN PROGRESS
040000                  DSC=    BIT14                   ;DRIVE STATUS CHANGE
100000                  SVAL=   BIT15                   ;STATUS VALID
```

```
                        .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION

000017                  MESMSK= 17                      ;MESSAGE MASK

000020                  PAT=    BIT4                    ;FORCE EVEN PARITY ON SERCON MESSAGE LINES
000040                  DMD=    BIT5                    ;DIAGNOSTIC MODE
000100                  MSP=    BIT6                    ;MAINTENANCE SECTOR PULSE
000200                  MIND=   BIT7                    ;MAINTENANCE INDEX
000400                  MCLK=   BIT8                    ;MAINTENANCE CLOCK
001000                  MERD=   BIT9                    ;MAINTENANCE ENCODED READ DATA
002000                  MEWD=   BIT10                   ;MAINTENACNE ENCODED WRITE DATA
004000                  PCA=    BIT11                   ;PRECOMPENSATION ADVANCE
010000                  PCD=    BIT12                   ;PRECOMPENSATION DELAY
020000                  ECCW=   BIT13                   ;ECC WORD IS BEING READ OR WRITTEN
040000                  WRTGAT= BIT14                   ;WRITE GATE
100000                  RDGATE= BIT15                   ;READ GATE

                        .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE A

000040                  S.DRA=  BIT5                    ;DRIVE AVAILIABLE
000100                  S.VV=   BIT6                    ;VOLUME VALID
000200                  S.DRY=  BIT7                    ;DRIVE READY
000400                  S.TYPE= BIT8                    ;DRIVE TYPE
001000                  S.FORM= BIT9                    ;DRIVE FORMAT
002000                  S.OFF=  BIT10                   ;OFFSET
004000                  S.WRL=  BIT11                   ;WRITE LOCK
010000                  S.SPIN= BIT12                   ;SPINDLE ON
020000                  S.PIP=  BIT13                   ;POSITIONING IN PROGRESS
040000                  S.DSC-  BIT14                   ;DRIVE STATUS CHANGE

                        .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE B

000040                  S.ICYL= BIT5                    ;ILLEGAL CYLINDER ADDRESS
000100                  S.ACLO- BIT6                    ;AC LOW
000200                  S.FLT=  BIT7                    ;DRIVE FAULT
000400                  S.ILF=  BIT8                    ;ILLEGAL FUNCTION
001000                  S.PAR=  BIT9                    ;DRIVE DETECTED SERCON PARITY ERROR
002000                  S.SKI=  BIT10                   ;SEEK INCOMPLETE
004000                  S.WLE=  BIT11                   ;WRITE LOCK ERROR
010000                  S.SPLS= BIT12                   ;SPEED LOSS
020000                  S.DROF= BIT13                   ;DRIVE OFF TRACK
040000                  S.UNS=  BIT14                   ;DRIVE UNSAFE

                        .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE A

000020                  S.XDOK= BIT4                    ;TRANSDUCER OK
000040                  S.HDHM= BIT5                    ;HEADS HOME
000100                  S.BRHM= BIT6                    ;BRUSHES HOME
000200                  S.DOOR= BIT7                    ;DOOR INTERLOCKED
000400                  S.CART= BIT8                    ;CARTRAGE INTERLOCK
001000                  S.SPOK= BIT9                    ;SPEED OK
002000                  S.FWD=  BIT10                   ;FORWARD
004000                  S.REV=  BIT11                   ;REVERSE
010000                  S.LOAD= BIT12                   ;HEADS LOADING
020000                  S.RTZ=  BIT13                   ;RETURN TO ZERO
```

```
2124          040000                  S.UNLD= BIT14                   ;HEADS UNLOADING
2125
2126                                  .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE B
2127
2128          000020                  S.SECT= BIT4                    ;SECTOR ERROR
2129          000040                  S.WCLK= BIT5                    ;WRITE CLOCK AND NO WRITE GATE
2130          000100                  S.WGAT= BIT6                    ;WRITE GATE AND NO TRANSISTIONS
2131          000200                  S.HDFL= BIT7                    ;HEAD FAULT
2132          000400                  S.MHD=  BIT8                    ;MULTIPLE HEAD SELECT
2133          001000                  S.XERR= BIT9                    ;INDEX ERROR
2134          002000                  S.DIB=  BIT10                   ;DIBIT ERROR
2135          004000                  S.PLO=  BIT11                   ;PLO ERROR
2136          010000                  S.NMOV- BIT12                   ;SEEK AND NO MOTION
2137          020000                  S.LIMD= BIT13                   ;LIMIT DETECT ON SEEK
2138          040000                  S.BRKE- BIT14                   ;SERVO-BRAKE
2139
2140                                  .SBTTL  COMMON MASKS
2141
2142          000007                  M.DRV   7                       ;DRIVE CODE
2143          100000                  M.PAR-  BIT15                   ;PARITY
2144          000003                  M.ID=   3                       ;BYTE ID
2145          017760                  M.CDIF= 17760                   ;CYLINDER DIFFERENCE/OFFSET
2146          017760                  M.CADD= 17760                   ;CYLINDER ADDRESS
2147          077770                  M.SER=  77770                   ;DRIVE SERIAL NUMBER
2148          000760                  M.SECT- 760                     ;SECTOR COUNT
2149          007000                  M.HEAD= 7000                    ;HEAD DECODE
2150                                  .SBTTL  TRAP CATCHER
2151
2152          000000                          .-0
2153                                  ;*ALL UNUSED LOCATIONS OF THE VECTOR AREA CONTAIN
2154                                  ;*A ".+2, IOT" SEQUENCE TO CATCH AND PROCESS ILLEGAL
2155                                  ;*TRAPS AND INTERRUPTS THAT MIGHT OCCUR.
2156                                  ;*THE IOT TRAP WHICH IS TAKEN ON THE ILLEGAL TRAP/INT
2157                                  ;*TRAPS TO THE $SCOPE ROUTINE WHICH (IF THE RETURN PC IS
2158                                  ;*LESS THAN 1002) JUMPS TO THE $ERROR ROUTINE.
2159                                  ;*THE $ERROR ROUTINE WILL REPORT THE ERROR AS FOLLOWS:
2160                                  ;*      PC=YYYYYY UNEXPECTED TRAP TO XXX
2161                                  ;*AND RETURN TO THE PROGRAM AT PC=YYYYYY+2
2162                                  ;*WHERE XXX LOCATION OF ILLEGAL TRAP
2163                                  ;*      YYYYYY-PC AT TIME OF TRAP
2164                                  ;*NOTE: IF THE PROCESSOR IS NOT AN 11/05 THE PROGRAM
2165                                  ;*      CAN BE STARTED AT ADDRESS 0 AS WELL AS ADDRESS 200.
2166
2167  000000  000000          $40CAT: HALT                            ;;HALT
2168  000002  000737                  BR      .-100                   ;;BRANCH TO 177700 & TIME OUT (NOT ON
2169                                                                  ;;11/05)
2170  000004  001772                  .WORD   START                   ;;VECTOR TO STARTING ADDRESS
2171  000006  000340                  .WORD   340                     ;;WITH PRIORITY LEVEL 7
2172          000174                  .-174
2173  000174  000000          DISPREG:.WORD   0                       ;;SOFTWARE DISPLAY REGISTER
2174  000176  000000          SWREG:  .WORD   0                       ;;SOFTWARE SWITCH REGISTER
2175                                  .SBTTL  STARTING ADDRES(ES)
2176  000200  000137  001772          JMP     @#START ;;GO TO START OF PROGRAM
2177  000204  000137  001762          JMP     RESTRT                  ;JUMP TO RESTART ROUTINE
2178          000214                  . 214
2179  000214  000137  001752          JMP     PARM                    ;JUMP TO OPERATOR ASSIGNED PARMETERS
```

```
                    000220
000220  000137  001742                .=220
                                      JMP     SETCLK          ;JUMP TO SET CLOCK ROUTINE
                                .SBTTL  APT PARAMETER BLOCK


                                ;;*****************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;*****************************************************************
                    000224              .$X=.   ;;SAVE CURRENT LOCATION
                    000024              .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                          200     ;;FOR APT START UP
                    000044              .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  000224                          $APTHDR ;;POINT TO APT HEADER BLOCK
                    000224              .=.$X   ;;RESET LOCATION COUNTER
                                ;;*****************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.

000224                          $APTHD:
000224  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
000226  001276                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
000230  000024                  $TSTM:  .WORD   20.     ;;RUN TIM OF LONGEST TEST
000232  000074                  $PASTM: .WORD   60.     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
000234  000740                  $UNITM: .WORD   480.    ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
000236  000031                          .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                  $REGAD: .WORD   0       ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001162  000000                  $REG0:  .WORD   0       ;;CONTAINS (($REGAD)+0)
001164  000000                  $REG1:  .WORD   0       ;;CONTAINS (($REGAD)+2)
001166  000000                  $REG2:  .WORD   0       ;;CONTAINS (($REGAD)+4)
001170  000000                  $REG3:  .WORD   0       ;;CONTAINS (($REGAD)+6)
001172  000000                  $REG4:  .WORD   0       ;;CONTAINS (($REGAD)+10)
001174  000000                  $REG5:  .WORD   0       ;;CONTAINS (($REGAD)+12)
001176  000000                  $REG6:  .WORD   0       ;;CONTAINS (($REGAD)+14)
001200  000000                  $REG7:  .WORD   0       ;;CONTAINS (($REGAD)+16)
001202  000000                  $REG10: .WORD   0       ;;CONTAINS (($REGAD)+20)
001204  000000                  $REG11: .WORD   0       ;;CONTAINS (($REGAD)+22)
001206  000000                  $REG12: .WORD   0       ;;CONTAINS (($REGAD)+24)
001210  000000                  $REG13: .WORD   0       ;;CONTAINS (($REGAD)+26)
001212  000000                  $REG14: .WORD   0       ;;CONTAINS (($REGAD)+30)
001214  000000                  $REG15: .WORD   0       ;;CONTAINS (($REGAD)+32)
001216  000000                  $REG16: .WORD   0       ;;CONTAINS (($REGAD)+34)
001220  000000                  $REG17: .WORD   0       ;;CONTAINS (($REGAD)+36)
001222  000000                  $TMP0:  .WORD   0       ;;USER DEFINED
```

```
2260  001224  000000                $TMP1:  .WORD   0               ;;USER DEFINED
2261  001226  000000                $TMP2:  .WORD   0               ;;USER DEFINED
2262  001230  000000                $TMP3:  .WORD   0               ;;USER DEFINED
2263  001232  000000                $TMP4:  .WORD   0               ;;USER DEFINED
2264  001234  000000                $TMP5:  .WORD   0               ;;USER DEFINED
2265  001236  000000                $TMP6:  .WORD   0               ;;USER DEFINED
2266  001240  000000                $TMP7:  .WORD   0               ;;USER DEFINED
2267  001242  000000                $TMP10: .WORD   0               ;;USER DEFINED
2268  001244  000000                $TMP11: .WORD   0               ;;USER DEFINED
2269  001246  000000                $TMP12: .WORD   0               ;;USER DEFINED
2270  001250  000000                $TMP13: .WORD   0               ;;USER DEFINED
2271  001252  000000                $TMP14: .WORD   0               ;;USER DEFINED
2272  001254  000000                $TMP15: .WORD   0               ;;USER DEFINED
2273  001256  000000                $TMP16: .WORD   0               ;;USER DEFINED
2274  001260  000000                $TMP17: .WORD   0               ;;USER DEFINED
2275  001262  000000                $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
2276  001264  000000                $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
2277  001266  177607  000377        $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
2278  001272     077                $QUES:  .ASCII  /?/             ;;QUESTION MARK
2279  001273     015                $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
2280  001274  000012                $LF:    .ASCIZ  <12>            ;;LINE FEED
2281                                ;;**************************************************************
2282                                .SBTTL  APT MAILBOX-ETABLE
2283
2284                                ;;**************************************************************
2285                                .EVEN
2286  001276                        $MAIL:                          ;;APT MAILBOX
2287  001276  000000                $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
2288  001300  000000                $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
2289  001302  000000                $TESTN: .WORD   ATESTN  ;;TEST NUMBER
2290  001304  000000                $PASS:  .WORD   APASS   ;;PASS COUNT
2291  001306  000000                $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
2292  001310  000000                $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
2293  001312  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
2294  001314  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
2295  001316                        $ETABLE:                        ;;APT ENVIRONMENT TABLE
2296  001316     000                $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
2297  001317     000                $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
2298  001320  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
2299  001322  000000                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
2300  001324  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
2301                                ;*                      BITS 15-11=CPU TYPE
2302                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45-05
2303                                ;*                              11/70=06,PDQ=07,Q=10
2304                                ;*                      BIT 10=REAL TIME CLOCK
2305                                ;*                      BIT  9=FLOATING POINT PROCESSOR
2306                                ;*                      BIT  8=MEMORY MANAGEMENT
2307  001326     000                $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
2308  001327     000                $MTYP*: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
2309                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
2310                                ;*                              900 NSEC CORE=001
2311                                ;*                              300 NSEC BIPOLAR=002
2312                                ;*                              500 NSEC MOS=003
2313  001330  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
2314                                ;*                        MEM.LAST ADDR.-3 BYTES,THIS WORD AND LOW OF ""TYPE"" ABOVE
2315  001332     000                $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
```

```
2316  001333  000                 $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
2317  001334  000000              $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
2318  001336  000                 $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
2319  001337  000                 $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
2320  001340  000000              $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
2321  001342  000                 $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
2322  001343  000                 $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
2323  001344  000000              $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
2324  001346  000210              $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
2325  001350  000000              $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
2326  001352  177440              $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
2327  001354  000000              $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
2328  001356  000000              $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
2329  001360                      $ETEND:
2330                              .MEXIT
```

```
                        .SBTTL  ERROR POINTER TABLE

                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

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


001360                  $ERRTB:

                        ;* EM AND DH ARE ASCIZ DATA.  EM IS ALWAYS A MESSAGE BUT DH
                        ;* CAN BE A MESSAGE OR A SET OF COLUMN LABELS SPACED ACCROSS
                        ;* THE PAGE. DT IS A STRING OF WORDS THAT POINT TO THE DATA TO
                        ;* BE TYPED, AND DF IS A STRING OF WORK THAT TELL HOW THE DT WORDS
                        ;* ARE TO BE TYPED.  IF ANY OF THE POINTERS ARE NOT NEEDED, FOR A
                        ;* PARTICULAR FORMAT, IT IS REPLACED WITH A ZERO.
                        ;*
                        ;* THE NORMAL USAGE OF THE ERROR TABLE IS TO HAVE A TABLE ENTRY FOR
                        ;* EACH ERROR MESSAGE THAT CAN OCCUR.  IN THE INTEREST OF ECONOMICS
                        ;* OF CORE MEMORY, THIS PROGRAM USES THE ERROR TABLE IN A
                        ;* SIGHTLY DIFFERENT MANNERS AS DESCRIBED BELOW.

                        ;* THE ERROR TABLE ENTRIES MAKE UP A SET OF REPORT FORMATS THAT ARE USED
                        ;* THROUGHOUT THE PROGRAM.  WHEN AN ERROR IS TO BE REPORTED, THE
                        ;* TABLE ENTRY THAT PROVIDES THE DESIRED FORMAT IS CHOSEN FROM
                        ;* THE DEFINED SET.  THE TABLE ENTRY CHOSEN IS THEN ALTERED
                        ;* BY CHANGING THE FIRST (AND POSSIBLY THE SECOND) WORD TO CONTAIN
                        ;* THE ADDRESS OF THE ASCIZ STRING THAT MAKES UP THE MESSAGE
                        ;* PORTION OF THE REPORT.  THE DATA FIELDS FOR THAT ENTRY ARE NEVER
                        ;* CHANGED, NOR ARE THE COLUMN LABELS OR POSITIONS.
                        ;*
                        ;* THE FORMAT THAT EACH TABLE ENTRY PROVIDES IS SHOWN BELOW WITH
                        ;* THE DEFINITION OF THE ENTRY.  ALL DATA FIELDS ARE TYPED IN OCTAL.

                                ;ERROR ITEM 1
                        ;*      (MESSAGE)
                        ;*      TST NUM ERR PC  DRIVE
                        ;*      $TESTN  $ERRPC  DRVNUM

001360  000000          EM1N:   .WORD   0
001362  057236                  DH001
001364  060610                  DT001
001366  060702                  DF001

                                ;ERROR ITEM 2
                        ;*      (MESSAGE)
                        ;*      (MESSAGE)
                        ;*      TST NUM ERR PC  DRIVE
                        ;*      $TESTN  $ERRPC  DRVNUM
                        ;*        RKCS1   RKCS2   RKDS    RKER    RKASOF  RKDCYL  RKDA
```

```
                                ;*        T.CS1   T.CS2   T.DS    T.ER    T.ASCF  T.DCYL  T.DA
                                ;*      RKBA    RKWC
                                ;*      T.BA    T.WC
                                ;
001370  000000                 EM2N:   .WORD   0
001372  000000                 DH2N:   .WORD   0
001374  060616                         DT002
001376  060706                         DF002
                                        ;*ERROR ITEM 3
                                ;*      (MESSAGE)
                                ;*      TST NUM ERR PC  DRIVE
                                ;*      $TESTN  $ERRPC  DRVNUM
                                ;*        RKCS1   RKCS2   RKDS    RKER    RKASOF  RKMR1
                                ;*        T.CS1   T.CS2   T.DS    T.ER    T.AST   T.MR1
                                ;
001400  000000                 EM3N:   .WORD   0
001402  057264                 DH002A
001404  060566                         DT003
001406  060726                         DF003
                                ;
                                ;* ERROR ITEMS 4,5,6,&7 ARE USED TO REPORT ERRORS THAT ARE THE RESULT
                                ;* OF A HARDWARE ERROR INDICATOR BEING SET WHEN NOT EXPECTED,
                                ;* NOT SET WHEN IT IS EXPECTED, OR BOTH. THE ERROR REPORT WILL
                                ;* CONTAIN (1) ALL THE ERRORS THAT WERE DETECTED, (2) ALL THE EXPECTED
                                ;* ERRORS THAT DID NOT OCCUR, OR (3) ALL THE EXPEDTED BUT NOT SET ERRORS
                                ;* AND THE UNEXPECTED BUT SET ERRORS.
                                ;*
                                ;* THE MESSAGE ITSELF EXPLAINS THE CIRCUMSTANCE FOR THE REPORT.
                                ;* INCLUDED IN THE REPORT WILL BE ONE OR MORE OF THE FOLLOWING
                                ;* STATEMENTS:
                                ;*
                                ;* "THE ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:"
                                ;* "THE ABOVE ARE UNEXPECTED ERRORS SET IN OPERATION:"
                                ;* "THE ABOVE ARE ERRORS SET IN OPERATION:"
                                ;*
                                ;* PRECEEDING ANY ONE OF THESE LINES WILL BE ONE OR MORE LINES THAT
                                ;* SPECIFY THE EXACT ERROR. FOLLOWING THE LAST LINE WILL BE A LINE
                                ;* THAT IDENTIFIES THE OPERATION BEING PERFORMED.
                                ;*
                                ;* EXAMPLE:
                                ;* NON-EXISTANT DRIVE
                                ;* THE ABOVE ARE ERRORS SET IN OPERATION:
                                ;* DRIVE SELECT
                                ;* (ADDITIONAL LINES OF INFORMATION)
                                ;*
                                ;* THIS IS THE RESULT OF AN ERROR SET IN A SELECT OPERATION.
                                ;*
```

```
                        ;* EXAMPLE:
                        ;* NON-EXISTANT DRIVE
                        ;* THE ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:
                        ;* DRIVE SELECT
                        ;* (ADDITIONAL LINES OF INFORMATION)
                        ;*
                        ;* THIS IS THE RESULT OF AN EXPECTED ERROR THAT DID NOT OCCUR, I.E.
                        ;* A NON-EXISTANT DRIVE WAS ADDRESSED BUT NED WAS NOT SET.
                        ;*
                        ;* EXAMPLE:
                        ;* NON-EXISTANT MEMORY
                        ;* THE ABOVE ARE UNEXPECTED ERRORS SET IN OPERATION:
                        ;* UNIBUS PARITY ERROR
                        ;* THE ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:
                        ;* WRITE DATA
                        ;* (ADDITIONAL LINES OF INFORMATION)
                        ;*
                        ;* THIS IS AN EXAMPLE OF NON-EXISTANT MEMORY BEING SET WHEN UNIBUS
                        ;* PARITY ERROR WAS EXPECTED.
                        ;*
                        ;*      ERROR ITEM 4
                        ;*      (DESCRIPTION OF ERROR)
                        ;*      ERROR IN OPERATION
                        ;*      (DESCRIPTION OF OPERATION)
                        ;*      TST NUM ERR PC  DRIVE
                        ;*      $TESTN  $ERRPC  DRVNUM
                        ;*        RKCS1   RKCS2   RKDS    RKER    RKASOF   RKDCYL   RKDA
                        ;*        T.CS1   T.CS2   T.DS    T.ER    T.ASOF   T.DCYL   T.DA
                        ;*      RKBA    RKWC
                        ;*      T.BA    T.WA
                        ;*        A00     B00     A01     B01     A02     B02     A03     B03
                        ;*        $REG10  $REG11  $REG12  $REG13  $REG14  $REG15  $REG16  $REG17
                        ;*
                        ;*      THE ERRORS REPORTED BY THIS FORMAT ARE:
                        ;*      CONTROLLER DETECTED DRIVE BUS ERROR
                        ;*      DRIVE DETECTED DRIVE BUS ERROR
                        ;*      SEEK INCOMPLETE
                        ;*      NON-EXECUTABLE DRIVE FUNCTION
                        ;*      DRIVE TIMING ERROR
                        ;*      DRIVE UNSAFE
                        ;*      AC LOW
                        ;*      SPINDLE SPEED LOSS
                        ;*      DRIVE OFF TRACK
                        ;*      ILLEGAL DRIVE ADDRESS ERROR
                        ;*      CYLINDER OVERFLOW
                        ;*      DRIVE TYPE ERROR
                        ;*      FORMAT ERROR
                        ;*      WRITE LOCK ERROR
                        
001410  000000  EM4N:    .WORD   0
001412  000000  DR4N:    .WORD   0
001414  060616            DT004
001416  060736            DF004
                        
                        ;*      ERROR ITEM 5
                        ;*      THIS ENTRY IS THE SAME AS ITEM 4 WITH THE ADDITION
```

```
                                ;*      OF A MESSAGE THAT FOLLOWS.  THIS MESSAGE IS:
                                ;*
                                ;*      "ANY FIELD WITH ALL ONES MUST BE CONSIDERED INVALID"
                                ;*
                                ;*      THIS REPORT WILL BE PRINTED WHEN THE GATHERING OF DATA FOR
                                ;*      A00 THRU B03 IS NOT ACCOMPLISHED WITHOUT ERROR.

001420  000000                  EM5N:   .WORD   0
001422  000000                  DH5N:   .WORD   0
001424  060616                          DT005
001426  060766                          DF005

                                ;*      ERROR ITEM 6
                                ;*      (DESCRIPTION OF ERROR)
                                ;*      ERROR IN OPERATION
                                ;*      (DESCRIPTION OF OPERATION)
                                ;*      TST NUM ERR PC  DRIVE
                                ;*      $TESTN  $ERRPC  DRVNUM
                                ;*        RKCS1  RKCS2  RKDS  RKER  RKASOF  RKDCYL  RKDA
                                ;*        T.CS1  T.CS2  T.DS  T.ER  T.ASOF  T.DCYL  T.DA
                                ;*      RKBA  RKWC
                                ;*      T.BA  T.WC
                                ;*
                                ;*      THE ERRORS REPORTED BY THIS FORMAT ARE:
                                ;*      DATA CHECK
                                ;*      WRITE CHECK
                                ;*      ECC HARD
                                ;*      DATA LATE
                                ;*      OPERATION INCOMPLETE
                                ;*      HEADER VRC ERROR
                                ;*      BAD SECTOR ERROR

001430  000000                  EM6N:   .WORD   0
001432  000000                  DH6N:   .WORD   0
001434  060616                          DT006
001436  061022                          DF006

                                ;*      ERROR ITEM 7
                                ;*      (DESCRIPTION OF ERROR)
                                ;*      ERROR IN OPERATION
                                ;*      (DESCRIPTION OF OPERATION)
                                ;*      TST NUM ERR PC  DRIVE
                                ;*      $TESTN  $ERRPC  DRVNUM
                                ;*        RKCS1    RKCS2    RKDS     RKER     RK4SOF
                                ;*        T.CS1    T.CS2    T.DS     T.ER     T.ASOF
                                ;*
                                ;*      THE ERRORS REPORTED BY THIS FORMAT ARE:
                                ;*      NON-EXISTANT DRIVE
                                ;*      NON-EXISTANT MEMORY
                                ;*      CONTROLLER TIME OUT
                                ;*      UNIT FIELD ERROR
                                ;*      MULTIPLE DRIVE SELECT
                                ;*      PROGRAMMING ERROR
                                ;*      UNIBUS PARITY ERROR
                                ;*      ILLEGAL FUNCTION CODE
                                ;*
```

```
                                ;*      DESCRIPTON OF OPERATION CAN BE ANY COMMAND, EITHER LEGAL OR ILLEGAL
                                
001440  000000                  EM7N:   .WORD   0
001442  000000                  DH7N:   .WORD   0
001444  060616                          DT007
001446  061046                          DF007
                                
                                ;*      ERROR ITEM 10
                                ;*      (DESCRIPTION OF ERROR)
                                ;*      ERROR AT COMPLETION OF OPERATION
                                ;*      (DESCRIPITON OF OPERATION)
                                ;*      TST NUM ERR PC  DRIVE
                                ;*      $TESTN  $ERRPC  DRVNUM
                                ;*        EXPT    1S
                                ;*        $REG10  $REG11
                                ;*
                                ;*      THE ERRORS REPORTED BY THIS FORMAT ARE SOFTWARE DETECTED BY
                                ;*      COMPARING EXPECTED RESULTS WITH ACTUAL RESULTS.  THE SPECIFIC
                                ;*      ERRORS ARE;
                                ;*      WORD COUNT INCORRECT
                                ;*      BUS ADDRESS INCORRECT
                                ;*      CYLINDER ADDRESS INCORRECT
                                ;*      TRACK ADDRESS INCORRECT
                                ;*      SECTOR ADDRESS INCORRECT
                                
001450  000000                  EM10N:  .WORD   0
001452  060077                          DH010
001454  060666                          DT015
001456  061066                          DF010
                                
                                ;*      ERROR ITEM 11
                                ;*      (ERROR INDICATOR OR STATUS BIT)
                                ;*      NOT SET AS A RESULT OF
                                ;*      (ANOTHER ERROR INDICATOR, STATUS BIT, OR OPERATION
                                ;*      TST NUM ERR PC  DRIVE
                                ;*      $TESTN  $ERRPC  DRVNUM
                                ;*        RKCS1   RKCS2   RKDS    RKER    RKASOF   RKMR1
                                ;*        T.CS1   T.CS2   T.DS    T.ER    T.ASOF   T.MR1
                                
001460  000000                  EM11N:  .WORD   0
001462  060223                          DH011
001464  060616                          DT010
001466  061106                          DF011
                                
                                ;*      ERROR ITEM 12
                                ;*      THIS ERROR IS IDENTICAL TO ITEM 11 EXCEPT THE SECOND LINE IS:
                                ;*      "NOT RESET AS A RESULT OF"
                                
001470  000000                  EM12N:  .WORD   0
001472  060252                          DH012
001474  060616                          DT010
001476  061106                          DF011
                                
                                ;*      ERROR ITEM 13
                                ;*      THIS ERROR IS IDENTICAL TO ITEM 11 EXCEPT THE SECOND LINE IS:
                                ;*      "SET AS A RESULT OF"
```

```
                                ;*      ERROR ITEM 14
                                ;*      THIS ERROR IS IDENTICAL TO ITEM 11 EXCEPT THE SECOND LINE IS:
                                ;*      'RESET AS A RESULT OF'
001510  000000                  EM14N:  .WORD   0
001512  060326                          DH014
001514  060616                          DT010
001516  061106                          DF011

                                ;*      ERROR ITEM 15
                                ;*      (HEADER WORD MISCOMPARE) OR (DATA MISCOMPARE)
                                ;*      TST NUM ERR PC  DRIVE
                                ;*      $TESTN  $ERRPC  DRVNUM
                                ;*        GOOD    BAD     WORD NUM
                                ;*        $REG10  $REG11  $REG12

001520  000000                  EM15N:  .WORD 0
001522  057264                          DH002A
001524  060666                          DT015
001526  061130                          DF015

                                ;*      ERROR ITEM 16
                                ;*      ADDITIONAL LINES OF GOOD, BAD, WORD NUM FOR ERROR 15

001530  000000                          0
001532  000000                          0
001534  060674                          DT015A
001536  061140                          DF016

                                .SBTTL   REGISTER STORAGE FOR TEST

001540  000000                  T.CS1:  .WORD   0
001542  000000                  T.WC:   .WORD   0
001544  000000                  T.BA:   .WORD   0
001546  000000                  T.DA:   .WORD   0
001550  000000                  T.CS2:  .WORD   0
001552  000000                  T.DS:   .WORD   0
001554  000000                  T.ER:   .WORD   0
001556  000000                  T.ASOF: .WORD   0
001560  000000                  T.DCYL: .WORD   0
001562  000000                  T.SPAR: .WORD   0
001564  000000                  T.DB:   .WORD   0
001566  000000                  T.MR1:  .WORD   0
001570  000000                  T.ECPS: .WORD   0
001572  000000                  T.ECPT: .WORD   0
001574  000000                  T.MR2:  .WORD   0
001576  000000                  T.MR3:  .WORD   0

                                .SBTTL  REGISTER SETUP STORAGE
001600  000100                  L.CS1:  .WORD   100             ;PRESET WITH INTERRUPT ENABLE
001602  000000                  L.WC:   .WORD   0
```

```
2658  001604  000000          L.BA:   .WORD   0
2659  001606                  L.DA:
2660  001606     000          L.DS:   .BYTE   0
2661  001607     000          L.DT:   .BYTE   0
2662  001610  000000          L.CS2:  .WORD   0
2663  001612  000000          L.ASOF: .WORD   0
2664  001614  000000          L.DCYL: .WORD   0
2665  001616  000000          L.MR1:  .WORD   0
2666                          .SBTTL  PROGRAM DEFINED VARIABLES
2667
2668  001620  000000          RKVEC:  .WORD   0               ;RK VECTOR
2669  001622  000000          RKPRI:  .WORD   0               ;RK PRIORITY
2670  001624  000000          SRTFLG: .WORD   0               ;START FLAG
2671                                                          ;  0 = 200
2672                                                          ;  1 = 214
2673                                                          ; -1 = 204
2674  001626  000000          DRVNUM: .WORD   0               ;DRIVE UNDER TEST
2675  001630  000000          DRVBIT: .WORD   0               ;WORD TO STORE BIT TO INDICATE DRIVE UNDER TEST
2676  001632  000024          ERRCNT: .WORD   ^D20            ;ERROR COUNTER TO LIMIT ERROR
2677                                                          ;ERRORS REPORTED IN PROGRAM
2678  001634  000024          ERRLMT: .WORD   ^D20            ;DATA COMPARE ERROR LIMIT
2679  001636  061270          BSF24P: .WORD   BS24            ;POINTER TO BAD SECTORS 24 SECTOR MODE
2680                                                          ;  (FACTORY)
2681  001640  061144          BSF26P: .WORD   BS26            ;POINTER TO BAD SECTORS 26 SECTOR MODE
2682                                                          ;  (FACTORY)
2683  001642  000000          BSS24P: .WORD   0               ;POINTER TO BAD SECTORS 24 SECT MODE
2684                                                          ; (SOFTWARE)
2685  001644  000000          BSS26P: .WORD   0               ;POINTER TO BAD SECTORS 26 SECTOR MODE
2686                                                          ;  (SOFTWARE)
2687  001646  000000          BS26CT: .WORD   0               ;COUNT OF BAD SECTORS 26 SECTOR MODE
2688  001650  000000          BS24CT: .WORD   0               ;COUNT OF BAD SECTORS 24 SECTOR MODE
2689  001652  000764          MILCNT: .WORD   ^D500           ;COUNT TO APPROXIMATE 1 MILL SEC
2690  001654  000017          TIMCNT: .WORD   ^D15            ;COUNTER FOR MYTIME ROUTINE
2691           001660                  .=1660
2692  001660  000000                  .WORD   0
2693  001662  000000          INTSET: .WORD   0               ;NON-ZERO IF RK06 INTERRUPT SINCE
2694                                                          ;LAST CLEARED
2695  001664  000000          OPTFLG: .WORD   0               ;OPTION FLAGS
2696
2697           000001                  DOTST=  BIT0            ;DRIVE 0 TO BE TESTED FLAG
2698           000002                  MEMSZB= BIT1            ;MEMORY SIZE REPORT FLAG
2699           000004                  MEMPYB= BIT2            ;MEMORY PARITY REPORT FLAG
2700           000010                  SRTINS= BIT3            ;START UP INSTRUCTIONS REPORTED FLAG
2701           000100                  PARPRE= BIT6            ;PARITY PRESENT FLAG
2702           000200                  BSERPT= BIT7            ;BSE HAS BEEN REPORTED
2703           000400                  FPFMT=  BIT8            ;FIRST PASS FORMAT SWITCH
2704           002000                  CP1170= BIT10           ;CP IS 11/70 FLAG
2705           004000                  DRVRPT= BIT11           ;DRIVE NUMBERS REPORTED FLAG
2706           100000                  LCLKPR= BIT15           ;LINE CLOCK PRESENT
2707
2708  001666  000000          DRVDRP: .WORD   0               ;LIST OF DRIVES DROPPED
2709  001670  000000          MEMPAR: .WORD   0               ;WORD OF PARITY FLAGS
2710  001672  000000          CSRPTR: .WORD   0               ;POINTER TO CSR TO USE FOR SETTING BAD
2711                                                          ;  PARITY
2712  001674  000000          LCLKTK: .WORD   0               ;LINE CLOCK TICK COUNTER
2713  001676  000000          REFMT:  .WORD   0               ;REFORMAT SWITCH FOR HALT
```

```
2714
2715                                    ;       THE FOLLOWING 4 VARIABLES ARE USED TO STORE PARAMETERS FOR
2716                                    ;       HEADER OR DATA COMPARE CONTINUATION PROCESS.
2717  001700  000000                    DESHLD: .WORD   0               ;DESTINATION HOLD
2718  001702  000000                    SRCHLD: .WORD   0               ;SOURCE HOLD
2719  001704  000000                    WRDNUM: .WORD   0               ;WORD NUMBER IN ERROR HOLD
2720  001706  000000                    WRDCNT: .WORD   0               ;WORDS LEFT IN COMPARE HOLD
2721  001710  177546                    KWLADD: .WORD   177546          ;KW11-L ADDRESS
2722  001712  000100                    KWLVEC: .WORD   100             ;KW11-L VECTOR
2723  001714  172100                    MEMBAS: .WORD   172100          ;MM11 ADDRESS
2724  001716  000114                    MMVECA: .WORD   114             ;MM11 VECTOR
2725
2726  001720  000000                    DTYPE:  0                       ;DRV TYP  0=RK06, 2000=RK07
2727  001722  000000                    TYPTBL: 0                       ;DRV 0       0=RK06, 2000=RK07
2728  001724  000000                            0                       ;DRV 1
2729  001726  000000                            0                       ;DRV 2
2730  001730  000000                            0                       ;DRV 3
2731  001732  000000                            0                       ;DRV 4
2732  001734  000000                            0                       ;DRV 5
2733  001736  000000                            0                       ;DRV 6
2734  001740  000000                            0                       ;DRV7
2735
2736
2737
2738
2739
2740                                    .SBTTL  PROGRAM SETUP
2741
2742  001742  012737  000002  001624    SETCLK: MOV     #2,SRTFLG       ;SET START FLAG FOR CLOCK ADJUST
2743  001750  000412                            BR      START1
2744
2745  001752  012737  000001  001624    PARM:   MOV     #1,SRTFLG       ;SET START FLAG FOR PARMETER START
2746  001760  000406                            BR      START1
2747
2748  001762  012737  177777  001624    RESTRT: MOV     #-1,SRTFLG      ;LOAD START FLAG FOR PARMETER START
2749  001770  000402                            BR      START1
2750
2751  001772  005037  001624            START:  CLR     SRTFLG          ;CLEAR START FLAG
2752  001776  000005                    START1: RESET                   ;RESET THE WHOLE SYSTEM
2753  002000  012706  001100                    MOV     #STACK,SP       ;INITIALIZE STACK POINTER
2754  002004  012746  000340                    MOV     #PR7,-(SP)      ;LOAD STACK TO LOCK OUT ALL INTERRUPTS
2755  002010  012746  002016                    MOV     #1$,-(SP)       ;LOAD START OF PROGRAM
2756  002014  000002                            RTI                     ;LOAD PSW
2757
2758  002016  004737  045220            1$:     JSR     PC,$TKINT       ;INITIALIZE KEYBOARD
2759  002022  005037  001676                    CLR     REFMT           ;CLEAR REFORMAT SWITCH
2760                                    .SBTTL  INITIALIZE THE COMMON TAGS
2761                                    ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
2762  002026  012706  001100                    MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
2763  002032  005026                            CLR     (R6)+           ;;CLEAR MEMORY LOCATION
2764  002034  022706  001140                    CMP     #SWR,R6 ;;DONE?
2765  002040  001374                            BNE     .-6             ;;LOOP BACK IF NO
2766  002042  012706  001100                    MOV     #STACK,SP       ;;SETUP THE STACK POINTER
2767                                    ;;INITIALIZE A FEW VECTORS
2768  002046  012737  032576  000020            MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
2769  002054  012737  000340  000022            MOV     #340,@#IOTVEC+2 ;;LEVEL 7
```

```
2770  002062  012737  033614  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
2771  002070  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
2772  002076  012737  047076  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
2773  002104  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
2774  002112  012737  046720  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
2775  002120  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
2776  002126  013737  032026  032020          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
2777  002134  005037  001262                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
2778  002140  005037  001264                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
2779  002144  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
2780  002152  012737  002152  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
2781  002160  012737  002160  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
2782                                  ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
2783                                  ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
2784  002166  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
2785  002172  012737  002226  000004          MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
2786  002200  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
2787  002206  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
2788  002214  022777  177777  176716          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
2789  002222  001012                          BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
2790                                                                  ;;AND  THE HARDWARE SWR IS NOT  -1
2791  002224  000403                          BR      65$             ;;BRANCH IF NO TIMEOUT
2792  002226  012716  002234          64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
2793  002232  000002                          RTI
2794  002234  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
2795  002242  012737  000174  001142          MOV     #DISPREG,DISPLAY
2796  002250  012637  000004          66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
2797
2798  002254  005037  001304                  CLR     $PASS           ;;CLEAR PASS COUNT
2799  002260  132737  000200  001317          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
2800  002266  001403                          BEQ     67$             ;;YES,USE NON-APT SWITCH
2801  002270  012737  001320  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
2802  002276                          67$:
2803                                  .SBTTL  TYPE PROGRAM NAME
2804                                  ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
2805  002276  005227  177777                  INC     #-1             ;;FIRST TIME?
2806  002302  001046                          BNE     68$             ;;BRANCH IF NO
2807  002304  022737  032162  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
2808  002312  001442                          BEQ     68$             ;;BRANCH IF YES
2809  002314  104401  002362                  TYPE    ,69$            ;;TYPE ASCIZ STRING
2810                                  .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
2811  002320  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
2812  002324  001012                          BNE     70$             ;;BRANCH IF YES
2813  002326  123727  001316  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
2814  002334  001406                          BEQ     70$             ;;BRANCH IF YES
2815  002336  023727  001140  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
2816  002344  001005                          BNE     71$             ;;BRANCH IF NO
2817  002346  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
2818  002350  000403                          BR      71$
2819  002352  112737  000001  001134  70$:    MOVB    #1,$AJTOB       ;;SET AUTO-MODE INDICATOR
2820  002360                          71$:
2821  002360  000417                          BR      68$             ;;GET OVER THE ASCIZ
2822                                  ;;69$:  .ASCIZ  <CRLF>*CZR6KG0 RK6 FCTNL CTRL DIAG*<CRLF>
2823  002420                          68$:
2824  002420  132737  000200  001317          BITB    #BIT7,$ENVM     ;TEST IF DO NOT SIZE
2825  002426  001061                          BNE     3$              ;YES - SKIP
```

```
2826  002430  004737  032234                  JSR     PC,$SIZE
2827  002434  023727  032574  000740          CMP     $LSTBK,#740     ;MAKE SURE MEMORY IS SUFFICIENT
2828  002442  103007                          BHIS    2$              ;YES - SKIP
2829  002444  104401  051165                  TYPE    ,OPR005         ;MESSAGE (NOT ENOUGH MEMORY)
2830  002450  012737  000001  032020          MOV     #1,$EOPCT       ;FORCE END OF PROGRAM
2831  002456  000137  031772                  JMP     $EOP
2832  002462                          2$:
2833  002462  012700  070414                  MOV     #IBUFF,R0       ;SET UP TO CLEAR 2000
2834  002466  012701  002000                  MOV     #2000,R1        ;WORDS OF BUFFER SPACE
2835  002472  005020                  30$:    CLR     (R0)+           ;LOOP -
2836  002474  005301                          DEC     R1              ;UNTIL -
2837  002476  001375                          BNE     30$             ;DONE
2838  002500  122737  000013  000041          CMPB    #13,@#41        ;LOAD FROM XXDP
2839  002506  001003                          BNE     99$             ;BRANCH IF NOT
2840  002510  104401  051236                  TYPE    ,OPR007
2841  002514  000000                          HALT
2842  002516                          99$:
2843  002516  013700  032574                  MOV     $LSTBK,R0       ;GET LAST BANK
2844  002522  012701  000006                  MOV     #6,R1           ;SET SHIFT COUNT
2845  002526  013703  032572                  MOV     $LSTAD,R3       ;GET LAST ADDRESS
2846  002532  005004                          CLR     R4              ;CLEAR R4 FOR OVERFLOW
2847  002534  005737  032316                  TST     $KT11           ;MEM MANAGE PRESENT?
2848  002540  100005                          BPL     23$             ;NO - SKIP
2849  002542  006100                  22$:    ROL     R0              ;SHIFT BANK LEFT
2850  002544  006104                          ROL     R4              ;ADD IN CARRY
2851  002546  005301                          DEC     R1              ;DECREMENT COUNT
2852  002550  001374                          BNE     22$             ;LOOP IF NOT ZERO
2853  002552  050003                          BIS     R0,R3           ;SET BANK BITS IN LAST ADDRESS
2854  002554  112737  000001  001327  23$:    MOVB    #1,$MTYP1       ;FORCE MEMORY TYPE TO 1
2855  002562  110437  001326                  MOVB    R4,$MAMS1       ;STORE UPPER MEMORY ADDRESS
2856  002566  010337  001330                  MOV     R3,$MADR1       ;STORE LOWER ADDRESS
2857  002572  032737  000010  001664  3$:     BIT     #SRTINS,OPTFLG  ;TEST IF ALREDY REPORTED
2858  002600  001005                          BNE     24$             ;YES - SKIP
2859  002602  104401  051766                  TYPE    ,OPR016         ;TYPE STARTUP INSTRUCTIONS
2860  002606  052737  000010  001664          BIS     #SRTINS,OPTFLG  ;SET REPORTED FLAG
2861  002614                          24$:
2862  002614  022737  000001  001624          CMP     #1,SRTFLG       ;CHECK IF PARAMETER START
2863  002622  001122                          BNE     15$             ;NO, START TESTING
2864  002624  104401  051056          5$:     TYPE    ,OPR001         ;TYPE "RK611 BUS ADDRESS (  ) -"
2865  002630  013746  001352                  MOV     $BASE,-(SP)     ;;SAVE $BASE FOR TYPEOUT
2866  002634  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2867  002636  104401  051105                  TYPE    ,OPR002
2868  002642  104412                          RDOCT                   ;GET VALUE
2869  002644  012637  001222                  MOV     (SP)+,$TMP0
2870  002650  001407                          BEQ     7$              ;CHECK IF <CR>
2871  002652  022737  160000  001222          CMP     #160000,$TMP0   ;CHECK IF IN I/O PAGE
2872  002660  101361                          BHI     5$
2873  002662  013737  001222  001352          MOV     $TMP0,$BASE     ;LOAD NEW BUS ADDRESS
2874  002670  104401  051113          7$:     TYPE    ,OPR003         ;TYPE "RK611 VECTOR ADDRESS (  ) ="
2875  002674  013746  001346                  MOV     $VECT1,-(SP)    ;GET $VECT1 FOR TYPOUT
2876  002700  042716  160000                  BIC     #160000,(SP)    ;CLEAR PRIORITY BITS
2877  002704  104402                          TYPOC
2878  002706  104401  051105                  TYPE    ,OPR002
2879  002712  104412                          RDOCT                   ;GET VALUE
2880  002714  012637  001222                  MOV     (SP)+,$TMP0
2881  002720  001412                          BEQ     10$             ;CHECK IF <CR>
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2882   002722  022737  001000  001222          CMP     #1000,$TMP0
2883   002730  101757                          BLOS    7$                  ;CHECK IF LEGAL
2884   002732  042737  017777  001346          BIC     #17777,$VECT1       ;CLEAR OLD VECTOR
2885   002740  053737  001222  001346          BIS     $TMP0,$VECT1        ;LOAD NEW VECTOR ADDRESS
2886   002746  104401  051143          10$:    TYPE    ,OPR004             ;TYPE 'RK611 PRIORITY (  ) ='
2887   002752  005046                          CLR     -(SP)
2888   002754  113716  001347                  MOVB    $VECT1+1,(SP)
2889   002760  006216                          ASR     (SP)                ;SHIFT 5 BITS RIGHT
2890   002762  006216                          ASR     (SP)
2891   002764  006216                          ASR     (SP)
2892   002766  006216                          ASR     (SP)
2893   002770  006216                          ASR     (SP)
2894   002772  104402                          TYPOC
2895   002774  104401  051105                  TYPE    ,OPR002
2896   003000  104412                          RDOCT                       ;GET VALUE
2897   003002  012637  001222                  MOV     (SP)+,$TMP0
2898   003006  001430                          BEQ     15$                 ;CHECK IF <CR>
2899   003010  022737  000007  001222          CMP     #7,$TMP0            ;CHECK IF LEGAL
2900   003016  103753                          BLO     10$
2901   003020  022737  000004  001222          CMP     #4,$TMP0
2902   003026  101347                          BHI     10$
2903   003030  006337  001222                  ASL     $TMP0               ;SHIFT 5 BITS LEFT
2904   003034  006337  001222                  ASL     $TMP0
2905   003040  006337  001222                  ASL     $TMP0
2906   003044  006337  001222                  ASL     $TMP0
2907   003050  006337  001222                  ASL     $TMP0
2908   003054  042737  160000  001347          BIC     #160000,$VECT1+1    ;CLEAR OLD PRIORITY
2909   003062  053737  001222  001347          BIS     $TMP0,$VECT1+1      ;LOAD RK611 PRIORITY
2910   003070  005037  001304          15$:    CLR     $PASS               ;SET PASS COUNT TO ZERO
2911   003074  005037  001666                  CLR     DRVDRP              ;CLEAR DROPPED DRIVES LIST
2912   003100  042737  004000  001664          BIC     #DRVRPT,OPTFLG      ;CLEAR DRIVE #'S REPORTED FLAG
2913   003106  004737  034522                  JSR     PC,OPTTST           ;SETUP PARITY CHECK & CLOCK
2914   003112  013700  001346                  MOV     $VECT1,R0           ;STORE VECTOR FOR USE
2915   003116  042700  160000                  BIC     #160000,R0          ;CLEAR PRIORITY BITS
2916   003122  010037  001620                  MOV     R0,RKVEC
2917   003126  012710  034442                  MOV     #INTHLR,(R0)        ;SETUP INTERRUPT ADDRESS
2918   003132  113737  001347  001622          MOVB    $VECT1+1,RKPRI      ;STORE PRIORITY FOR USE
2919   003140  013702  001352                  MOV     $BASE,R2            ;SET BASE ADDRESS
2920   003144  005037  001264                  CLR     $ESCAPE             ;CLEAR ESCAPE
2921   003150  012746  000000          NEWPAS: MOV     #PR0,-(SP)          ;SET PRIORITY
2922   003154  012746  003162                  MOV     #16$,-(SP)
2923   003160  000002                          RTI
2924   003162                          16$:
2925
2926                                  .SBTTL  **BASIC INTERFACE AND OPTION TESTS
2927                                  ;;*****************************************************************
2928                                  ;*TEST 1        RK611 BASE ADDRESS TEST
2929                                  ;*      CHECK THAT READING THE RK611 BASE ADDRESS (RKCS1) DOES NOT
2930                                  ;*      CAUSE A NON-EXISTANT MEMORY TRAP. IF A TRAP OCCURS
2931                                  ;*      THE PROGRAM IS HALTED.
2932
2933                                  ;;*****************************************************************
2934   003162  000004                  TST1:   SCOPE
2935   003164  012737  000100  001262          MOV     #100,$TIMES         ;;DO 100 ITERATIONS
2936   003172  012706  001100                  MOV     #STACK,SP           ;CLEAN OFF STACK
2937   003176  012701  000004                  MOV     #4,R1               ;SET POINTER TO VECTOR
```

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2938  003202  012146                          MOV     (R1)+,-(SP)     ;STORE OLD VECTOR CONTENTS
2939  003204  011146                          MOV     (R1),-(SP)
2940  003206  012701  000004                  MOV     #4,R1           ;RESET POINTER
2941  003212  012721  034434                  MOV     #NEXINT,(R1)+   ;SET VECTOR TO NEM TEST HANDLER
2942  003216  012711  000340                  MOV     #PR7,(R1)       ;SET PRIORITY
2943  003222  013702  001352                  MOV     $BASE,R2        ;SET POINTER TO RK611 BASE ADDRESS
2944  003226  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT COUNTER
2945  003232  012762  000000  000000          MOV     #0,RKCS1(R2)    ;WRITE CS1 TO SEE IN NEM WILL SET
2946  003240  000240                          NOP
2947  003242  000240                          NOP
2948  003244  000240                          NOP
2949  003246  005737  001662                  TST     INTSET          ;TEST IF COUNTER IS 0
2950  003252  001406                          BEQ     1$              ;YES - SKIP ERROR REPORT
2951  003254  012737  053405  001360          MOV     #EM1,EM1N       ;MESSAGE (NON-EXISTANT MEMORY TRAP ERR
2952  003262  104001                          ERROR   1
2953  003264  000137  043724                  JMP     CTRHLT          ;GO TO CONTROLLED HALT
2954  003270  012701  000006          1$:     MOV     #6,R1           ;RESTORE VECTOR
2955  003274  012611                          MOV     (SP)+,(R1)
2956  003276  012641                          MOV     (SP)+,-(R1)
2957
2958                                  ;;*******************************************************************
2959                                  ;*TEST 2        INTERRUPT VECTOR ADDRESS TEST
2960                                  ;*      CHECK THAT THE INTERRUPT VECTOR FOR THE RK611 IS SET TO THE
2961                                  ;*      EXPECTED ADDRESS. IF INTERRUPT VECTOR IS IN ERROR,
2962                                  ;*      THE PROGRAM IS HALTED.
2963
2964                                  ;;*******************************************************************
2965  003300  000004                  TST2:   SCOPE
2966  003302  012737  000100  001262          MOV     #100,$TIMES     ;;DO 100 ITERATIONS
2967  003310  012762  005000  000010          MOV     #CLR,RKCS2(R2) ;CLEAR SUBSYSTEM, SPECIFICALLY TO
2968                                                                  ;CLEAR ANY OLD INTERRUPTS
2969  003316  005037  001662          CLR     INTSET          ;CLEAR INTERRUPT COUNTER
2970  003322  012762  000300  000000          MOV     #RDYIE,RKCS1(R2)        ;WRITE CS1 TO FORCE INTERRUPT
2971  003330  000240                          NOP
2972  003332  000240                          NOP
2973  003334  000240                          NOP
2974  003336  005737  001662                  TST     INTSET          ;TEST IF INTERRUPT OCCURRED
2975  003342  001011                          BNE     3$              ;YES - SKIP ERROR REPORT
2976  003344  105737  001103                  TSTB    $ERFLG          ;TEST IF ERFLG ALREADY SET. IF SO THE
2977                                                                  ;INTERRUPT WENT TO THE WRONG VECTOR
2978                                                                  ;AND MESSAGE HAS BEEN REPORTED.
2979  003350  001004                          BNE     2$              ;THEREFORE - EXIT
2980  003352  012737  053405  001360          MOV     #EM1,EM1N       ;MESSAGE (NO INTERRUPT)
2981  003360  104001                          ERROR   1
2982  003362  000137  043724          2$:     JMP     CTRHLT          ;GO TO CONTROLLED HALT
2983  003366                          3$:
2984
2985                                  .SBTTL  **STATUS VALID TESTS
2986
2987
2988                                  ;;*******************************************************************
2989                                  ;*TEST 3        SELECT ALL DRIVES
2990                                  ;*
2991                                  ;*      IF NOT RUNNING IN APT AUTOMATIC ENVIRONMENT,
2992                                  ;*      DETERMINE WHAT DRIVES ARE ON-LINE BY
2993                                  ;*      SELECTING ALL DRIVES.  IF NON-EXISTENT DRIVE REPORTED
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                        ;*      MAKE SURE STATUS VALID IS RESET.  IF DRIVE
                        ;*      PRESENT MAKE SURE NO ERROR EXISTS, DRIVE
                        ;*      IS CYCLED UP, AND STATUS VALID SET, AND DSC RESET.
                        ;*
                        ;*      IF RUNNING IN APT AUTOMATIC ENVIRONMENT, THE DRIVES
                        ;*      IDENTIFIED IN ETABLE ARE TESTED FOR NO ERROR, DRIVE
                        ;*      CYCLED UP, AND STATUS VALID SET.
                        ;*
                        ;*      IF LOCATION 41 INDICATES THE XXDP MEDIA IS ON
                        ;*      THE RK06, DRIVE 0 WILL ONLY BE TESTED IF THE PARAM
                        ;*      START (214) WAS USED. IF THE AUTOMATIC START (200)
                        ;*      IS USED, DRIVE 0 IS NOT TESTED. THE RESTART (204)
                        ;*      WILL RETAIN THE TEST STATUS OF DRIVE 0.
                        ;*
                        ;*      IF THE PARAM START IS USED, THE OPERATOR MUST
                        ;*      EITHER PLACE DRIVE 0 OFF LINE IF IT IS NOT TO BE TESTED
                        ;*      OR UNLOADED AND A SCRATCH MEDIA MOUNTED IF IT IS TO
                        ;*      BE TESTED. THE PROGRAM WILL MONITOR OFF LINE AND VOLUME
                        ;*      VALID TO DETERMINE THE TEST STATUS OF DRIVE 0.
                        ;*
                        ;*      ALL DRIVES TO BE TESTED MUST BE ON-LINE, CYCLED UP, AND
                        ;*      WRITE LOCK RESET. ADDRESSES OF DRIVES THAT ARE NON-
                        ;*      EXISTANT EITHER BECAUSE THE DRIVE DOES NOT EXIST OR IS OFF-
                        ;*      LINE ARE USED TO VERIFY NON-EXISTANT DRIVE ERROR DETECTION.
                        ;*      DRIVES THAT ARE ON-LINE BUT NOT CYCLED UP OR ARE WRITE
                        ;*      LOCKED ARE NOT TESTED.
                        ;*
                        ;*      AT COMPLETION OF THE TEST A MESSAGE WILL BE GIVEN TO
                        ;*       IDENTIFY THE DRIVES TO BE USED IN TESTING.
                        ;*
                        ;*      NOTE: THIS TEST MUST BE RUN AT LEAST ONCE BEFORE
                        ;*              ANY OTHER TEST THAT FOLLOWS.
                        ;*              THE DETERMINATION OF WHETHER EACH DRIVE IS AN
                        ;*              RK06 OR AN RK07 IS MADE IN THIS TEST, AND A
                        ;*              TABLE IS MADE ACCORDINGLY.
                        ;*************************************************************
003366  000004         TST3:  SCOPE
003370  012737  000062  001262        MOV    #50.,$TIMES      ;;DO 50. ITERATIONS
003376  005037  001720              CLR    DTYPE            ;ASSUME RK06
003402  104416                      TSSINIT                 ;CALL SUBSYSTEM CLEAR AND TEST
003404  104003                      ERROR  3

003406  012746  000000              MOV    #PR0,-(SP)       ;SET PROCESSOR PRIORITY TO ALLOW
003412  012746  003420              MOV    #1$,-(SP)        ;RK611 INTERRUPTS
003416  000002                      RTI

003420  013701  001620         1$:  MOV    RKVEC,R1         ;GET VECTOR
003424  012721  034442              MOV    #INTHLR,(R1)+ ;LOAD INTERRUPT VECTOR
003430  012711  000340              MOV    #PR7,(R1)
003434  012703  001354              MOV    #$DEVM,R3        ;GET ADDRESS OF DEVICE MAP
003440  132737  000200  001317        BITB   #BIT7,$ENVM      ;TEST IF SHOULD SIZE
003446  001007                      BNE    50$              ;NO - SKIP DRIVE SIZING.
003450  005737  001304              TST    $PASS            ;TEST IF FIRST PASS
003454  001004                      BNE    50$              ;NO - SKIP TO DRIVE SELECT TEST
003456  032737  004000  001664        BIT    #DRVRPT,OPTFLG   ;TEST IF DRIVE #'S REPORTED
003464  001402                      BEQ    92$              ;NO - GOTO SIZING
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3050  003466  000137  004142          50$:    JMP     11$
3051  003472  005013                  92$:    CLR     (R3)            ;CLEAR DEVICE MAP
3052  003474  123727  000041  000013          CMPB    @#41,#13        ;TEST IF RK06 IS LOAD DEVICE
3053  003502  001111                          BNE     77$             ;NO - SKIP
3054  003504  022737  000001  001624          CMP     #1,SRTFLG       ;WAS START AT PARAM?
3055  003512  001411                          BEQ     2$              ;YES - SKIP
3056  003514  104401  051236                  TYPE    ,OPR007         ;NO TEST OF DRIVE 0
3057  003520  052737  000001  001666          BIS     #BIT0,DRVDRP    ;SET DRIVE 0 DROPPED
3058  003526  042737  000001  001664          BIC     #DOTST,OPTFLG   ;DR FLAG - NO TEST DRIVE 0
3059  003534  000477                          BR      7$
3060  003536  104401  051236          2$:     TYPE    ,OPR006         ;MESSAGE - SWAP PACK ON DRIVE OFF LINE.
3061  003542  005037  001610                  CLR     L.CS2           ;SET TO DRIVE 0
3062  003546  005037  001232                  CLR     $TMP4           ;CLEAR FOR USE AS A SWITCH
3063  003552  012737  000101  001600  3$:     MOV     #SELDRV,L.CS1   ;LOAD FOR SELECT
3064  003560  012737  003646  001264          MOV     #4$,$ESCAPE     ;SET UP ESCAPE IN CASE OF ERR
3065  003566  104417                          TLOADRK                 ;LOAD RK & DO SELECT
3066
3067  003570  104423                          TWAT16                  ;WAIT 16MS FOR COMPLETION
3068  003572  104002                          ERROR   2               ;NOT DONE ON TIME
3069
3070  003574  104420                          TGETRK                  ;GET RK REGISTER
3071  003576  032737  100000  001540          BIT     #CERR,T.CS1     ;TEST IF CERR
3072  003604  001431                          BEQ     5$              ;NO - SKIP
3073  003606  032737  010000  001550          BIT     #NED,T.CS2      ;TEST IF NED
3074  003614  001014                          BNE     4$              ;YES - SKIP
3075  003616  032737  000040  001554          BIT     #DTYE,T.ER      ;ELSE SEE IF DRIVE TYPE ERROR
3076  003624  001406                          BEQ     26$             ;BR IF NO
3077
3078  003626  012737  002000  001720          MOV     #CDT,DTYPE      ;ELSE SETUP FOR RK07
3079
3080  003634  104416                          TSSINIT                 ;INIT SUBSYS
3081  003636  104003                          ERROR   3               ;NOT SUCCESSFUL
3082  003640  000744                          BR      3$              ;AND TRY AGAIN
3083
3084  003642  104421          26$:            TCHKOP                  ;CHECK THE OPERATION AND REPORT THE ERROR
3085  003644  104004                          ERROR   4 ;OR5,6,7      ;AFTER THE ERROR IS REPORTED THE TEST
3086                                                                  ;IS ABORTED
3087  003646  104401  051236          4$:     TYPE    ,OPR007         ;TYPE NO TEST OF DRIVE 0
3088  003652  042737  000001  001664          BIC     #DOTST,OPTFLG   ;DR FLAG - NO TEST OF DRIVE 0
3089  003660  052737  000001  001666          BIS     #BIT0,DRVDRP    ;SET DRV 0 AS DROPPED
3090  003666  000422                          BR      7$              ;SKIP OVER WAIT FOR PACK MOUNT
3091  003670  005737  001232          5$:     TST     $TMP4           ;TEST FLAG DRIVE READY HAS RESET
3092  003674  001010                          BNE     6$              ;YES - SKIP TO CHECK IF IT IS SET AGAIN
3093  003676  032737  000200  001552          BIT     #DRDY,T.DS      ;ELSE CHECK READY
3094  003704  001322                          BNE     3$              ;STILL SET - GET STATUS AGAIN
3095  003706  012737  177777  001232          MOV     #-1,$TMP4       ;ELSE SET FLAG TO INDICATE READY WENT LOW
3096  003714  000716                          BR      3$              ;GO GET STATUS AGAIN
3097
3098  003716  032737  000200  001552  6$:     BIT     #DRDY,T.DS      ;TEST IF READY SET AGAIN
3099  003724  001712                          BEQ     3$              ;NO - GO GET STATUS AGAIN
3100  003726  052737  000001  001664  77$:    BIS     #DOTST,OPTFLG   ;ELSE SET DRV 0 TEST FLAG.
3101
3102  003734  012737  004042  001264  7$:     MOV     #35$,$ESCAPE    ;SET UP ESCAPE IN CASE OF ERR
3103  003742  005000                          CLR     R0              ;CLEAR FOR DRIVE NUMBER COUNTER
3104  003744  012701  000001                  MOV     #1,R1           ;SET BIT 0 AS DRIVE SELECTOR
3105  003750  005037  001720                  CLR     DTYPE           ;INIT TO RK06
```

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3106
3107  003754  032737  000001  001664          BIT     #DOTS*,OPTFLG   ;TEST DRIVE 0?
3108  003762  001440                          BEQ     9$              ;NO - SKIP
3109
3110  003764  104416                  8$:     TSSINIT                 ;INITIALZE SUBSYSTEM
3111  003766  104003                          ERROR   3               ;ERROR IF NOT SUCCESSFUL
3112
3113  003770  010037  001610                  MOV     R0,L.CS2        ;LOAD DRIVE NUMBER
3114  003774  012737  000101  001600          MOV     #SELDRV,L.CS1   ;LOAD DRIVE SELECT
3115  004002  104417                          TLOADRK                 ;LOAD RK REGS
3116
3117  004004  104423                          TWAIT6                  ;WAIT FOR INTERRUPT
3118  004006  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3119
3120  004010  104420                          TGETRK                  ;GET RK REGS
3121  004012  032737  100000  001540          BIT     #CERR,T.CS1     ;ERROR?
3122  004020  001031                          BNE     10$             ;YES - SKIP
3123  004022  032737  000200  001552          BIT     #DRDY,T.DS      ;ELSE TEST IF DRIVE READY
3124  004030  001404                          BEQ     35$             ;NO - SKIP
3125  004032  032737  004000  001552          BIT     #WRL,T.DS       ;ELSE TEST IF WRITE LOCKED
3126  004040  001403                          BEQ     36$             ;NO - SKIP
3127  004042  050137  001666          35$:    BIS     R1,DRVDRP       ;SET THIS BIT AS DROPPED DRIVE
3128  004046  000406                          BR      9$
3129  004050                          36$:
3130  004050  050113                          BIS     R1,(R3)         ;SET BIT - DRIVE PRESET IN MAP
3131  004052  006300                          ASL     R0
3132  004054  013760  001720  001722          MOV     DTYPE,TYPTBL(R0)        ;SET TABLE WITH DRIVE TYPE INFO
3133  004062  006200                          ASR     R0
3134
3135  004064  005200                  9$:     INC     R0              ;BUMPS TO NEXT DRIVE
3136  004066  006301                          ASL     R1              ;SHIFT DRIVE SELECTOR TO NEXT DRIVE.
3137  004070  032701  000400                  BIT     #BIT8,R1        ;WAS LAST DRIVE DONE?
3138  004074  001022                          BNE     11$             ;BR IF YES
3139  004076  005037  001720                  CLR     DTYPE           ;ELSE INIT FOR RK06 TO TEST NEXT DRV
3140  004102  000730                          BR      8$
3141
3142  004104  032737  010000  001550  10$:    BIT     #NED,T.CS2      ;WAS CERR DUE TO NED?
3143  004112  001364                          BNE     9$              ;YES - BUMP TO NEXT DRIVE
3144  004114  032737  000040  001554          BIT     #DTYE,T.ER      ;ELSE SEE IF DRIVE TYPE ERR
3145  004122  001404                          BEQ     24$             ;BR IF NO
3146
3147  004124  012737  002000  001720          MOV     #CDT,DTYPE      ;ELSE SET UP FOR RK07
3148  004132  000714                          BR      8$              ;AND TRY AGAIN
3149
3150  004134  104427                  24$:    TCHKOP                  ;ELSE REPORT THE ERRORS
3151  004136  104004                          ERROR   4 ;OR5,6,7
3152  004140  000000                  10$:    .WORD   0
3153  004142  032737  004000  001664  11$:    BIT     #DRVRPT,OPTFLG  ;TEST IF SHOULD REPORT
3154  004150  001037                          BNE     16$             ;NO - SKIP
3155
3156  004152  005713                          TST     (R3)            ;ANY DRIVE AVAILABLE?
3157  004154  001004                          BNE     12$             ;BR IF NOT ZERO
3158  004156  104401  051317                  TYPE    ,OPR008         ;ELSE REPORT NO DRIVES AVAILABLE
3159  004162  000137  043724                  JMP     CTRHLT          ;GO TO CONTROLLED HALT
3160
3161  004166  012701  000200          12$:    MOV     #BIT7,R1        ;SET DRIVE SELECTOR FOR DRIVE 7
```

```
3162  004172  012700  000007          MOV     #7,R0           ;SET DRIVE NUMBER TO 7
3163  004176  104401  051402          TYPE    ,OPR009         ;TYPE PREFIX TO DRIVE TEST MESSAGE
3164
3165  004202  030113          13$:    BIT     R1,(R3)         ;TEST IF THIS DRIVE TO BE TESTED
3166  004204  001007          BNE     15$             ;YES - SKIP
3167
3168  004206  005300          14$:    DEC     R0              ;ELSE DECREMENT DRIVE NUMBER
3169  004210  006201          ASR     R1              ;SHIFT BIT SELECTOR TO NEXT DRIVE DOWN
3170  004212  001373          BNE     13$             ;IF NOT SHIFTED OUT - LOOP
3171  004214  052737  004000  001664  BIS     #DRVRPT,OPTFLG  ;SET DRIVE #'S REPORTED FLAG
3172  004222  000412          BR      16$             ;ELSE GO TO STATUS VALID TEST
3173
3174  004224  010037  004140  15$:    MOV     R0,101$         ;PUT DRIVE NUMBER IN TYPE LOCATION
3175  004230  052737  000060  004140  BIS     #BIT4.BIT5,101$ ;MAKE IT ASCIZ
3176  004236  104401          TYPE                    ;TYPE IT
3177  004240  004140          101$
3178  004242  104401  051053          TYPE    ,SPACE2         ;TYPE SOME SPACES
3179  004246  000757          BR      14$             ;LOOP
3180
3181  004250  005000          16$:    CLR     R0              ;CLEAR DRIVE NUMBER COUNTER
3182  004252  012701  000001          MOV     #1,R1           ;SET DRIVE SELECTOR TO DRIVE 0
3183  004256  012737  177777  001240  MOV     #-1,$TMP7       ;SET $TMP7 NEGATIVE
3184  004264  012737  177777  001630  MOV     #-1,DRVBIT      ;SET DRIVE SELECT BIT NEGATIVE
3185  004272  012737  004400  001264  MOV     #18$,$ESCAPE    ;SET ESCAPE IN CASE OF ERR
3186  004300  030137  001666          BIT     R1,DRVDRP       ;HAS DRIVE 0 BEEN DROPPED?
3187  004304  001035          BNE     18$             ;YES - SKIP TO DRIVE INC.
3188
3189  004306  104416          17$:    TSSINIT                 ;CLEAR SUBSYSTEM
3190  004310  104003          ERROR   3               ;ERROR FOR BAD CLEAR
3191
3192  004312  010037  001610          MOV     R0,L.CS2        ;SET DRIVE SELECT
3193  004316  010037  001626          MOV     R0,DRVNUM       ;SET DRIVE NUMBER
3194  004322  004737  036134          JSR     PC,GTYPO        ;GET DRV TYPE
3195  004326  012737  000101  001600  MOV     #SELDRV,L.CS1   ;SET FOR DRIVE SELECT
3196
3197  004334  104417          TLOADRK                 ;LOAD RK REGS
3198  004336  104423          TWAT16                  ;WAIT FOR INTERRUPT
3199  004340  104002          ERROR   2               ;ERROR TO SLOW/NOT COMPLETE
3200  004342  030113          BIT     R1,(R3)         ;WAS THAT DRIVE AVAILABLE
3201  004344  001026          BNE     19$             ;YES - SKIP
3202
3203  004346  104422          TCHKWE                  ;CHECK THAT ERROR OCCURRED
3204  004350  000000          .WORD   0               ;NONE OF GROUP 1
3205  004352  000000          .WORD   0               ;NONE OF GROUP 2
3206  004354  000001          .WORD   1               ;NED IN GROUP 3
3207  004356  104004          ERROR   4 ;OR5,6,7      ;ERROR IF NO ERROR OR WRONG ERROR
3208
3209  004360  032737  100000  001552  BIT     #SVAL,T.DS      ;DID STATUS VALID RESET?
3210  004366  001404          BEQ     18$             ;YES - SKIP
3211  004370  012737  055527  001400  MOV     #EM47,EM3N      ;ELSE MESSAGE (SVAL NOT RESET WITH NED)
3212  004376  104003          ERROR   3
3213  004400  005200          18$:    INC     R0              ;BUMP TO NEXT DRIVE
3214  004402  006301          ASL     R1              ;SHIFT DRIVE SELECT BIT
3215  004404  032701  000400          BIT     #BIT8,R1        ;ALL DRIVES CHECKED
3216  004410  001063          BNE     21$             ;YES - EXIT
3217  004412  030137  001666          BIT     R1,DRVDRP       ;TEST IF DRIVE HAS BEEN DROPPED
```

```
3218  004416  001370                    BNE     18$             ;YES - GET NEXT DRIVF
3219  004420  000732                    BR      17$             ;ELSE CHECK THIS DRIVE
3220  004422  104421            19$:    TCHKOP                  ;CHECK NO ERRORS SET
3221  004424  104004                    ERROR   4 ;OR5,6,7      ;REPORT ALL ERRORS
3222
3223  004426  032737  100000  001552    BIT     #SVAL,T.DS      ;CHECK SVAL SET
3224  004434  001004                    BNE     20$             ;YES - SKIP
3225  004436  012737  055610  001400    MOV     #EM48,EM3N      ;MESSAGE (NO SVAL FROM EXISTANT DR)
3226  004444  104003                    ERROR   3
3227
3228  004446  012737  000103  001600  20$:    MOV     #PACK,L.CS1     ;ELSE SET TO DO PACK ACK
3229  004454  104417                    TLOADRK                 ;LOAD RK
3230
3231  004456  104423                    TWAT16                  ;WAIT FOR INTERRUPT
3232  004460  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3233
3234  004462  104421                    TCHKOP                  ;CHECK FOR ANY ERRORS
3235  004464  104004                    ERROR   4 ;OR5,6,7      ;YES - REPORT & ABORT TEST
3236
3237  004466  032737  000100  001552    BIT     #VV,T.DS        ;DID VV SET
3238  004474  001005                    BNE     22$             ;YES - SKIP
3239  004476  012737  055472  001400    MOV     #EM46,EM3N      ;MESSAGE (VV DID NOT SET/
3240  004504  104003                    ERROR   3
3241  004506  000734                    BR      18$
3242
3243  004510  032737  040000  001552  22$:    BIT     #DSC,T.DS       ;TEST IF DSC RESET
3244  004516  001410                    BEQ     23$             ;YES - SKIP
3245  004520  012737  056604  001470    MOV     #EMDSC,EM12N
3246  004526  012737  057044  061112    MOV     #EMSCLR,DF011A
3247  004534  104003                    ERROR   3               ;'DSC NOT RESET RESULT OF SUBSYS CLEAR''
3248  004536  000720                    BR      18$
3249
3250  004540  005737  001630          23$:    TST     DRVBIT          ;TEST IF DRVBIT IS NEGATIVE
3251  004544  100315                    BPL     18$             ;NO - SKIP
3252  004546  010137  001630            MOV     R1,DRVBIT       ;STORE DRIVE SELECT BIT
3253  004552  010037  001240            MOV     R0,$TMP7        ;STORE DRIVE NUMBER TO BE TESTED
3254  004556  000710                    BR      18$
3255
3256  004560                    21$:
3257  004560  005037  001264            CLR     $ESCAPE         ;REV 006
3258  004564  013737  001240  001626    MOV     $TMP7,DRVNUM    ;LOAD LOWEST # DRIVE PRESENT INTO DRVNUM
3259  004572  013701  001626            MOV     DRVNUM,R1
3260  004576  004737  036150            JSR     PC,GTYP1        ;GET DRV TYP
3261
3262  004602  023727  001624  000002    CMP     SRTFLG,#2       ;TEST IF CLOCK ADJUST START
3263  004610  001002                    BNE     25$             ;NO - SKIP
3264  004612  000137  0.3614            JMP     ADJCLK          ;GO TO ADJUST CLOCK ROUTINE
3265
3266  004616                    25$:
3267
3268                            ;;*****************************************************************
3269                            ;*TEST 4        RELEASE ALL DRIVES
3270                            ;*
3271                            ;*      RELEASE ALL DRIVES.  MAKE SURE NO ERROR
3272                            ;*      SETS AND STATUS VALID IS RESET.
3273                            ;*
```

```
3274                                    ;;*****************************************************************
3275  004616  000004                    TST4:   SCOPE
3276  004620  012737  000062  001262            MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3277  004626  104416                            TSSINIT                 ;INITIALIZE SUBSYSTEM
3278  004630  104003                            ERROR   3               ;BAD INIT
3279
3280  004632  013737  001626  001610            MOV     DRVNUM,L.CS2    ;SET DRIVE NUMBER
3281  004640  012737  000101  001600            MOV     #SELDRV,L.CS1   ;SET DRIVE SELECT
3282
3283  004646  104417                            TLOADRK                 ;LOAD RK REGS
3284  004650  104423                            TWAT16                  ;WAIT FOR INTERRUPT
3285  004652  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3286
3287  004654  104421                            TCHKOP                  ;CHECK FOR ANY ERRORS
3288  004656  104004                            ERROR   4 ;OR5,6,7      ;REPORT ANY ERRORS
3289
3290  004660  012737  000010  001610            MOV     #RLS,L.CS2      ;SET DRIVE RELEASE,STILL SET FOR SELECT
3291
3292  004666  104417                            TLOADRK                 ;LOAD RK REGS
3293  004670  104423                            TWAT16                  ;WAIT FOR INTERRUPT
3294  004672  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3295
3296  004674  104421                            TCHKOP                  ;CHECK FOR ANY ERRORS
3297  004676  104004                            ERROR   4  ;OR 5, 6, OR 7 ;REPORT ALL ERRORS
3298  004700  032737  100000  001552            BIT     #SVAL,T.DS      ;DID SVAL RESET?
3299  004706  001404                            BEQ     1$              ;YES - SKIP
3300  004710  012737  055667  001400            MOV     #EM49,EM3N      ;MESSAGE (SVAL NOT RESET W/RELEASE)
3301  004716  104003                            ERROR   3
3302  004720                            1$:
3303
3304  004720  004737  036034            TSTLUP: JSR     PC,LDCON        ;LOAD RK06-RK07 CONSTANTS
3305                                    ;;*****************************************************************
3306                                    ;*TEST 5        NON-STANDARD MESSAGES AND SVAL
3307                                    ;*
3308                                    ;*      PICK ONE OF THE AVAILABLE DRIVES AND GET
3309                                    ;*      NON-STANDARD MESSAGES.  MAKE SURE NO
3310                                    ;*      ERROR OCCURS AND STATUS VALID DOES NOT SET
3311                                    ;*      AND THAT NON-STANDARD MESSAGES CAUSE STATUS
3312                                    ;*      VALID TO RESET.
3313                                    ;*
3314                                    ;*****************************************************************
3315  004724  000004                    TST5:   SCOPE
3316  004726  012737  000062  001262            MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3317  004734  104416                            TSSINIT                 ;CLEAR SUBSYSTEM
3318  004736  104003                            ERROR   3               ;BAD CLEAR MESSAGE
3319  004740  012701  000001                    MOV     #1,R1           ;PRESET R1 FOR MESSAGE PAIR 1
3320  004744  013737  001626  001610            MOV     DRVNUM,L.CS2    ;LOAD DRV NUMBER
3321  004752  012737  000101  001600            MOV     #SELDRV,L.CS1   ;LOAD SELECT COMMAND
3322  004760  005037  001616            1$:     CLR     L.MR1           ;LOAD FOR STANDARD STATUS
3323  004764  104417                            TLOADRK                 ;LOAD RK
3324  004766  104423                            TWAT16                  ;WAIT FOR INTERRUPT
3325  004770  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3326  004772  104421                            TCHKOP                  ;CHECK OPERATION
3327  004774  104004                            ERROR   4 ;5,6 OR 7     ;REPORT ALL ERRORS
3328
3329  004776  032737  100000  001552            BIT     #SVAL,T.DS      ;TEST STATUS VALID SET
```

```
3330  005004  001007                        BNE     2$              ;YES-SKIP
3331
3332  005006  012737  056444  001460        MOV     #EMSVAL,EM11N
3333  005014  012737  050250  061112        MOV     #EMSELD,DF011A
3334  005022  104011                        ERROR   11              ;''SVAL NOT SET RESULT OF DRIVE SELECT''
3335
3336  005024  010137  001616          2$:   MOV     R1,L.MR1        ;LOAD MESSAGE PAIR SELECT
3337
3338  005030  104417                        TLOADRK                 ;LOAD RK
3339  005032  104423                        TWAT16                  ;WAIT FOR INTERRUPT
3340  005034  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3341
3342  005036  104421                        TCHKOP                  ;CHECK OPERATION
3343  005040  104004                        ERROR   4 ;5,6, OR 7    ;REPORT ALL ERRORS
3344
3345  005042  032737  100000  001552        BIT     #SVAL,T.DS      ;TEST STATUS VALID RESET
3346  005050  001407                        BEQ     3$              ;YES-SKIP
3347
3348  005052  012737  056444  001470        MOV     #EMSVAL,EM12N
3349  005060  012737  056461  061112        MOV     #EMNZPR,DF011A
3350  005066  104012                        ERROR   12              ;''SVAL NOT RESET RESULT OF SEL W/ NON-0 PAIR''
3351
3352  005070  022701  000003          3$:   CMP     #3,R1           ;WAS PAIR 3 SELECTED?
3353  005074  001402                        BEQ     4$              ;YES-SKIP
3354  005076  005201                        INC     R1              ;BUMP TO NEXT PAIR
3355  005100  000727                        BR      1$              ;SKIP TO DO IT.
3356  005102                          4$:
3357                                        ;;*****************************************************************
3358                                        ;*TEST 6        WRITING CS2 AND STATUS VALID
3359                                        ;*
3360                                        ;*      SELECT AN AVAILABLE DRIVE.  MAKE SURE STATUS
3361                                        ;*      VALID IS SET.  WRITE COMMAND AND STATUS REGISTER 2.
3362                                        ;*      MAKE SURE STATUS VALID RESETS.
3363                                        ;*
3364                                        ;;*****************************************************************
3365  005102  000004                  TST6: SCOPE
3366  005104  012737  000062  001262        MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3367  005112  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
3368  005114  104003                        ERROR   3               ;BAD INIT ERROR
3369
3370  005116  013737  001626  001610        MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
3371  005124  012737  000101  001600        MOV     #SELDRV,L.CS1   ;LOAD DRIVE SELECT
3372
3373  005132  104417                        TLOADRK                 ;LOAD RK
3374  005134  104423                        TWAT16                  ;WAIT FOR INTERRUPT
3375  005136  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3376
3377  005140  104421                        TCHKOP                  ;CHECK OPERATION
3378  005142  104004                        ERROR   4 ;5,6, OR 7    ;REPORT ALL ERRORS
3379
3380  005144  032737  100000  001552        BIT     #SVAL,T.DS      ;TEST STATUS VALID SET
3381  005152  001007                        BNE     1$              ;YES-SKIP
3382
3383  005154  012737  056444  001460        MOV     #EMSVAL,EM11N
3384  005162  012737  050250  061112        MOV     #EMSELD,DF011A
3385  005170  104011                        ERROR   11              ;''SVAL NOT SET RESULT OF DRV SELECT''
```

```
3386
3387  005172  013762  001626  000010  1$:     MOV     DRVNUM,RKCS2(R2)  ;WRITE CS2 TO RESET SVAL
3388
3389  005200  104420                          TGETRK                    ;GET RK REGS.
3390
3391  005202  032737  100000  001552          BIT     #SVAL,T.DS        ;TEST SVAL RESET
3392  005210  001407                          BEQ     2$                ;YES-SKIP
3393
3394  005212  012737  056444  001470          MOV     #EMSVAL,EM12N
3395  005220  012737  056522  061112          MOV     #EMWCS2,DF011A
3396  005226  104012                          ERROR   12                ;''SVAL NOT RESET BY WRITING CS2''
3397  005230                          2$:
3398
3399                                  .SBTTL  **CONTROLLER ERROR TESTS
3400
3401                                  ;;*********************************************************** ****
3402                                  ;*TEST 7         DRIVE TYPE ERROR
3403                                  ;*
3404                                  ;*      CREATE A DRIVE TYPE ERROR.  MAKE SURE DRIVE
3405                                  ;*      TYPE ERROR SETS AND STATUS VALID SETS.
3406                                  ;*
3407                                  ;;*************************************************************
3408  005230  000004                  TST7:   SCOPE
3409  005232  012737  000062  001262          MOV     #50.,$TIMES       ;;DO 50. ITERATIONS
3410  005240  104416                          TSSINIT                   ;CLEAR SUBSYSTEM
3411  005242  104003                          ERROR   3                 ;BAD INIT ERROR
3412
3413  005244  013737  001626  001610          MOV     DRVNUM,L.CS2      ;LOAD DRIVE NUMBER
3414  005252  012737  000101  001600          MOV     #SELDRV,L.CS1     ;LOAD DRIVE SELECT
3415  005260  053737  036130  001600          BIS     HOLD2,L.CS1       ;LOAD DRIVE TYPE
3416
3417  005266  104417                          TLOADRK                   ;LOAD RK
3418  005270  104423                          TWAT16                    ;WAIT FOR INTERRUPT
3419  005272  104002                          ERROR   2                 ;TO SLOW/NOT COMPLETE ERROR
3420
3421  005274  104422                          TCHKWE                    ;CHECK OPERATION WITH EXPECTED ERROR
3422  005276  000040                          .WORD   000040            ;DRIVE TYPE ERROR
3423  005300  000000                          .WORD   0
3424  005302  000000                          .WORD   0
3425  005304  104004                          ERROR   4 ; OR 5,6,7      ;REPORT ANY DIFFERENCES (NO ERRORS,
3426                                                                    ;ADDITIONAL ERRORS, DIFFERENT ERRORS)
3427  005306  032737  100000  001552          BIT     #SVAL, T.DS       ;TEST IF SVAL SET
3428  005314  001007                          BNE     1$                ;YES-SKIP
3429
3430  005316  012737  056444  001460          MOV     #EMSVAL,EM11N
3431  005324  012737  055140  061112          MOV     #EMDTPE,DF011A
3432  005332  104011                          ERROR   11                ;''SVAL NOT SET RESULT OF DRV TYPE ERR''
3433  005334                          1$:
3434                                  ;;*************************************************************
3435                                  ;*TEST 10        STATUS VALID AND PARITY ERROR
3436                                  ;*
3437                                  ;*      ISSUE A SELECT TO AN AVAILIABLE DRIVE WITH BAD PARITY.
3438                                  ;*      MAKE SURE SPAR, CONTROLLER ERROR, ATTENTION,
3439                                  ;*      DRIVE STATUS CHANGES, DRPAR, DRIVE INTERRUPT,
3440                                  ;*      AND STATUS VALID SET, ISSUE A CONTROLLER
3441                                  ;*      CLEAR.  MAKE SURE DRIVE INTERRUPT AND ATTENTION
```

```
                                        ;*      ARE STILL SET.  SELECT DRIVE AGAIN WITH GOOD
                                        ;*      PARITY.  MAKE SURE ATTENTION, DRIVE STATUS
                                        ;*      CHANGE, DRPAR, CONTROLLLER ERROR, DRIVE INTERRUPT,
                                        ;*      AND STATUS VALID ARE SET AND SPAR IS RESET.
                                        ;*      ISSUE A CONTROLLER CLEAR.  GET NON-STANDARD MESSAGES
                                        ;*      AND MAKE SURE ONLY DRIVE INTERRUPT AND ATTENTION
                                        ;*      ARE SET.  CLEAR ATTENTION WITH DRIVE CLEAR. REPEAT
                                        ;*      FOR ALL AVAILIABLE DRIVES.
                                        ;*
                                        ;**************************************************************************
005334  000004                  TST10:  SCOPE
005336  012737  000062  001262          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
005344  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
005346  104003                          ERROR   3               ;BAD INIT ERROR

005350  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
005356  012737  000101  001600          MOV     #SELDRV,L.CS1   ;LOAD DRIVE SELECT
005364  012737  000020  001616          MOV     #PAT,L.MR1      ;LOAD EVEN PARITY BIT

005372  104417                          TLOADRK                 ;LOAD RK REGS-SELECT W/EVEN PARITY
005374  104423                          TWAT16                  ;WAIT FOR INTERRUPT
005376  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

005400  104422                          TCHKWE                  ;CHECK OPERATION FOR EXPECTED ERROR
005402  000011                          DRPARERR!SPARERR        ;DRIVE SELECTED DRIVE BUS PARITY ERROR
005404  000000                          .WORD   0               ;CONTROLLER DETECTED DRIVE BUS PARITY ERROR
005406  000000                          .WORD   0
005410  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ANY DIFFERENCES
```

```
3471  005412  012700  000400              MOV     #BIT8,R0        ;ROUTINE TO DETERMINE WHICH BIT
3472
3473  005416  013701  001626              MOV     DRVNUM,R1       ;SHOULD BE SET IN ASOF TO INDICATE
3474  005422  001403                       BEQ     3$              ;DRIVE ATTENTION. R0 WILL HAVE THE
3475  005424  006300              2$:     ASL     R0              ;BIT THAT SHOULD BE SET FOR THE DRIVE
3476  005426  005301                       DEC     R1              ;IN USE
3477  005430  001375                       BNE     2$
3478
3479  005432  030037  001556        3$:     BIT     R0,T.ASOF       ;TEST ATTENTION SET
3480  005436  001007                       BNE     4$              ;YES-SKIP
3481  005440  012737  056630  001460        MOV     #EMDA,EM11N
3482  005446  012737  055055  061112        MOV     #EMDPAR,DF011A
3483  005454  104011                       ERROR   11              ;''DRV ATT NOT SET RESULT OF DRV PARITY ERR''
3484  005456  032737  040000  001540  4$:   BIT     #DI,T.CS1       ;TEST DRIVE INTERRUPT SET
3485  005464  001007                       BNE     5$              ;YES-SKIP
3486  005466  012737  056564  001460        MOV     #EMDI,EM11N
3487  005474  012737  055055  061112        MOV     #EMDPAR,DF011A
3488  005502  104011                       ERROR   11              ;''DRV INT NOT SET RESULT OF DRV PARITY ERR''
3489
3490  005504  032737  040000  001552  5$:   BIT     #DSC,T.DS       ;TEST DRIVE STATUS CHANGE SET
3491  005512  001007                       BNE     6$              ;YES-SKIP
3492  005514  012737  056604  001460        MOV     #EMDSC,EM11N
3493  005522  012737  055055  061112        MOV     #EMDPAR,DF011A
3494  005530  104011                       ERROR   11              ;''DSC NOT SET RESULT OF DRV PARITY ERR''
3495
3496  005532  032737  100000  001552  6$:   BIT     #SVAL,T.DS      ;TEST STATUS VALID SET
3497  005540  001007                       BNE     7$              ;YES-SKIP
3498  005542  012737  056444  001460        MOV     #EMSVAL,EM11N
3499  005550  012737  055055  061112        MOV     #EMDPAR,DF011A
3500
3501  005556  104011                       ERROR   11              ;''SVAL NOT SET RESULT OF DRV PAR ERR''
3502
3503  005560  005037  001616        7$:     CLR     L.MR1           ;CLEAR PAT IN MR1
3504
3505  005564  052737  100000  001600        BIS     #CCLR,L.CS1     ;CLEAR CONTROLLER
3506  005572  104417                       TLOADRK                 ;LOAD RK REGS TO DO CLEAR
3507
3508
3509  005574  104421                       TCHKOP                  ;CHECK NO ERRORS SET
3510  005576  104004                       ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS STILL SET
3511
3512  005600  030037  001556              BIT     R0,T.ASOF       ;TEST ATTENTION STILL SET
3513  005604  001007                       BNE     8$              ;YES-SKIP
3514  005606  012737  056630  001510        MOV     #EMDA,EM14N
3515  005614  012737  056650  061112        MOV     #EMCCLR,DF011A
3516  005622  104014                       ERROR   14              ;''DRV ATT RESET RESULT OF CONT CLR''
3517
3518  005624  032737  040000  001540  8$:   BIT     #DI,T.CS1       ;TEST DRIVE INTERRUPT STILL SE
3519  005632  001007                       BNE     9$              ;YES-SKIP
3520  005634  012737  056564  001510        MOV     #EMDI,EM14N
3521  005642  012737  056650  061112        MOV     #EMCCLR,DF011A
3522  005650  104014                       ERROR   14              ;''DRV INT RESET RESULT OF CONTROLLER CLR''
3523
3524  005652  012737  000101  001600  9$:   MOV     #SELDRV,L.CS1   ;LOAD SELECT DRIVE
3525
3526  005660  104417                       TLOADRK                 ;LOAD RK REGS
```

```
3527  005662  104423                          TWAIT6                  ;WAIT FOR INTERRUPT
3528  005664  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3529
3530  005666  104422                          TCHKWE                  ;CHECK THAT ERRORS ARE SET
3531  005670  000010                          .WORD   000010          ;DPAR SET (NO SPAR 1, REPORT
3532  005672  000000                          .WORD   0               ;ANY DISCREPENCIES
3533  005674  000000                          .WORD   0
3534  005676  104004                          ERROR   4 ; OR 5,6,7
3535  005700  030037  001556                  BIT     R0,T.ASOF       ;TEST ATTENTION STILL SET.
3536  005704  001007                          BNE     10$             ;YES-SKIP
3537  005706  012737  056630  001460          MOV     #EMDA,EM11N
3538  005714  012737  055055  061112          MOV     #EMDPAR,DF011A
3539  005722  104011                          ERROR   11              ;''DRV ATT NOT SET RESULT OF DRV PARITY ERR''
3540
3541  005724  032737  040000  001540  10$:    BIT     #DI,T.CS1       ;TEST DRIVE INTERRUPT STILL SET
3542  005732  001007                          BNE     11$             ;YES-SKIP
3543  005734  012737  056564  001460          MOV     #EMDI,EM11N
3544  005742  012737  055055  061112          MOV     #EMDPAR,DF011A
3545  005750  104011                          ERROR   11              ;''DRV INT NOT SET RESULT OF DRV  PARITY ERR''
3546
3547  005752  032737  040000  001552  11$:    BIT     #DSC,T.DS       ;TEST STATUS CHANGE STILL SET
3548  005760  001007                          BNE     12$             ;YES-SKIP
3549  005762  012737  056604  001460          MOV     #EMDSC,EM11N
3550  005770  012737  055055  061112          MOV     #EMDPAR,DF011A
3551  005776  104011                          ERROR   11              ;''DSC NOT SET RESULT OF DRV PARITY ERR''
3552
3553  006000  032737  100000  001552  12$:    BIT     #S.VAL,T.DS     ;TEST STATUS VALID STILL SET
3554  006006  001007                          BNE     13$             ;YES-SKIP
3555  006010  012737  056444  001460          MOV     #EMSVAL,EM11N
3556  006016  012737  055055  061112          MOV     #EMDPAR,DF011A
3557  006024  104011                          ERROR   11              ;''SVAL NOT SET RESULT OF DRV PARITY ERR''
3558
3559  006026  052737  100000  001600  13$:    BIS     #CCLR,L.CS1     ;CLEAR CONTROLLER
3560
3561  006034  104417                          TLOADRK                 ;LOAD RK REGS (DO CLEAR)
3562
3563
3564  006036  012701  000001                  MOV     #1,R1           ;SET COUNTER TO SELECT STATUS PAIR
3565  006042  012737  000001  001600          MOV     #SELDRV,L.CS1   ;LOAD DRIVE SELECT
3566
3567  006050  010137  001616          14$:    MOV     R1,L.MR1        ;LOAD STATUS PAIR SELECTION
3568  006054  104417                          TLOADRK                 ;LOAD RK REGS
3569  006056  104423                          TWAIT6                  ;WAIT FOR INTERRUPT
3570  006060  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3571
3572  006062  104421                          TCHKOP                  ;CHECK IF ANY ERRORS SET
3573  006064  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS SET.
3574
3575  006066  030037  001556                  BIT     R0,T.ASOF       ;TEST ATTENTION STILL SET
3576  006072  001007                          BNE     15$             ;YES-SKIP
3577  006074  012737  056630  001410          MOV     #EMDA,EM4N
3578  006102  012737  056461  061112          MOV     #EMNZPR,DF011A
3579  006110  104014                          ERROR   14              ;''ATTENTION RESET RESULT OF NON-0 PAIR SEL''
3580
3581  006112  032737  040000  001540  15$:    BIT     #DI,T.CS1
3582  006120  001007                          BNE     16$
```

```
3583  006122  012737  056564  001510          MOV     #EMDI,EM14N
3584  006130  012737  056461  061112          MOV     #EMNZPR,DF011A
3585  006136  104014                          ERROR   14              ;'DRV INT RESET RESULT OF NON-0 PAIR SELECT''
3586
3587  006140  005201                  16$:     INC     R1              ;BUMP PAIR SELECT
3588  006142  022701  000004                  CMP     #4,R1           ;ALL PAIRS DONE?
3589  006146  001340                          BNE     14$             ;NO-LOOP
3590
3591  006150  005037  001616                  CLR     L.MR1           ;CLEAR MR1
3592
3593  006154  012737  000105  001600          MOV     #CLEAR,L.CS1    ;LOAD DRIVE CLEAR
3594
3595  006162  104417                          TLOADRK                 ;DO DRIVE CLEAR
3596  006164  104423                          TWAIT6                  ;WAIT FOR INTERRUPT
3597  006166  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3598
3599  006170  104421                          TCHKOP                  ;CHECK FOR ANY ERRORS
3600  006172  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
3601
3602  006174  012701  000020                  MOV     #20,R1          ;SET COUNT FOR SHORT WAIT
3603  006200  005301                  17$:     DEC     R1              ;TO ALLOW CONTROLLER TIME TO POLL
3604  006202  001376                          BNE     17$             ;DRIVES
3605
3606  006204  104420                          TGETRK                  ;GET RK REGS
3607  006206  030037  001556                  BIT     R0,T.ASOF       ;TEST ATTENTION RESET
3608  006212  001407                          BEQ     18$             ;YES-SKIP
3609  006214  012737  056630  001470          MOV     #EMDA,EM12N
3610  006222  012737  050276  061112          MOV     #EMDCLR,DF011A
3611  006230  104012                          ERROR   12              ;''ATTENTION NOT RESET RESULT OF DRV CLEAR
3612
3613  006232  032737  040000  001540  18$:     BIT     #DI,T.CS1       ;TEST DRIVE INTERRUPT RESET
3614  006240  001407                          BEQ     19$             ;YES-SKIP
3615  006242  012737  056564  001470          MOV     #EMDI,EM12N
3616  006250  012737  050276  061112          MOV     #EMDCLR,DF011A
3617  006256  104012                          ERROR   12              ;''DRV INT NOT RESET RESULT OF DRIVE CLR''
3618
3619  006260                          19$:
3620                                  ;;*****************************************************************
3621                                  ;*TEST 11        UNIT FIELD ERROR ON RELEASE
3622                                  ;*
3623                                  ;*      ISSUE A SUBSYSTEM CLEAR. SELECT AN AVAILABLE
3624                                  ;*      DRIVE.  PUT CONTROLLER IN DIAGNOSTIC MODE. ISSUE
3625                                  ;*      A RELEASE COMMAND.  CLOCK THROUGH PHASE ADDRESS 2.
3626                                  ;*      TURN OFF DIAGNOSTIC MODE.  MAKE SURE UNIT FIELD
3627                                  ;*      ERROR SETS.
3628                                  ;*
3629                                  ;;*****************************************************************
3630  006260  000004                  TST11:  SCOPE
3631  006262  012737  000062  001262          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3632  006270  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
3633  006272  104002                          ERROR   2               ;BAD INIT ERROR
3634
3635  006274  013737  001626  001610          MOV     DRVNUM,L.CS2    ;SELECT A DRIVE
3636  006302  012737  000101  001600          MOV     #SELDRV,L.CS1   ;DO DRIVE SELECT
3637
3638  006310  104417                          TLOADRK                 ;LOAD RK
```

```
3639  006312  104423                          TWAT16                  ;WAIT FOR INTERRUPT
3640  006314  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3641
3642  006316  104421                          TCHKOP                  ;CHECK FOR ANY ERRORS
3643  006320  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS.
3644
3645  006322  052737  000010  001610          BIS     #RLS,L.CS2      ;LOAD RELEASE
3646  006330  012737  000040  001616          MOV     #DMD,L.MR1      ;SET DIAGNOSTIC MODE
3647
3648  006336  104417                          TLOADRK                 ;LOAD RK
3649
3650  006340  004437  036316                  JSR     R4,MCLOCK       ;CALL MAINT CLOCK
3651  006344     023                          .BYTE   ^D19            ;NUMBER OF PHASES
3652  006345     002                          .BYTE   2               ;NUMBER OF CLOCK XISTIONS
3653
3654  006346  042762  000040  000026          BIC     #DMD,RKMR1(R2)  ;CLEAR DIAG MODE
3655
3656  006354  104423                          TWAT16                  ;WAIT FOR INTERRUPT
3657  006356  104002                          ERROR   2               ;TO SLOW/NOT COMPLETED
3658
3659  006360  104422                          TCHKWE                  ;CHECK OPERATION WITH ERROR
3660  006362  000000                          .WORD   0
3661  006364  000000                          .WORD   0
3662  006366  000004                          .WORD   UFERR           ;UNIT FIELD ERROR
3663  006370  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ANY DISCREPENCIES
3664
3665  006372  104416                          TSSINIT                 ;CLEAR SUBSYSTEM TO INSURE UFE RESETS
3666  006374  104002                          ERROR   2
3667                                ;;*********************************************************************
3668                                ;*TEST 12        UNIT FIELD ERROR ON SELECT
3669                                ;*
3670                                ;*      ISSUE A SUBSYSTEM CLEAR.  SELECT AN AVAILABLE
3671                                ;*      DRIVE.  PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE
3672                                ;*      A SELECT COMMAND WITH MESSAGE ID = 3 AND DRIVE
3673                                ;*      SELECTED = 0.  CLOCK THROUGH PHASE ADDRESS 6.
3674                                ;*      TURN OFF DIAGNOSTIC MODE.  MAKE SURE UNIT FIELD
3675                                ;*      ERROR SETS.
3676                                ;*
3677                                ;;*********************************************************************
3678  006376  000004                TST12:  SCOPE
3679  006400  012737  000062  001262          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3680  006406  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
3681  006410  104003                          ERROR   3               ;BAD INIT ERROR
3682
3683  006412  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
3684  006420  012737  000101  001600          MOV     #SELDRV,L CS1   ;LOAD DRIVE SELECT
3685
3686  006426  104417                          TLOADRK                 ;LOAD RK
3687  006430  104423                          TWAT16                  ;WAIT FOR INTERRUPT
3688  006432  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE
3689
3690  006434  104421                          TCHKOP                  ;CHECK FOR ANY ERROR
3691  006436  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
3692
3693  006440  012737  000043  001616          MOV     #DMD!BIT1.BIT0,L.MR1    ;LOAD DIAG MODE & MSG PAIR 3
3694  006446  005037  001610                  CLR     L.CS2           ;LOAD FOR DRIVE 0
```

```
3695
3696  006452  104417                          TLOADRK                 ;LOAD RK
3697
3698  006454  004437  036316                  JSR     R4,MCLOCK       ;CALL MAINTENANCE CLOCK
3699  006460    026                           .BYTE   ^D22            ;THROUGH PHASE 6
3700  006461    002                           .BYTE   2               ;PLUS 2 TRANSITIONS
3701
3702  006462  042762  000040  000026          BIC     #DMD,RKMR'(R2)  ;CLEAR DIAG MODE
3703
3704  006470  104423                          TWAT16                  ;WAIT FOR INTERRUPT
3705  006472  104002                          ERROR   2               ;TO SLOW/NOT COMPLETED ERROR
3706
3707  006474  013737  036132  006504          MOV     HOLD3,'$        ;EXPECTED ERROR
3708
3709  006502  104422                          TCHKWE                  ;CHECK OPERATION WITH ERROR
3710  006504  000000                  1$:     .WORD   0
3711  006506  000000                          .WORD   0
3712  006510  000004                          .WORD   UFERR           ;UNIT FIELD ERROR SHOULD SET
3713  006512  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ANY DISCREPENCIES
3714
3715                                  .SBTTL  **ATTENTION HANDLING BY CONTROLLER
3716
3717                                  ;;*******************************************************************
3718                                  ;*TEST 13       DOUBLE INTERRUPT
3719                                  ;*
3720                                  ;*      ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECALIBRATE.
3721                                  ;*      MAKE SURE STATUS VALID IS SET.  CHECK THAT SECOND
3722                                  ;*      INTERRUPT OCCURS.  AFTER SECOND INTERRUPT
3723                                  ;*      CHECK THAT STATUS VALID IS RESET.  ISSUE SELECT
3724                                  ;*      AND MAKE SURE STATUS VALID SETS.  CLEAR DRIVE.
3725                                  ;*      CHECK THAT DRIVE STATUS CHANGE SETS
3726                                  ;*      (BIT 14 OF DRIVE STATUS
3727                                  ;*      REGISTER)
3728                                  ;*
3729                                  ;;*******************************************************************
3730  006514  000004                  TST13:  SCOPE
3731  006516  012737  000062  001262          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3732  006524  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
3733  006526  104003                          ERROR   3               ;BAD INIT ERROR
3734
3735  006530  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
3736  006536  012737  000113  001600          MOV     #RECAL,L.CS1    ;LOAD RECAL
3737
3738  006544  104417                          TLOADRK                 ;LOAD RK
3739  006546  104423                          TWAT16                  ;WAIT FOR 1ST INTERRUPT
3740  006550  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE
3741  006552  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
3742  006556  104420                          TGETRK                  ;GET RK REGS
3743  006560  032737  100000  001552          BIT     #SVAL,T.DS      ;TEST SVAL SET
3744  006566  001010                          BNE     1$              ;YES-SKIP
3745  006570  012737  056444  001460          MOV     #EMSVAL,EM1'N
3746  006576  012737  050337  061112          MOV     #EMRCAL,DF011A
3747  006604  104011                          ERROR   11              ;"SVAL NOT SET RESULT OF RECAL"
3748  006606  000463                          BR      50$             ;ABORT TEST
3749
3750  006610  104437                  1$:     TWAT8S                  ;WAIT FOR INTERRUPT
```

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3751  006612  000407                      BR      2$              ;NO INTERRUPT RETURN
3752  006614  000404                      BR      3$              ;INTERRUPT RETURN
3753
3754  006616  012737  055737  001370  2$: MOV     #EM50,EM2N      ;ALTER MESSAGE 'NO 2ND INTERRUPT OR IT WAS LATE"
3755  006624  104002                      ERROR   2
3756
3757  006626  104420                  3$: TGETRK                  ;GET RK REGS
3758  006630  032737  100000  001552      BIT     #SVAL,T.DS      ;TEST SVAC SET NOW
3759  006636  001410                      BEQ     4$              ;NO-SKIP
3760  006640  012737  056444  001470      MOV     #EMSVAL,EM12N
3761  006646  012737  056671  061112      MOV     #EM2INT,DF011A
3762  006654  104012                      ERROR   12              ;"SVAL NOT RESET RESULT OF SECOND TEST"
3763  006656  000437                      BR      50$
3764
3765  006660  032737  040000  001552  4$: BIT     #DSC,T.DS       ;TEST DSC SET BY ATTENTION
3766  006666  001010                      BNE     5$              ;YES-SKIP
3767  006670  012737  056604  001460      MOV     #EMDSC,EM11N
3768  006676  012737  056671  061112      MOV     #EM2INT,DF011A
3769  006704  104011                      ERROR   11              ;"DSC NOT SET RESULT OF SECOND INTERRUPT"
3770  006706  000423                      BR      50$
3771
3772  006710  012737  000101  001600  5$: MOV     #SELDRV,L.CS1   ;LOAD DRIVE SELECT
3773
3774  006716  104417                      TLOADRK                 ;LOAD RK REGS
3775  006720  104423                      TWAT16                  ;WAIT FOR INTERRUPT
3776  006722  104002                      ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3777
3778  006724  104421                      TCHKOP                  ;CHECK FOR ANY ERRORS
3779
3780  006726  104004                      ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
3781
3782  006730  032737  100000  001552      BIT     #SVAL,T.DS      ;TEST SVAC SET
3783  006736  001007                      BNE     50$             ;YES-SKIP
3784  006740  012737  056444  001460      MOV     #EMSVAL,EM11N
3785  006746  012737  050250  061112      MOV     #EMSELD,DF011A
3786  006754  104011                      ERROR   11              ;"SVAL NOT SET RESULT OF DRV SEL.
3787  006756                          50$:
3788                                  ;;*****************************************************************
3789                                  ;*TEST 14       SINGLE INTERRUPT FROM ATTENTION
3790                                  ;*
3791                                  ;*      DO A SEEK TO CYLINDER 0.  WAIT FOR INTERRUPT FROM
3792                                  ;*      DRIVE ATTENTION.  LOWER PRIORITY AGAIN AND MAKE
3793                                  ;*      SURE ANOTHER INTERRUPT DOES NOT OCCUR.  CLEAR DRIVE.
3794                                  ;*
3795                                  ;;*****************************************************************
3796  006756  000004                  TST14:  SCOPE
3797  006760  012737  000062  001262      MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
3798  006766  104416                      TSSINIT                 ;CLEAR SUBSYSTEM
3799  006770  104003                      ERROR   3               ;BAD INIT ERROR
3800
3801  006772  013737  001626  001610      MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
3802  007000  012737  000117  001600      MOV     #SEEK,L.CS1     ;LOAD SEEK DCYL LEFT AT 0.
3803
3804  007006  104417                      TLOADRK                 ;LOAD RK REGS
3805  007010  104423                      TWAT16                  ;WAIT FOR INTERRUPT
3806  007012  104002                      ERROR   2               ;TO SLOW/NOT COMPLETED ERROR
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3807
3808
3809  007014  104420                          TGETRK                          ;GET RK REGS
3810
3811  007016  032737  040000  001540          BIT     #DI.T.CS1               ;TEST DI SET
3812  007024  001010                          BNE     2$                      ;YES-SKIP
3813  007026  012737  056564  001460          MOV     #EMDI,EM11N
3814  007034  012737  056712  061112          MOV     #EMSKSF,DF011A
3815  007042  104011                          ERROR   11                      ;"DI NOT SET RESULT OF SEEK TO SELF"
3816  007044  000417                          BR      50$
3817
3818
3819  007046  012700  000031          2$:     MOV     #25.,R0                 ;LOAD AND DECREMENT A COUNT TO
3820  007052  005300                  3$:     DEC     R0                      ;ZERO. GIVE CONTROLLER A CHANCE TO
3821  007054  001376                          BNE     3$                      ;INTERRUPT AGAIN.  ERROR IF IT DOES.
3822
3823  007056  022737  000001  001662          CMP     #1,INTSET               ;CHECK ONLY ONE INTERRUPT OCCURRED
3824  007064  001407                          BEQ     50$                     ;YES-SKIP
3825  007066  012737  057064  001500          MOV     #EMMI,EM13N
3826  007074  012737  056712  061112          MOV     #EMSKSF,DF011A
3827  007102  104013                          ERROR   13                      ;"MULTIPLE INTERRUPTS RESULT OF SEEK TO SELF"
3828
3829  007104  104421                  50$.    TCHKOP                          ;CHECK FOR ANY ERRORS
3830  007106  104004                          ERROR   4  ;OR 5,6,7            ;REPORT ALL ERRORS
3831                                ;;*****************************************************************
3832                                ;*TEST 15       RESET ATTENTIONS WITH UNIBUS INIT
3833                                ;*
3834                                ;*      DO A SEEK TO CYLINDER 0 ON ALL AVAILIABLE DRIVES.
3835                                ;*      ISSUE A RESET.  MAKE SURE ALL ATTENTION RESET.
3836                                ;*
3837                                ;*****************************************************************
3838  007110  000004          TST15:  SCOPE
3839  007112  012737  000005  001262          MOV     #5.,$TIMES              ;;DO 5. ITERATIONS
3840  007120  104416                          TSSINIT                         ;CLEAR SUBSYSTEM
3841  007122  104003                          ERROR   3                       ;BAD INIT ERROR
3842
3843  007124  013737  001626  001610          MOV     DRVNUM,L.CS2            ;LOAD DRIVE NUMBER
3844  007132  012737  000117  001600          MOV     #SEEK,L.CS1             ;LOAD SEEK (TO SELF-0)
3845
3846  007140  104417                          TLOADRK                         ;LOAD RK REGS
3847  007142  104423                          TWAIT6                          ;WAIT FOR INTERRUPT
3848  007144  104002                          ERROR   2                       ;TO SLOW/NOT COMPLETE
3849
3850  007146  104420                          TGETRK                          ;GET RK REGS
3851
3852  007150  032737  040000  001540          BIT     #DI,T.CS1               ;TEST DI SET
3853  007156  001010                          BNE     1$                      ;YES-EXIT
3854  007160  012737  056564  001460          MOV     #EMDI,EM11N
3855  007166  012737  056712  061112          MOV     #EMSKSF,DF011A
3856  007174  104011                          ERROR   11                      ;"DI NOT SET RESULT OF SEEK TO SELF
3857  007176  000450                          BR      50$
3858
3859  007200  005037  001662          1$:     CLR     INTSET                  ;CLEAR INTERRUPT COUNTER
3860  007204  000005                          RESET                           ;DO UNIBUS RESET
3861  007206  004737  045220                  JSR     PC,$TKINT               ;RESET KEYBOARD INTERRUPT
3862
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3863  007212  005037  001674                  CLR     LCLKTK          ;CLEAR TICK COUNTER
3864  007216  004737  035314          5$:     JSR     PC,MYTIME       ;CALL TIMER
3865  007222  022737  000012  001674          CMP     #10.,LCLKTK     ;COUNT 10 TICKS (MILLISECONDS)?
3866  007230  001372                          BNE     5$              ;NO - LOOP
3867
3868  007232  012762  000100  000054          MOV     #IE,RKCS1(R2)   ;SET IE FOR ANY STRAY INTERRUPTS
3869  007240  004737  034522                  JSR     PC,OPTTST       ;SET UP OPTIONS AGAIN
3870
3871  007244  104423                          TWAIT6                  ;WAIT 16 MS FOR AN INTERRUPT
3872  007246  000410                          BR      2$              ;NONE IS EXPECTED SO RETURN SHOULD BE
3873                                                                  ;HERE-BR TO CONTINUE TEST.
3874  007250  012737  056727  001500          MOV     #EMUXIT,EM13N   ;INT OCCURRED ON RESET
3875  007256  012737  056771  061112          MOV     #EMRSET,DF01*A
3876  007264  104013                          ERROR   13              ;"UNEXECUTED INTERRUPT RESULT OF RESET"
3877  007266  000414                          BR      50$
3878  007270  104420          2$:             TGETRK                  ;GET RK REGS
3879  007272  032737  040000  001540          BIT     #DI,T.CS1       ;TEST DI RESET
3880  007300  001407                          BEQ     50$             ;YES-SKIP
3881  007302  012737  056564  001470          MOV     #EMDI,EM12N
3882  007310  012737  056771  061112          MOV     #EMRSET,DF011A
3883  007316  104012                          ERROR   12              ;"DI NOT RESET RESULT OF RESET"
3884
3885  007320                          50$:
3886
3887                                  .SBTTL  **ILLEGAL DISK ADDRESS ERROR TESTS
3888
3889                                  ;;*******************************************************************
3890                                  ;*TEST 16       ILLEGAL DISK ADDRESS (PART 1)
3891                                  ;*
3892                                  ;*      ISSUE A SEEK TO CYLINDER 0, HEAD 3. MAKE SURE
3893                                  ;*      ILLEGAL ADDRESS ERROR AND SEEK INCOMPLETE SETS.
3894                                  ;*      CLEAR CONTROLLER AND CLEAR DRIVE.  REPEAT FOR HEADS 4-7,
3895                                  ;*      CHECKING THAT BOTH IDAF AND SEEK INCOMPLETE SET FOR
3896                                  ;*      HEAD 7 AND IDAE ALONE SETS FOR HEADS 4, 5, AND 6.
3897                                  ;*
3898                                  ;*******************************************************************
3899  007320  000004          TST16:  SCOPE
3900  007322  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3901  007330  012701  000003                  MOV     #3,R1           ;PRESET FOR SELECTING TRACK 3
3902
3903  007334  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
3904  007336  104003                          ERROR   3
3905
3906  007340  012737  000113  001600          MOV     #RECAL,L.CS1    ;SET UP TO RECAL
3907  007346  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE
3908
3909  007354  104417                          TLOADRK                 ;LOAD RK REGS
3910
3911  007356  104423                          TWAIT16                 ;WAIT FOR 1ST INTERRUPT
3912  007360  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3913
3914  007362  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
3915
3916  007366  104437                          TWAIT8S                 ;WAIT FOR INTERRUPT
3917  007370  104002                          ERROR   2
3918
```

```
3919  007372  012737  007400  001110          MOV     #1$,$LPERR      ;SET LOCAL LOOP ON ERROR
3920
3921  007400  104416                  1$:     TSSINIT                 ;CLEAR SUBSYSTEM
3922  007402  104003                          ERROR   3               ;BAD INIT ERROR
3923
3924  007404  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
3925  007412  012737  000117  001600          MOV     #SEEK,L.CS1     ;LOAD SEEK
3926  007420  110137  001607                  MOVB    R1,L.DT         ;LOAD TRACK
3927
3928  007424  104417                          TLOADRK                 ;LOAD RK REGS
3929  007426  104423                          TWAT16                  ;WAIT FOR INTERRUPT
3930  007430  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE
3931
3932  007432  032701  000001                  BIT     #BIT0,R1        ;TEST IF HEAD ADDRESS HAS BIT 0
3933  007436  001403                          BEQ     2$              ;NO - SKIP
3934  007440  032701  000002                  BIT     #BIT1,R1        ;TEST IF HEAD ADDRESS HAS BOTH 0 AND 1
3935  007444  001007                          BNE     3$              ;YES-GO CHECK BOTH IDAE AND SKI SET
3936
3937  007446  104422                  2$:     TCHKWE                  ;CHECK OPERATION WITH ERROR
3938  007450  002000                          IDAERR                  ;ILLEGAL DISK ADDRESS ERROR
3939  007452  000000                          0
3940  007454  000000                          0
3941  007456  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL DISCREPANCIES
3942  007460  104415                          SCOP1                   ;LOCAL LOOP ON ERROR
3943  007462  000406                          BR      4$
3944
3945  007464  104422                  3$:     TCHKWE                  ;CHECK OPERATION WITH ERROR
3946  007466  002002                          !DAERR!SKIERR           ;ILLEGAL DISK ADDRESS ERROR
3947  007470  000000                          0                       ;SEEK INCOMPLETE
3948  007472  000000                          0
3949  007474  104004                          ERROR   4  ;OR 5,6,7    ;REPORT ANY DISCREPANCIES
3950  007476  104415                          SCOP1                   ;LOCAL LOOP ON ERROR TO 1$
3951
3952  007500  005201                  4$:     INC     R1              ;ELSE BUMP TO NEXT ILLEGAL TRACK
3953  007502  022701  000010                  CMP     #8.,R1          ;ALL ILLEGAL TRACKS SELECTED?
3954  007506  001334                          BNE     1$              ;NO-LOOP
3955                                  ;;*****************************************************************
3956                                  ;*TEST 17       ILLEGAL DISK ADDRESS (PART 2)
3957                                  ;*
3958                                  ;*      ISSUE A SEEK TO CYLINDER 1000, HEAD 0. MAKE SURE
3959                                  ;*      ILLEGAL DISK ADDRESS ERROR SETS.  CLEAR CONTROLLER AND DRIVE
3960                                  ;*      THIS TEST IS BYPASSED FOR THE RK07 BECAUSE THE RK07
3961                                  ;*      CONTROLLER DOES NOT RECOGNIZE THE ILLEGAL DISK ADDRESS
3962                                  ;*
3963                                  ;;*****************************************************************
3964  007510  000004                  T17:    SCOPE
3965  007512  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
3966  007520  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
3967  007522  104003                          ERROR   3               ;BAD INIT ERROR
3968
3969  007524  012737  000113  001600          MOV     #RECAL,L.CS1    ;LOAD RECALIBRATE
3970  007532  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE
3971
3972  007540  104417                          TLOADRK                 ;LOAD RK REGS
3973
3974  007542  104423                          TWAT16                  ;WAIT FOR 1ST INTERRUPT
```

```
3975  007544  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
3976
3977  007546  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
3978
3979  007552  104437                          TWAT8S                  ;WAIT FOR INTERRUPT
3980  007554  104002                          ERROR   2
3981
3982  007556  012737  007564  001110          MOV     #1$,$LPERR      ;SET LOOP TO BYPASS RECAL
3983
3984  007564  104416                  1$:     TSSINIT                 ;CLEAR SUBSYSTEM
3985  007566  104003                          ERROR   3
3986
3987  007570  013737  001626  001610          MOV     DRVNUM, L.CS2   ;LOAD DRIVE NUMBER
3988  007576  012737  000117  001600          MOV     #SEEK,L.CS1     ;LOAD SEEK
3989  007604  005737  001720                  TST     DTYPE           ;SEE IF RK06
3990  007610  001402                          BEQ     2$              ;BR IF YES
3991                                  ;       MOV     #1777,L.DCYL    ;ELSE LOAD RK07 ILL CYL
3992                                  ;       MOV     #<IDAERR!SKIERR>,4$     ;EXP RK07 ERR
3993                                  ;       BR      3$
3994  007612  000137  007644                  JMP     TST20           ;RK07 CONTROLLER
3995                                                                  ;DOES NOT RECOGNIZE
3996                                                                  ;ILLEGAL DISK ADDRESS
3997                                                                  ;REV 006 THE ABOVE THREE LINES
3998
3999  007616  012737  001000  001614  2$:     MOV     #1000,L.DCYL    ;LOAD DK06 ILL CYL
4000                                  ;       MOV     #IDAERR,4$      ;EXP RK06 ERR
4001
4002  007624  104417                  3$:     TLOADRK                 ;LOAD RK REGS
4003  007626  104423                          TWAT16                  ;WAIT FOR INTERRUPT
4004  007630  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4005
4006  007632  104422                          TCHKWE                  ;CHECK OPERATION WITH ERROR
4007  007634  002000                  4$:     .WORD   IDAERR          ;DISK ADDRESS ERROR
4008  007636  000000                          .WORD   0
4009  007640  000000                          .WORD   0
4010  007642  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ANY DISCREPANCIES
4011
4012                                  .SBTTL  **WRITE HEADER TESTS
4013
4014                                  ;;*****************************************************************
4015                                  ;*TEST 20       READ BAD SECTOR INFORMATION
4016                                  ;*
4017                                  ;*      ISSUE A READ DATA OF 400 WORDS TO CYLINDER 632,
4018                                  ;*      TRACK 2 TO GET THE FACTORY DETECTED BAD
4019                                  ;*      SECTOR FILE, 26 SECTOR MODE.
4020                                  ;*
4021                                  ;*      CYLINDER 1456 IS USED FOR THE RK07.
4022                                  ;*
4023                                  ;*      IF AN ERROR OCCURS, READ SECTOR 2, 4, 6, OR 10(8) UNTIL
4024                                  ;*      A SUCCESSFUL READ IS DONE. IF NONE READ SUCCESSFULLY
4025                                  ;*      REMOVE THIS DRIVE FROM TEST. WHEN A READ IS SUCCESSFUL,
4026                                  ;*      TEST THAT THE PACK IS NOT AN ALIGNMENT PADK AND
4027                                  ;*      STORE THE ENTRIES FOR LATER USE.
4028                                  ;*
4029                                  ;*      REPEAT THIS SERIES OF OPERATIONS FOR FACTORY DETECTED
4030                                  ;*      BAD SECTORS 24 SECTOR MODE, SOFTWARE DETECTED
```

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                                        ;*      BAD SECTORS 26 SECTOR MODE, AND SOFTWARE DETECTED BAD
                                        ;*      SECTORS 24 SECTOR MODE. IF THE NUMBER OF BAD SECTORS FOR
                                        ;*      24 OR 26 SECTOR MODE EXCEED 20(10) THE DRIVE IS REMOVED
                                        ;*      FROM TESTING.
                                        ;*
                                        ;*
                                        ;**************************************************************
007644  000004                  TST20:  SCOPE
007646  012737  000001  001262          MOV     #1,$TIMES       ;;DO 1 ITERATION
                                        ;
                                        TSSINIT                 ;CLEAR SUBSYS FROM LAST IDAERR
                                        ERROR   3               ;BAD INIT ERROR
                                        ;
                                        MOV     #RECAL,L.CS1    ;DO RECAL CMD
                                        MOV     DRVNUM,L.CS2
                                        ;
                                        TLOADRK                 ;LOAD "L" REGS INTO RK REGS
                                        TWAT16
                                        ERROR   2               ;NO INTR
                                        ;
                                        CLR     INTSET          ;CLR INIT FLAG
                                        ;
                                        TWAT8S                  ;WAIT FOR 2'N INTR
                                        ERROR   2               ;NOT THERE
                                        ;
                                        ;
007654  105037  007722                  CLRB    2$              ;CLEAR SECTOR POINTER
007660  005000                          CLR     R0
007662  005005                          CLR     R5              ;CLEAR R5 FOR BAD SECTOR COUNTING
007664  013703  001640                  MOV     BSF26P,R3       ;SET POINT IN TO STORE BS 26 SECT FORMAT
007670  012737  007676  001110          MOV     #1$,$LPERR      ;SET ERROR RETURN ADDRESS FOR INTERNAL LOOP
007676  104416              1$:         TSSINIT                 ;CLEAR SUBSYSTEM
007700  104003                          ERROR   3               ;BAD INIT ERROR
                                        ;
007702  013737  036120  007724          MOV     LSTCYL,15$
                                        ;
007710  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS WITH
007714  000121                          RDDATA                  ; READ DATA
007716  177400                          -400                    ; WORD COUNT
007720  070414                          IBUFF                   ; BUFFER ADDRESS
007722     000              2$:         .BYTE   0               ; SECTOR ADDRESS
007723     002                          .BYTE   2               ; TRACK ADDRESS
007724  000000              15$:        0                       ; CYLINDER ADDRESS 632/1456
                                        ;
007726  104417                          TLOADRK                 ;LOAD "L" REGS INTO RK
007730  104431                          TWAT112                 ;WAIT FOR INTERRUPT
007732  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
007734  104421                          TCHKOP                  ;CHECK FOR ANY ERRORS
007736  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
007740  104415                          SCOP1                   ;LOOP TO 1$ IF SW 9 SET
                                        ;
007742  105737  001103                  TSTB    $ERFLG          ;TEST FOR ERROR IN OPERATION
007746  001502                          BEQ     7$              ;NO-SKIP
007750  005700                          TST     R0              ;GETTING A BS FACTORY SECTOR 26 SECT FORMAT?
007752  001023                          BNE     3$              ;NO-SKIP
007754  062737  000002  007722          ADD     #2,2$           ;NEXT SECTOR ADDRESS
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4087  007762  122737  000012  007722          CMPB    #10.,2$         ;PAST APPLICABLE SECTORS?
4088  007770  001066                          BNE     6$              ;NO-SKIP
4089  007772  012737  056036  001360          MOV     #EM51,EM1N
4090  010000  104001                          ERROR   1               ;''CANNOT READ BS FILES
4091  010002  043737  001630  001354  25$:    BIC     DRVBIT,$DEVM    ;CLEAR DRIVE FROM DRIVE MAP
4092  010010  053737  001630  001666          BIS     DRVBIT,DRVDRP   ;SET DRIVE DROPPED
4093  010016  000137  027716                  JMP     NEWDRV          ;ABORT TEST PASS.
4094
4095  010022  022700  000001          3$:     CMP     #1,R0           ;GETTING A BS SOFT SECTOR 26 SECT FORMAT?
4096  010026  001014                          BNE     4$              ;NO-SKIP
4097  010030  062737  000002  007722          ADD     #2,2$           ;NEXT SECTOR ADDRESS
4098  010036  122737  000026  007722          CMPB    #22.,2$         ;PAST APPLICABLE SECTORS?
4099  010044  001040                          BNE     6$              ;NO-SKIP
4100  010046  012737  056036  001360          MOV     #EM51,EM1N
4101  010054  104001                          ERROR   1               ;''CANNOT READ BS FILES''
4102  010056  000751                          BR      25$
4103
4104  010060  022700  000002          4$:     CMP     #2,R0           ;GETTING A BS FACT SECTOR 24 SECTOR FORMAT?
4105  010064  001014                          BNE     5$              ;NO-SKIP
4106  010066  062737  000002  007722          ADD     #2,2$           ;NEXT SECTOR ADDRESS
4107  010074  122737  000013  007722          CMPB    #11.,2$         ;PAST APPLICABLE SECTORS?
4108  010102  001021                          BNE     6$              ;NO-SKIP
4109
4110  010104  012737  056036  001360          MOV     #EM51,EM1N
4111  010112  104001                          ERROR   1               ;''CANNOT READ BS FILES''
4112  010114  000732                          BR      25$
4113
4114  010116  062737  000002  007722  5$:     ADD     #2,2$           ;NEXT SECTOR (BS SOFT 24 SECT MODE)
4115  010124  122737  000027  007722          CMPB    #23.,2$         ;PAST APPLICABLE SECTORS?
4116  010132  001005                          BNE     6$              ;NO-SKIP
4117  010134  012737  056036  001360          MOV     #EM51,EM1N
4118  010142  104001                          ERROR   1               ;''CANNOT READ BS FILES
4119  010144  000716                          BR      25$
4120
4121  010146  105037  001103          6$:     CLRB    $ERFLG          ;CLEAR ERROR FLAG
4122  010152  000651                          BR      1$              ;DO NEXT READ
4123
4124  010154  005737  070422          7$:     TST     IBUFF+6         ;CHECK FOR ALIGNMENT PACK
4125  010160  001405                          BEQ     8$              ;NO-SKIP
4126  010162  012737  056131  001360          MOV     #EM52,EM1N
4127  010170  104001                          ERROR   1               ;''ALIGNMENT PACK. DRIVE ABORTING''
4128  010172  000703                          BR      25$
4129
4130  010174  012701  070424          8$:     MOV     #IBUFF+10,R1    ;SET TO START OF BAD SECTOR DATA
4131
4132  010200  022711  177777          9$:     CMP     #-1,(R1)        ;TEST IF WORD ALL ONES (END OF DATA)
4133  010204  001422                          BEQ     11$             ;YES-SKIP
4134  010206  012123                          MOV     (R1)+,(R3)+     ;STORE CYLINDER
4135  010210  012123                          MOV     (R1)+,(R3)+     ;      TRACK AND SECTOR
4136  010212  005205                          INC     R5              ;BUMP ERROR COUNTER
4137  010214  022705  000025                  CMP     #21.,R5         ;DOES IT TOTAL 20 FOR THIS FORMAT?
4138  010220  001367                          BNE     9$              ;NO-TEST AND MORE NEXT ADDRESS
4139  010222  012737  056227  001360          MOV     #EM53,EM1N
4140  010230  104001                          ERROR   1               ;TO MANY BAD SECTORS
4141  010232  043737  001630  001354  10$:    BIC     DRVBIT,$DEVM    ;CLEAR DRIVE FROM TESTING
4142  010240  053737  001630  001666          BIS     DRVBIT,DRVDRP   ;SET DRIVE DROPPED
```

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4143  010246  000137  027716                    JMP     NEWDRV          ;ABORT PASS
4144
4145  010252  005200                  11$:      INC     R0              ;BUMP TO NEXT
4146  010254  022700  000001                    CMP     #1,R0           ;NOW TESTING BS SOFT 26 SECTOR MODE?
4147  010260  001011                            BNE     12$             ;NO-SKIP
4148  010262  012723  177777                    MOV     #-1,(R3)+       ;INSERT END OF FIELD FLAG
4149  010266  010337  001644                    MOV     R3,BSS26P       ;SET POINTER TO BAD SECTOR SOFTWARE FIELD
4150  010272  112737  000012  007722            MOVB    #12,2$          ;SET TO FIRST SECTOR  HIS MODE
4151  010300  000137  007676                    JMP     1$              ;GO READ IT.
4152  010304  022700  000002          12$:      CMP     #2,R0           ;NOW TESTING BS FACT 24 SECTOR MODE?
4153  010310  001014                            BNE     13$             ;NO-SKIP
4154  010312  012723  177777                    MOV     #-1,(R3)+       ;INSERT END OF FIELD FLAG
4155  010316  112737  000001  007722            MOVB    #1,2$           ;SET TO FIRST SECTOR THIS MODE
4156  010324  010537  001646                    MOV     R5,BS26CT       ;STORE TOTAL BS COUNT 26 SECTOR MODE
4157  010330  005005                            CLR     R5              ;CLEAR COUNTER FOR COUNTING 24 SECT BS
4158  010332  013703  001636                    MOV     BSF24P,R3       ;SET POINTER FOR STORING BS
4159  010336  000137  007676                    JMP     1$              ;GO READ
4160
4161  010342  022700  000003          13$:      CMP     #3,R0           ;NOW TESTING BS SOFT 24 SECTOR MODE
4162  010346  001011                            BNE     14$             ;NO-SKIP
4163  010350  012723  177777                    MOV     #-1,(R3)+       ;INSERT END OF FIELD FLAG
4164  010354  010337  001642                    MOV     R3,BSS24P       ;STORE POINTER TO BSS 24 SECTOR MODE
4165  010360  112737  000013  007722            MOVB    #13,2$          ;GET START OF FIELDS BSS 24 SECT MODE
4166  010366  000137  007676                    JMP     1$              ;GO READ IT
4167
4168  010372  012723  177777          14$:      MOV     #-1,(R3)+       ;INSERT END OF FIELD FLAG
4169  010376  010537  001650                    MOV     R5,BS24CT       ;STORE COUNT BSS 24 SECTOR MODE
4170
4171
4172  010402  012700  061144                    MOV     #BS26,R0        ;GET START OF BAD SECTOR BUFFER
4173                          ;                 MOV     #BS24+52.,R3    ;GET END OF BUFFER
4174                          ;
4175                          ;27$:     CMP     #312,(R0)+      ;TEST IF ANY SECTORS BAD IN CYL 312
4176                          ;         BEQ     26$             ;YES - GET OUT
4177                          ;
4178                          ;         CMP     R0,R3           ;CHECK IF ALL OF BUFFER TESTED
4179                          ;         BNE     27$             ;NO - LOOP
4180                          ;         BR      28$             ;EXIT
4181  010406  005003                            CLR     R3              ;COUNT
4182  010410  022710  177777          27$:      CMP     #-1,(R0)        ;AT THE END OF TABLE ?
4183  010414  001404                            BEQ     16$             ;BRANCH IF SO
4184  010416  022720  000312                    CMP     #312,(R0)+      ;CYL 312 BAD ?
4185  010422  001372                            BNE     27$             ;BRANCH IF NOT TRY AGAIN
4186  010424  000424                            BR      26$             ;ELSE ERROR
4187  010426  005203                  16$:      INC     R3              ;
4188  010430  020327  000001                    CMP     R3,#1           ;SEE IF 1 ST HALF OF BS 26 TABLE
4189  010434  001003                            BNE     17$             ;BRANCH IF NOT
4190  010436  013700  001644                    MOV     BSS26P,R0       ;MOVE UP THE TABLE
4191  010442  000762                            BR      27$             ;
4192  010444  020327  000002          17$:      CMP     R3,#2           ;SEE IF DID 2 ND HALF OF BS26 TABLE
4193  010450  001003                            BNE     18$             ;BRANCH IF NOT
4194  010452  012700  061270                    MOV     #BS24,R0        ;ELSE MOVE UP 1 ST HALF
4195  010456  000754                            BR      27$             ;
4196  010460  020327  000003          18$:      CMP     R3,#3           ;SEE IF DID 1 ST HALF OF BS24 TABLE
4197  010464  001003                            BNE     19$             ;BRANCH IF NOT
4198  010466  013700  001642                    MOV     BSS24P,R0       ;ELSE MOVE UP 2ND HALF OF BS24
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4199  010472  000746                        BR      27$
4200  010474  000406                19$:    BR      28$             ;ALL DONE
4201
4202  010476  012737  057110  001360  26$:  MOV     #DRVABT,EMIN    ;"BAD SECTOR IN AREA FOR TEST"
4203  010504  104001                        ERROR   1
4204  010506  000137  010002                JMP     25$
4205
4206  010512                        28$:
4207
4208                                ;;*****************************************************************
4209                                ;*TEST 21       FORMAT IN 26 SECTOR FORMAT
4210                                ;*
4211                                ;*      FORMAT CYLINDER 312, TRACK 0 AND TRACK 1 FOR 26 SECTOR
4212                                ;*      FORMAT.  VERIFY FORMAT AND THAT DATA LATE DID NOT
4213                                ;*      OCCUR WITH WRITE HEADER OR IN READING DATA
4214                                ;*      BUFFER AFTER READ HEADER.
4215                                ;*
4216                                ;;*****************************************************************
4217  010512  000004                TST21:  SCOPE
4218  010514  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4219  010522  012737  000312  001676        MOV     #312,REFMT      ;SET REFORMAT SWITCH
4220  010530  105037  010653               CLRB    10$             ;CLEAR SECTOR POINTER
4221  010534  105037  010557               CLRB    11$             ;CLEAR TRACK POINTER
4222  010540  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
4223  010542  104003                        ERROR   3               ;BAD INIT ERROR
4224
4225  010544  004437  035674          9$:   JSR     R4,LRLOAD       ;LOAD "L" REGS
4226  010550  000127                        WRHEAD                  ;WRITE HEADER
4227  010552  177676                        -102                    ;WORD CNT FOR 26 SECTOR MODE
4228  010554  072414                        OBUFF                   ;BUFFER
4229  010556     000                        .BYTE   0               ;SECTOR 0
4230  010557     000                11$:    .BYTE   0               ;TRACK 0
4231  010560  000312                        312                     ;CYL 0
4232
4233  010562  004437  04 ·.·0               JSR     R4,GENCOM       ;GENERATE DATA
4234  010566  000600                        000600                  ;BUILD HEADERS-NO BAD SECTORS
4235  010570  012737  010600  001110        MOV     #111$,$LPERR    ;SET LOCAL LOOP ON ERROR
4236  010576  000402                        BR      1$              ;SKIP INIT
4237  010600                        111$:
4238  010600  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
4239  010602  104003                        ERROR   3               ;BAD INIT ERROR
4240  010604  104417                1$:     TLOADRK                 ;LOAD RK REGS
4241  010606  104431                        TWAT112                 ;WAIT FOR INTERRUPT
4242  010610  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4243
4244  010612  104421                        TCHKOP                  ;CHECK FOR ANY ERRORS
4245  010614  104004                        ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
4246
4247  010616  104415                        SCOP1                   ;INTERNAL LOOP TO 111$
4248
4249  010620  012737  010660  001110        MOV     #112$,$LPERR    ;SET LOCAL LOOP ON ERROR
4250  010626  010203                        MOV     R2,R3           ;BUILD POINTER TO RKDB
4251  010630  062703  000024               ADD     #RKDB,R3
4252  010634  012701  070414               MOV     #IBUFF,R1       ;SET POINTER TO BUFFER
4253  010640  004437  035674               JSR     R4,LRLOAD       ;LOAD "L" REGS
4254  010644  000125                        RDHEAD                  ;READ HEADER
```

```
4255  010646  000000                        0                       ;NO WORDS COUNT
4256  010650  000000                        0                       ;NO BUFFER
4257  010652     000                        .BYTE   0               ;SECTOR 0
4258  010653     000              10$:      .BYTE   0               ;  TRACK 0
4259  010654  000312                        312                     ;  CYL 312
4260
4261  010656  000402                        BR      2$              ;SKIP INIT
4262  010660                           112$:
4263  010660  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
4264  010662  104003                        ERROR   3               ;BAD INIT ERROR
4265  010664  104417                  2$:   TLOADRK                 ;LOAD RK REGS
4266  010666  104423                        TWAT16                  ;WAIT FOR INTERRUPT
4267  010670  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4268
4269  010672  104421                        TCHKOP                  ;CHECK FOR ANY ERRORS
4270  010674  104004                        ERROR   4; OR 5,6,7     ;REPORT ALL ERRORS
4271  010676  012700  000003              MOV     #3,R0             ;SET COUNT
4272  010702  011321                  5$:   MOV     (R3),(R1)+        ;GET RKDB
4273  010704  104420                        TGETRK                  ;GET RK REGS
4274  010706  032737  100000  001550        BIT     #DLT,T.CS2      ;TEST IF DATA LATE
4275  010714  001410                        BEQ     3$              ;NO-SKIP
4276  010716  012737  054631  054260        MOV     #EMDLT,EM13
4277  010724  012737  056777  061112        MOV     #EMRDB,DF011A
4278  010732  104013                        ERROR   13              ;'DATA LATE SET RESULT OF DB READ
4279  010734  104415                        SCOP1                   ;LOCAL LOOP TO 112$
4280
4281  010736  032737  100000  001540  3$:   BIT     #CERR,T.CS1     ;TEST IF CONT ERROR SET
4282  010744  001410                        BEQ     4$              ;NO-SKIP
4283  010746  012737  057023  001500        MOV     #EMCERR,EM13N
4284  010754  012737  056777  061112        MOV     #EMRDB,DF011A
4285  010762  104013                        ERROR   13              ;''CERR SET RESULT OF READ DB
4286  010764  104415                        SCOP1                   ;LOCAL LOOP TO 112$
4287  010766  005300                  4$:   DEC     R0                ;DEC COUNT
4288  010770  001344                        BNE     5$              ;LOOP IF NOT ZERO
4289  010772  012737  011002  001110        MOV     #117$,$LPERR    ;SET LOCAL LOOP 117$
4290  011000  000402                        BR      7$              ;SKIP INIT
4291  011002                           117$:
4292  011002  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
4293  011004  104003                        ERROR   3               ;BAD INIT ERROR
4294  011006  004437  036362              JSR     R4,RDSTHD         ;GO READ & SEQUENCE HEADERS
4295  011012  104421                        TCHKOP                  ;CONTROLLER ERROR RETURN
4296  011014  104004                        ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
4297  011016  104013                        ERROR   13              ;''DATA LATE SET RESULT OF DATA BUFFER READ''
4298  011020  104002                        ERROR   2               ;''OPERATION TO SLOW'' MESSAGE
4299                                                                ;OR ''HEADER 0 NOT FOUND'' MESSAGE
4300
4301  011022  004437  042260              JSR     R4,GENCOM
4302  011026  100200                        100200                  ;COMPARE IBUF & OBUFF (HEADERS)
4303  011030  000414                        BR      6$              ;GOOD RETURN-NO MISCOMPARES
4304  011032  104015                        ERROR   15              ;REPORT 1ST MSCOMPARES
4305
4306  011034  013700  001634              MOV     ERRLMT,R0         ;GET ERROR LIMIT
4307  011040  005300                  12$:  DEC     R0                ;DECREMENT IT
4308  011042  001407                        BEQ     6$              ;EXIT IF ZERO
4309  011044  004437  042260              JSR     R4,GENCOM
4310
```

```
4311  011050  040000                          040000                  ;RESUME COMPARE
4312  011052  000403                          BR      6$              ;GOOD RETURN-NO MORE ERRORS
4313  011054  104016                          ERROR   16              ;REPORT NEXT ERROR LINE
4314  011056  000770                          BR      12$             ;LOOP
4315  011060  104415                          SCOP1                   ;LOCAL ERROR LOOP TO 117$
4316
4317  011062  105737  001607          6$:     TSTB    L.DT            ;WAS TRACK 1 JUST DONE?
4318  011066  001010                          BNE     8$              ;YES-SKIP
4319
4320  011070  112737  000001  010557          MOVB    #1,11$          ;CHANGE PARAM TO LOAD "L" WITH
4321  011076  112737  000001  010653          MOVB    #1,10$          ;TRACK 2
4322  011104  000137  010544                  JMP     9$              ;JUMP TO DO ENTIRE TEST ON TRK 1
4323
4324  011110                          8$:
4325
4326                                  .SBTTL  **HEADER RECOGNITION TESTS
4327
4328                                  ;;*****************************************************************
4329                                  ;*TEST 22       BAD SECTOR ERROR
4330                                  ;*
4331                                  ;*      FORMAT CYLINDER 312, TRACK 0, ON SCRATCH PACK TO HAVE
4332                                  ;*      SECTOR 0 (BIT 15 OR WORD 2 OF HEADER RESET) AND SECTOR 1
4333                                  ;*      (BIT 14 OR WORD 2 OF HEADER RESET) TO BE BAD SECTORS
4334                                  ;*      AND ALL OTHER SECTORS GOOD.
4335                                  ;*
4336                                  ;*      ISSUE A WRITE DATA OR 400 WORDS TO CYLINDER 312, TRACK 0,
4337                                  ;*      SECTOR 0.  MAKE SURE BAD SECTOR ERROR SETS.  ISSUE A
4338                                  ;*      WRITE DATA TO CYLINDER 0, TRACK 0, SECTOR 1 OF 400 WORDS.
4339                                  ;*      MAKE SURE BAD SECTOR ERROR SET.  ISSUE A WRITE DATA
4340                                  ;*      OF 400 WORDS TO CYLINDER 0, TRACK 0, SECTOR 2.  MAKE
4341                                  ;*      SURE NO ERROR SETS.
4342                                  ;*
4343                                  ;;*****************************************************************
4344  011110  000004          TST22:  SCOPE
4345  011112  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4346  011120  012737  000312  001676          MOV     #312,REFMT      ;SET REFORMAT SWITCH
4347  011126  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
4348  011130  104003                          ERROR   3               ;BAD INIT ERROR
4349
4350  011132  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS.
4351  011136  000127                          WRHEAD                  ;WRITE HEADER
4352  011140  177676                          -102                    ;WORD COUNT FOR 26 SECTOR MODE
4353  011142  072414                          OBUFF                   ;BUFFER ADDRESS
4354  011144     000                          .BYTE   0               ;SECTOR
4355  011145     000                          .BYTE   0               ;TRACK
4356  011146  000312                          312                     ;CYLINDER
4357
4358
4359  011150  004437  042260                  JSR     R4,GENCOM       ;GENERATE HEADERS
4360  011154  000600                          600                     ;WITH NO BS BITS
4361
4362  011156  012700  072416                  MOV     #OBUFF+2,R0     ;RESET BIT 15 IN WORD 2 OF
4363  011162  042720  100000                  BIC     #BIT15,(R0)+    ;SECTOR 0 HEADER AND BIT 14
4364  011166  042720  100000                  BIC     #BIT15,(R0)+    ;IN WORD 2 OF SECTOR 1 HEADER.
4365  011172  005720                          TST     (R0)+           ;ALSO CORRECT THE VRC
4366  011174  042720  040000                  BIC     #BIT14,(R0)+
```

```
4367  011200  042710  040000                    BIC     #BIT14,(R0)
4368
4369  011204  104417                            TLOADRK                 ;LOAD RK REGS
4370  011206  104431                            TWAIT12                 ;WAIT FOR INTERRUPT
4371  011210  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4372
4373  011212  104421                            TCHKOP                  ;CHECK IF ANY ERRORS
4374  011214  104004                            ERROR   4 , OR 5,6,7    ;REPORT ALL ERRORS
4375  011216  012737  011224  001110            MOV     #4$,$LPERR      ;SET LOCAL LOOP ON ERROR
4376  011224  104416                    4$:     TSSINIT
4377  011226  104003                            ERROR   3
4378  011230  004437  035674                    JSR     R4,LRLOAD       ;LOAD "L" REGS
4379  011234  000123                            WRDATA                  ;WRITE DATA
4380  011236  177400                            -400                    ;WORD COUNT
4381  011240  072414                            OBUFF                   ;BUS ADDRESS
4382  011242     000                    5$:     .BYTE   0               ;SECT 0
4383  011243     000                            .BYTE   0               ;TRACK 0
4384  011244  000312                            312                     ;CYL 312
4385
4386  011246  104417                    1$:     TLOADRK                 ;LOAD RK REGS
4387  011250  104424                            TWAIT32                 ;WAIT FOR INTERRUPT
4388  011252  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4389
4390  011254  022737  000002  011242            CMP     #2,5$           ;JUST READ SECTOR 2?
4391  011262  001415                            BEQ     6$              ;YES - SKIP
4392
4393  011264  104422                            TCHKWE                  ;CHECK OPERATION WITH ERROR
4394  011266  000000                            0
4395  011270  000100                            100                     ;EXPECTED BSE
4396  011272  000000                            0
4397  011274  104004                            ERROR   4 ; OR 5,6,7    ;REPORT ANY DISCREPENCIES
4398
4399  011276  104415                            SCOP1                   ;LOCAL ERROR LOOP TO 4$
4400
4401  011300  122737  000002  011242            CMPB    #2,5$           ;WAS SECTOR SET TO 2
4402  011306  001405                            BEQ     7$              ;YES-SKIP
4403  011310  105237  011242                    INCB    5$              ;BUMP TO NEXT SECTOR
4404  011314  000743                            BR      4$              ;LOOP
4405
4406  011316  104421                    6$:     TCHKOP                  ;CHECK FOR GOOD OPERATION
4407  011320  104004                            ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
4408
4409  011322                            7$:
4410                                    ;;*****************************************************************
4411                                    ;*TEST 23       HEADER VRC ERROR
4412                                    ;*
4413                                    ;*      FORMAT CYLINDER 312, TRACK 0, ON SCRATCH PACK TO HAVE
4414                                    ;*      16 SECTORS WITH BAD HEADER VRC.  ISSUE A WRITE DATA
4415                                    ;*      OF EACH OF THE SECTORS WITH A BAD HEADER VRC.  MAKE
4416                                    ;*      SURE HEADER VRC ERROR SETS.  ISSUE A WRITE DATA TO
4417                                    ;*      A GOOD HEADER AND MAKE SURE NO ERROR OCCURS.
4418                                    ;*
4419                                    ;;*****************************************************************
4420  011322  000004                    TST23:  SCOPE
4421  011324  012737  000012  001262            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4422  011332  012737  000312  001676            MOV     #312,REFMT      ;SET REFORMAT SWITCH
```

```
4423  011340  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
4424  011342  104003                        ERROR   3               ;BAD INIT ERROR
4425
4426  011344  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
4427  011350  000127                        WRHEAD                  ;WRITE HEADER
4428  011352  177676                        -102                    ;WORD COUNT
4429  011354  072414                        OBUFF                   ;BUFF ADD
4430  011356     000                        .BYTE   0               ;SECT
4431  011357     000                        .BYTE   0               ;TRACK
4432  011360  000312                        312                     ;CYL
4433
4434  011362  004437  042260                JSR     R4,GENCOM
4435  011366  000600                        600                     ;BUILD HEADERS NO BSE
4436
4437  011370  012700  072420                MOV     #OBUFF+4,R0     ;GET ADDRESS OF VRC HDR0
4438  011374  012703  000001                MOV     #BIT0,R3        ;SET FOR BIT CHANGE SELECT
4439  011400  030310            1$:         BIT     R3,(R0)         ;CHECK A VRC BIT
4440  011402  001402                        BEQ     2$              ;SKIP IF ZERO
4441  011404  040310                        BIC     R3,(R0)         ;ELSE CLEAR IT
4442  011406  000401                        BR      3$              ;SKIP
4443  011410  050310            2$:         BIS     R3,(R0)         ;IF ZERO SET IT
4444  011412  062700  000006    3$:         ADD     #6,R0           ;BUMP TO NEXT VRC WORD
4445
4446  011416  006303                        ASL     R3              ;SHIFT THE SELECT
4447  011420  001367                        BNE     1$              ;IF BIT NOT SHIFTED OUT-LOOP
4448
4449  011422  104417                        TLOADRK                 ;LOAD RK REGS
4450  011424  104431                        TWAT112                 ;WAIT FOR INTERRUPT
4451  011426  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4452  011430  104421                        TCHKOP                  ;CHECK OPERATION COMPLETE
4453  011432  104004                        ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
4454
4455  011434  012737  011442  001110        MOV     #4$,$LPERR      ;SET LOCAL LOOP
4456  011442  104416            4$:         TSSINIT                 ;CLEAR SUBSYSTEM
4457  011444  104003                        ERROR   3               ;BAD INIT ERROR
4458
4459  011446  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
4460  011452  000123                        WRDATA                  ;WRITE DATA
4461  011454  177400                        -400                    ;WORD COUNT
4462  011456  072414                        OBUFF                   ;BUFFER ADD
4463  011460     000            5$:         .BYTE   0               ;SECT
4464  011461     000                        .BYTE   0               ;TRACK
4465  011462  000312                        312                     ;CYL
4466
4467  011464  104417                        TLOADRK                 ;LOAD RK REG
4468  011466  104424                        TWAT32                  ;WAIT FOR INTERRUPT
4469  011470  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4470
4471  011472  022737  000020  011460        CMP     #16.,5$         ;WAS THIS WRITE SECTOR 16?
4472  011500  001415                        BEQ     6$              ;YES-SKIP
4473                                                                ;ELSE
4474  011502  104422                        TCHKWE                  ;CHECK OPERATION WITH ERROR
4475  011504  000000                        0
4476  011506  000040                        40                      ;HVRC  EM EXPECTED
4477  011510  000000                        0
4478  011512  104004                        ERROR   4 ; OR 5,6,7    ;REPORT ANY DISCREPENCIES
```

```
4479
4480  011514  104415                          SCOP'                   ;LOCAL LOOP TO 4$
4481
4482  011516  105237  011460                  INCB    5$              ;BUMP SECTOR IN "L" REG
4483  011522  022737  000016  011460          CMP     #16,5$          ;IF SECTOR IS 16 OR LESS
4484  011530  003744                          BLE     4$              ;LOOP
4485  011532  000402                          BR      7$              ;ELSE EXIT
4486  011534  104421                  6$:     TCHKOP                  ;CHECK LAST OPERATION NO ERRORS
4487  011536  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
4488
4489  011540                          7$:
```

```
                        ;;*****************************************************************
                        ;*TEST 24       BAD SECTOR ERROR AND HVRC ERROR
                        ;*
                        ;*      FORMAT CYLINDER 312, TRACK 0 SUCH THAT SECTOR ZERO HAS
                        ;*      BOTH A BAD SECTOR ERROR AND HEADER VRC.  ISSUE A WRITE DATA
                        ;*      TO CYLINDER 0, TRACK 0, SECTOR 0.  MAKE SURE ONLY HEADER VRC
                        ;*      ERROR SETS.
                        ;*
                        ;*****************************************************************
011540  000004         *ST24:  SCOPE
011542  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
011550  012737  000312  001676          MOV     #312,REFMT      ;SET REFORMAT SWITCH
011556  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
011560  104003                          ERROR   3               ;BAD INIT ERROR

011562  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REG
011566  000127                          WRHEAD                  ;WRITE HEADER
011570  177676                          -102                    ;WORD CNT FOR 26 SECTOR MODE
011572  072414                          OBUFF                   ;BUFF ADD
011574     000                          .BYTE   0               ;SECTOR
011575     000                          .BYTE   0               ;TRACK
011576  000312                          312                     ;CYLINDER

011600  004437  042260                  JSR     R4,GENCOM
011604  000600                          600                     ;BUILD HEADERS-NO BSE

011606  042737  100000  072416          BIC     #BIT15,OBUFF+2  ;CLEAR BIT TO SET BSE,LEAVE VRC BAD.

011614  104417                          TLOADRK                 ;LOAD RK REGS
011616  104431                          TWAIT12                 ;WAIT FOR INTERRUPT
011620  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

011622  104421                          TCHKOP                  ;CHECK FOR ANY ERRORS
011624  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS

011626  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
011632  000123                          WRDATA                  ;WRITE DATA
011634  177400                          -400                    ;WORD COUNT
011636  072414                          OBUFF                   ;BUFF ADD
011640     000                          .BYTE   0               ;SECTOR
011641     000                          .BYTE   0               ;TRACK
011642  000312                          312                     ;CYLINDER

011644  104417                          TLOADRK                 ;LOAD RK REGS
011646  104424                          TWAIT32                 ;WAIT FOR INTERRUPT
011650  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

011652  104422                          TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERR
011654  000000                          0
011656  000040                          40                      ;HVRC ERR EXPECTED
011660  000000                          0
011662  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL DISCREPENCIES

                        ;;*****************************************************************
                        ;*TEST 25       OPERATION INCOMPLETE
                        ;*
```

```
                                        ;*      FORMAT CYLINDER 312, TRACK 0 SUCH THAT SECTOR 21 HAS THE
                                        ;*      WRONG FORMAT.  ISSUE A WRITE DATA OF 400 TO CYLINER 0,
                                        ;*      TRACK 0, SECTOR 21.  MAKE SURE OPI SET.
                                        ;*
                                        ;*************************************************************
011664  000004                  TST25:  SCOPE
011666  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
011674  012737  000312  001676          MOV     #312,REFMT      ;SET REFORMAT SWITCH
011702  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
011704  104003                          ERROR   3               ;BAD INIT ERROR

011706  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
011712  000127                          WRHEAD                  ;WRITE HEADER
011714  177676                          -102                    ;WORD COUNT FOR 26 SECT MODE
011716  072414                          OBUFF                   ;BUFF ADD
011720     000                          .BYTE   0               ;SECTOR
011721     000                          .BYTE   0               ;TRACK
011722  000312                          312                     ;CYLINDER

011724  004437  042260                  JSR     R4,GENCOM
011730  000600                          600                     ;BUILD HEADERS-NO BSE ERRORS

011732  052737  001000  072614          BIS     #BIT9,OBUFF+200 ;CHANGE FORMAT IN SECTOR 25
011740  052737  001000  072616          BIS     #BIT9,OBUFF+202 ;CORRECT THE VRC

011746  104417                          TLOADRK                 ;LOAD RK REGS
011750  104431                          TWAT112                 ;WAIT FOR INTERRUPT
011752  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE

011754  104421                          TCHKOP                  ;CHECK FOR ANY ERRORS
011756  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS

011760  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
011764  000123                          WRDATA                  ;WRITE DATA
011766  177400                          -400                    ;400 WORDS
011770  072414                          OBUFF                   ;BUFF ADD
011772     025                          .BYTE   25              ;SECTOR 25
011773     000                          .BYTE   0               ;TRACK 0
011774  000312                          312                     ;CYL 312

011776  104417                          TLOADRK                 ;LOAD RK REGS
012000  104425                          TWAT48                  ;WAIT FOR INTERRUPT
012002  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE

012004  104422                          TCHKWE                  ;CHECK OPERATION EXPECTED ERROR
012006  000000                          0
012010  000020                          20                      ;OPI EXPECTED
012012  000000                          0
012014  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ANY DISCREPENCIES
                                        ;*************************************************************
                                        ;*TEST 26       OPI WITH HVRC ERROR
                                        ;*
                                        ;*      FORMAT CYLINDER 312, TRACK 0 SUCH THAT A HEADER VRC
                                        ;*      ERROR IS PRESENT AND SECTOR 17 HAS THE WRONG FORMAT.
                                        ;*      ISSUE A WRITE DATA OF 400 WORDS TO CYLINDER 312,
                                        ;*      TRACK 0, SECTOR 17.  THAT BOTH OPERATION INCOMPLETE
```

```
                                ;*      AND HEADER VRC SET.
                                ;*
                                ;*************************************************************
                                TST26:  SCOPE
012016  000004                          
012020  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
012026  012737  000312  001676          MOV     #312,REFMT      ;SET REFORMAT SWITCH
012034  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
012036  104003                          ERROR   3               ;BAD INIT ERROR
                                
012040  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
012044  000127                          WRHEAD                  ;WRITE HEADER
012046  177676                          -102                    ;WORD COUNT FOR 26 SECT MODE
012050  072414                          OBUFF                   ;BUS ADDRESS
012052     000                          .BYTE   0               ;SECTOR
012053     000                          .BYTE   0               ;TRACK
012054  000312                          312                     ;CYLINDER
                                
012056  004437  042260                  JSR     R4,GENCOM
012062  000600                          600                     ;BUILD HEADER- NO BSE ERRORS
                                
012064  012700  072550                  MOV     #OBUFF+134,R0   ;GET ADDRESS 2ND WORD HDR 17(8)
012070  052720  001000                  BIS     #BIT9,(R0)+     ;SET FORMAT 24 SECT PER TRACK
012074  052720  001000                  BIS     #BIT9,(R0)+     ;SET VRC BIT
012100  062700  000004                  ADD     #4,R0           ;BUMP TO HVRC WORD HDR 20(8)
012104  032710  000001                  BIT     #BIT0,(R0)      ;TEST BIT 0
012110  001403                          BEQ     1$              ;RESET-SKIP
012112  042710  000001                  BIC     #BIT0,(R0)      ;CLEAR BIT
012116  000402                          BR      2$
012120  052710  000001                  1$:     BIS     #BIT0,(R0)      ;SET BIT
                                
                                ;FORCE OPI AND HVRC ERROR
012124  104417                  2$:     TLOADRK                 ;LOAD RK REGS
012126  104431                          TWAT112                 ;WAIT FOR INTERRUPT
012130  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
                                
012132  104421                          TCHKOP                  ;CHECK FOR ANY ERRORS
012134  104004                          ERROR   4 ; OR 5,6,7    ;YES-REPORT ALL ERRORS
                                
012136  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
012142  000123                          WRDATA                  ;WRITE DATA
012144  177400                          -400                    ;400 WORDS
012146  072414                          OBUFF                   ;BUFF ADDRESS
012150     017                          .BYTE   17              ;SECT 17
012151     000                          .BYTE   0               ;TRACK 0
012152  000312                          312                     ;CYLINDER 312
                                
012154  104417                          TLOADRK                 ;LOAD RK REGS
012156  104425                          TWAT48                  ;WAIT FOR INTERRUPT
012160  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE
                                
012162  104422                          TCHKWE                  ;CHECK WITH EXPECTED ERROR
012164  000000                          0
012166  000060                          60                      ;HVRC ERR & OPI EXPECTED
012170  000000                          0
012172  104004                          ERROR   4  ;OR 5,6,7
                                ;;*************************************************************
                                ;*TEST 27        HVRC IGNORE ON NON-ADDRESSED SECTOR
```

```
                                        ;*
                                        ;*      FORMAT CYLINDER 312, TRACK 0 SUCH THAT SECTOR 20 HAS AN HVRC
                                        ;*      ERROR. ISSUE A WRITE DATA OF 400 WORDS TO CYLINDER 312, TRACK 0,
                                        ;*      AND SECTOR 21. MAKE SURE HVRC IS NOT SET AT THE
                                        ;*      END OF THE OPERATION
                                        ;*
                                        ;**************************************************************
012174  000004                  TST27:  SCOPE
012176  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
012204  012737  000312  001676          MOV     #312,REFMT      ;SET REFORMAT SWITCH

012212  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
012214  104003                          ERROR   3               ;BAD INIT ERROR

012216  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGISTERS
012222  000127                          WRHEAD                  ;WRITE HEADER
012224  177676                          -102                    ;WORD COUNT FOR 26 SECTOR MODE
012226  072414                          OBUFF                   ;BUFF ADD
012230     000                          .BYTE   0               ;SECTOR
012231     000                          .BYTE   0               ;TRACK
012232  000312                          312                     ;CYLINDER

012234  004437  042260                  JSR     R4,GENCOM
012240  000600                          600                     ;BUILD HEADERS-NO BSE ERRORS

012242  012700  072560                  MOV     #OBUFF+144,R0   ;ADDRESS OF HEAD 20 HVRC WORD
012246  012701  000002                  MOV     #BIT1,R1        ;BIT 1 CONSTANT
012252  030110                          BIT     R1,(R0)         ;TEST BIT 1 SET
012254  001402                          BEQ     1$              ;RESET-SKIP
012256  040110                          BIC     R1,(R0)         ;ELSE CLEAR BIT 1
012260  000401                          BR      2$              ;SKIP
012262  050110                  1$:     BIS     R1,(R0)         ;SET BIT 1

012264  104417                  2$:     TLOADRK                 ;LOAD RK REGS
012266  104431                          TWAT112                 ;WAIT FOR INTERRUPT
012270  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE

012272  104421                          TCHKOP                  ;CHECK FOR ANY ERROR
012274  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS

012276  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGISTER
012302  000123                          WRDATA                  ;WRITE DATA
012304  177400                          -400                    ;WORD COUNT
012306  072414                          OBUFF                   ;BUFF ADD
012310     021                          .BYTE   21              ;SECTOR
012311     000                          .BYTE   0               ;TRACK
012312  000312                          312                     ;CYLINDER
012314  104417                          TLOADRK                 ;LOAD RK REGS
012316  104424                          TWAT32                  ;WAIT FOR INTERRUPT
012320  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

012322  104421                          TCHKOP                  ;CHECK FOR ANY ERROR
012324  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS.


                                .SBTTL  **DATA TRANSFER TESTS
```

```
                                ;;*****************************************************************
                                ;*TEST 30       WRITE AND READ ONE SECTOR
                                ;*
                                ;*      FORMAT CYLINDER 312, ALL TRACKS AND CYLINDER 313, TRACK 0
                                ;*      TO AGREED WITH BAD SECTOR INFORMATION.  ISSUE A WRITE DATA
                                ;*      OF ONE SECTOR ON CYLINDER 312, TRACK 0.  READ IT BACK TO
                                ;*      MAKE SURE IT AGREES WITH WHAT IS WRITTEN.
                                ;*
                                ;*****************************************************************
012326  000004                TST30:  SCOPE
012330  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
012336  012737  000312  001676        MOV     #312,REFMT      ;SET REFORMAT SWITCH
012344  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
012346  104003                        ERROR   3               ;BAD INIT ERROR

012350  012737  000312  012376        MOV     #312,7$         ;PRESET CYL POINTER
012356  105037  012375                CLRB    2$              ;CLEAR TRACK POINTER

012362  004437  035674          1$:   JSR     R4,LRLOAD       ;LOAD "L" REG
012366  000127                        WRHEAD                  ;WRITE HEADER
012370  177676                        -102                    ;WORD COUNT FOR 26 SECTOR MODE
012372  072414                        OBUFF                   ;BUFF ADDRESS
012374     000                        .BYTE   0               ;SECTOR
012375     000                  2$:   .BYTE   0               ;TRACK
012376  000312                  7$:   312                     ;CYLINDER

012400  004437  042260                JSR     R4,GENCOM
012404  001200                        1200                    ;BUILD HDRS-INCLUDE BAD SECTORS

012406  104417                        TLOADRK                 ;LOAD RK REGS
012410  104431                        TWAT112                 ;WAIT FOR INTERRUPT
012412  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

012414  104421                        TCHKOP                  ;CHECK FOR ANY ERRORS
012416  104004                        ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS

012420  022737  000313  012376        CMP     #313,7$         ;TEST IF DONE 313 TK 0
012426  001414                        BEQ     3$              ;YES - SKIP
012430  123727  012375  000002        CMPB    2$,#2           ;DID WE JUST FORMAT TRACK 2
012436  001403                        BEQ     8$              ;YES-SKIP
012440  105237  012375                INCB    2$              ;BUMP TO NEXT TRACK
012444  000746                        BR      1$              ;GO FORMAT NEXT TRACK

012446  105037  012375          8$:   CLRB    2$              ;CLEAR TRACK POINTER
012452  005237  012376                INC     7$              ;BUMP CYL TO 313
012456  000741                        BR      1$              ;GO FORMAT 313 TK 0

012460  004437  035674          3$:   JSR     R4,LRLOAD       ;LOAD "L" REGS
012464  000123                        WRDATA                  ;WRITE DATA
012466  177400                        -400                    ;ONE SECTOR WORD COUNT
012470  072414                        OBUFF                   ;BUFF ADDRESS
012472     012                        .BYTE   12              ;SECTOR 12
012473     000                        .BYTE   0               ;TRACK 0
012474  000312                        312                     ;CYLINDER 312
```

```
                                                                ;JSR     R4,GENCOM
                                                                1                       ;BUILD DATA PATTERN 1
                                                                400                     ;400 WORDS LONG
                                                                MOV     #4$,$LPERR      ;SET FOR LOCAL LOOP
                                                        4$:     TLOADRK                 ;LOAD RK REGS
                                                                TWAT112                 ;WAIT FOR INTERRUPT
                                                                ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

                                                                TCHKOP                  ;CHECK FOR ANY ERRORS
                                                                ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS

                                                                JSR     R4,LRLOAD       ;LOAD "L" REGS
                                                                RDDATA                  ;READ DATA
                                                                -400                    ;400 WORDS
                                                                IBUFF                   ;BUFF ADD
                                                                .BYTE   12              ;SECTOR 12
                                                                .BYTE   0               ;TRACK 0
                                                                312                     ;CYL 312

                                                                TLOADRK                 ;LOAD RK
                                                                TWAT32                  ;WAIT FOR INTERRUPT
                                                                ERROR   2               ;TO SLOW/NOT COMPLETE

                                                                TCHKOP                  ;CHECK FOR ANY ERRORS
                                                                ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS

                                                                JSR     R4,GENCOM
                                                                100001                  ;GO COMPARE DATA TO PATTERN 1
                                                                400                     ;400 WORDS LONG
                                                                BR      6$              ;GOOD RETURN-NO DATA ERRORS
                                                                ERROR   15              ;ERROR RETURN

                                                                MOV     ERRLMT,R0       ;GET ERROR LIMIT
                                                        5$:     DEC     R0              ;DEC LIMIT
                                                                BEQ     6$              ;EXIT IF 0
                                                                JSR     R4,GENCOM
                                                                040000                  ;CONTINUE COMPARE
                                                                BR      6$              ;EXIT IF NO MORE ERRORS
                                                                ERROR   16              ;ELSE REPORT MISCOMPARE
                                                                BR      5$              ;LOOP
                                                        6$:     CLR     REFMT           ;CLEAR REFORMAT SWITCH

                                                        ;;*****************************************************************
                                                        ;*TEST 31       WRITE DATA WITH BUS ADDRESS INCREMENT INHIBIT
                                                        ;*
                                                        ;*      ISSUE A WRITE DATA OF ONE SECTOR TO CYLINDER 312,
                                                        ;*      TRACK 2, SECTOR 12 WITH INHIBIT BUS
                                                        ;*      ADDRESS INCREMENT. READ DATA BACK TO MAKE SURE
                                                        ;*      EVERY WORD IS THE SAME AND CORRECT.
                                                        ;*
                                                        ;;*****************************************************************
                                                        TST31:  SCOPE
                                                                MOV     #10.,$TIMES     ;;DO 10. ITERATIONS

                                                                TSSINIT                 ;CLEAR SUBSYSTEM
                                                                ERROR   3               ;BAD INIT ERROR
```

```
 4826
 4827  012636  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
 4828  012642  000123                    WRDATA                  ;WRDATA
 4829  012644  177400                    -400                    ;-400 WORDS
 4830  012646  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
 4831  012650     012                    .BYTE   12              ;SECTOR 12
 4832  012651     001                    .BYTE   1               ;TRACK 1
 4833  012652  000312                    312                     ;CYLINDER 312
 4834
 4835  012654  052737  000020  001610    BIS     #BAI,L.CS2      ;SET INCREMENT INHIBIT
 4836  012662  004437  042260            JSR     R4,GENCOM       ;BUILD PATTERN
 4837  012666  000016                    16                      ;PATTERN 16
 4838  012670  000400                    400                     ;400 WORDS
 4839
 4840  012672  104417                    TLOADRK                 ;LOAD RK REGS
 4841  012674  104430                    TWAT96                  ;WAIT FOR INTERRUPT
 4842  012676  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 4843
 4844  012700  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 4845  012702  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 4846
 4847  012704  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
 4848  012710  000121                    RDDATA                  ;RDDATA
 4849  012712  177400                    -400                    ;-400 WORDS
 4850  012714  070414                    IBUFF                   ;IBUFF IS BUFF ADDRESS
 4851  012716     012                    .BYTE   12              ;SECTOR 12
 4852  012717     001                    .BYTE   1               ;TRACK 1
 4853  012720  000312                    312                     ;CYLINDER 312
 4854
 4855  012722  012700  000377            MOV     #377,R0         ;SET COUNT TO SET OBUFF TO BE
 4856  012726  012701  072416            MOV     #OBUFF+2,R1     ;ALL THE FIRST WORD OF PATTERN
 4857  012732  012703  072414            MOV     #OBUFF,R3
 4858
 4859  012736  011321          1$:       MOV     (R3),(R1)+      ;MOV THE WORD
 4860  012740  005300                    DEC     R0
 4861  012742  001375                    BNE     1$              ;LOOP UNTIL ALL WORDS SET
 4862
 4863  012744  104417                    TLOADRK                 ;LOAD RK REGS
 4864  012746  104424                    TWAT32                  ;WAIT FOR INTERRUPT
 4865  012750  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 4866
 4867  012752  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 4868  012754  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 4869
 4870  012756  004437  042260            JSR     R4,GENCOM       ;COMPARE THE DATA
 4871  012762  100000                    100000
 4872  012764  000400                    400
 4873  012766  000413                    BR      2$
 4874  012770  104015                    ERROR   15
 4875  012772  013700  001634            MOV     ERRLMT,R0       ;GET ERROR LIMIT
 4876  012776  005300          64$:      DEC     R0              ;DECREMENT COUNT
 4877  013000  001406                    BEQ     65$             ;IF ZERO - EXIT
 4878  013002  004437  042260            JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
 4879  013006  040000                    40000
 4880  013010  000402                    BR      65$             ;NO MORE ERRORS - EXIT
 4881  013012  104016                    ERROR   16              ;REPORT NEXT ERROR
```

```
                                        BR      64$             ;LOOP
                                65$:
                                2$:
                                ;;*****************************************************************
                                ;*TEST 32        WRITE DATA ADDRESS GREATER THAN 32K
                                ;*
                                ;*      ISSUE A WRITE DATA OF 400 WORDS WITH ADDRESS - '77770.
                                ;*      MAKE SURE CORRECT DATA IS ON DISK.
                                ;*
                                ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF MORE THAN 32K
                                ;*              OF MEMORY IS PRESENT.
                                ;*
                                ;;*****************************************************************
013016  000004                  TST32:  SCOPE
013020  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
013026  123727  001326  000001          CMPB    $MAMS1,#1       ;TEST IF >32K MEM
013034  002016                          BGE     2$              ;YES-SKIP

013036  032737  000002  001664          BIT     #MEMSZB,OPTFLG  ;TEST IF REPORT ALREADY MADE
013044  001011                          BNE     1$              ;YES -SKIP

013046  104401  051573                  TYPE    ,OPR011         ;''INSUFFICIENT MEMORY DATA TRANSFER WITH
013052  104401  051736                  TYPE    ,OPR012         ;ADDRESS >32K
013056  052737  000002  001664          BIS     #MEMSZB,OPTFLG  ;SET FLAG
013064  104401  051752                  TYPE    ,OPR015         ;BYPASSED''
013070  000470                  1$:     BR      4$              ;EXIT
013072  012737  013100  001110  2$:     MOV     #5$,$LPERR      ;SET LOCAL LOOP ON ERROR ADDRESS
013100                          5$:
013100  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
013102  104003                          ERROR   3               ;BAD INIT ERROR

013104  004437  035674                  JSR     R4,LRLOAD       ;LOAD ''L'' REGS
013110  000123                          WRDATA                  ;WRITE DATA
013112  177400                          -400                    ;400 WORDS
013114  177770                          177770                  ;BUS ADDRESS IN 32K -10 BYTES
013116     016                          .BYTE   16              ;SECTOR 16
013117     000                          .BYTE   0               ;TRACK 0
013120  000312                          312                     ;CYLINDER 312
013122  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
013126  010010                          10010                   ;PATTERN 10, MEM. MANAGEMENT FOR DEST.
013130  001777                          1777                    ;RELOCATION ARGUMENT
013132  000400                          400                     ;400 WORDS

013134  104417                          TLOADRK                 ;LOAD RK REGS
013136  104430                          TWAT96                  ;WAIT FOR INTERRUPT
013140  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

013142  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
013144  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
013146  104415                          SCOP1                   ;LOCAL LOOP ON ERROR TO 5$

013150  004437  042260                  JSR     R4,GENCOM       ;CLEAR IBUFF TO 1'S.
013154  002007                          2007
013156  001000                          1000
```

```
4938  013160  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
4939  013164  000121                  RDDATA                  ;RDDATA
4940  013166  177400                  -400                    ;-400 WORDS
4941  013170  070414                  IBUFF                   ;IBUFF IS BUFF ADDRESS
4942  013172     016                  .BYTE   16              ;SECTOR 16
4943  013173     000                  .BYTE   0               ;TRACK 0
4944  013174  000312                  312                     ;CYLINDER 312
4945  013176  104417                  TLOADRK                 ;LOAD RK REGS
4946  013200  104424                  TWAT32                  ;WAIT FOR INTERRUPT
4947  013202  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
4948  013204  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
4949  013206  104004                  ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
4950  013210  004437  042260          JSR     R4,GENCOM       ;COMPARE
4951  013214  110000                  110000                  ;MEMORY MANAGEMENT FOR DESTINATION
4952  013216  001777                  1777                    ;RELOCATION ARGUMENT
4953  013220  000400                  400                     ;400 WORDS
4954  013222  000413                  BR      4$              ;NO ERROR-SKIP
4955  013224  104015                  ERROR   15              ;REPORT FIRST MISCOMPARE
4956  013226  013700  001634          MOV     ERRLMT,R0       ;GET ERROR LIMIT
4957  013232  005300          64$:    DEC     R0              ;DECREMENT COUNT
4958  013234  001406                  BEQ     65$             ;IF ZERO - EXIT
4959  013236  004437  042260          JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
4960  013242  050000                  50000
4961  013244  000402                  BR      65$             ;NO MORE ERRORS - EXIT
4962  013246  104016                  ERROR   16              ;REPORT NEXT ERROR
4963  013250  000770                  BR      64$             ;LOOP
4964  013252                  65$:
4965
4966  013252                  4$:
4967                          ;;*****************************************************************
4968                          ;*TEST 33       READ DATA ADDRESS GREATER THAN 32K
4969                          ;*
4970                          ;*      ISSUE A READ DATA OF 400 WORDS WITH ADDRESS = 177770.
4971                          ;*      CHECK MEMORY FOR CORRECT TRANSFER.
4972                          ;*
4973                          ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF MORE THAN 32K
4974                          ;*              OF MEMORY IS PRESENT.
4975                          ;*
4976                          ;;*****************************************************************
4977  013252  000004          TST33:  SCOPE
4978  013254  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
4979  013262  123727  001326  000001          CMPB    $MAMS1,#1       ;CHECK IF >32K MEMORY
4980  013270  002001                  BGE     2$              ;YES-SKIP
4981
4982  013272  000462          1$:     BR      5$              ;EXIT
4983
4984  013274  012737  013302  001110  2$:     MOV     #3$,$LPERR      ;SET LOCAL ERROR LOOP
4985
4986  013302                  3$:
4987  013302  104416                  TSSINIT                 ;CLEAR SUBSYSTEM
4988  013304  104003                  ERROR   3               ;BAD INIT ERROR
4989  013306  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
4990  013312  000123                  WRDATA                  ;WRDATA
4991  013314  177400                  -400                    ;-400 WORDS
4992  013316  072414                  OBUFF                   ;OBUFF IS BUFF ADDRESS
4993  013320     017                  .BYTE   17              ;SECTOR 17
```

```
4994  013321  000                        .BYTE   0               ;TRACK 0
4995  013322  000312                     312                     ;CYLINDER 312
4996  013324  004437  042260             JSR     R4,GENCCM       ;GENERATE DATA IN OBUFF
4997  013330  000011                     11                      ;PATTERN 11
4998  013332  000400                     400                     ;400 WORDS
4999
5000  013334  104417                     TLOADRK                 ;LOAD RK REGS
5001  013336  104430                     TWAT96                  ;WAIT FOR INTERRUPT
5002  013340  104002                     ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5003
5004  013342  104421                     TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5005  013344  104004                     ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5006  013346  004437  035674             JSR     R4,LRLOAD       ;LOAD "L" REG
5007  013352  000121                     RDDATA                  ;READ DATA
5008  013354  177400                     -400                    ;400 WORDS
5009  013356  177770                     177770                  ;ACCROSS 32K BOUNDARY
5010  013360  017                        .BYTE   17              ;SECTOR 17
5011  013361  000                        .BYTE   0               ;TRACK 0
5012  013362  000312                     312                     ;CYL 312
5013
5014  013364  104417                     TLOADRK                 ;LOAD RK REGS
5015  013366  104424                     TWAT32                  ;WAIT FOR INTERRUPT
5016  013370  104002                     ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5017  013372  104421                     TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5018  013374  104004                     ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5019  013376  004437  042260             JSR     R4,GENCOM       ;COMPARE DATA
5020  013402  120000                     120000                  ;MEMORY MANAGEMENT WITH SOURCE
5021  013404  001777                     1777                    ;RELOCATION ARGUMENT
5022  013406  000400                     400                     ;COMPARE 400 WORDS
5023  013410  000413                     BR      5$              ;NO MISCOMPARE-EXIT
5024  013412  104015                     ERROR   15              ;REPORT FIRST MISCOMPARE
5025  013414  013700  001634             MOV     ERRLMT,R0       ;GET ERROR LIMIT
5026  013420  005300               64$:  DEC     R0              ;DECREMENT COUNT
5027  013422  001406                     BEQ     65$             ;IF ZERO - EXIT
5028  013424  004437  042260             JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
5029  013430  060000                     60000
5030  013432  000402                     BR      65$             ;NO MORE ERRORS - EXIT
5031  013434  104016                     ERROR   16              ;REPORT NEXT ERROR
5032  013436  000770                     BR      64$             ;LOOP
5033  013440                         65$:
5034  013440                         5$:
5035                                   ;;*****************************************************************
5036                                   ;*TEST 34       WRITE DATA ADDRESS GREATER THAN 64K
5037                                   ;*
5038                                   ;*      ISSUE A WRITE DATA OF 400 WORDS WITH ADDRESS = 377770.
5039                                   ;*      MAKE SURE CORRECT DATA IS ON DISK.
5040                                   ;*
5041                                   ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF MORE THAN 64K
5042                                   ;*              OF MEMORY IS PRESENT.
5043                                   ;*
5044                                   ;*****************************************************************
5045  013440  000004                 TST34:  SCOPE
5046  013442  012737  000012  001262         MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5047  013450  123727  001326  000002         CMPB    $MAMS1,#2       ;CHECK IF >64K MEMORY
5048  013456  002016                         BGE     2$              ;YES-SKIP
5049  013460  032737  000002  001664   6$:   BIT     #MEMSZB,OPTFLG  ;TEST IF REPORT FLAG SET
```

```
5050  013466  001017                        BNE     1$              ;NO-SKIP
5051
5052  013470  104401  051573                TYPE    ,OPR011         ;''INSUFFICIENT MEMORY-DATA XFER WITH
5053  013474  104401  051742                TYPE    ,OPR013         ;ADDRESS >64K
5054  013500  104401  051752                TYPE    ,OPR015         ;BYPASSED''
5055  013504  052737  000002  001664        BIS     #MEMSZB,OPTFLG  ;SET FLAG
5056  013512  000467                1$:     BR      5$
5057
5058  013514  012737  013522  001110  2$:   MOV     #3$,$LPERR      ;SET LOCAL LOOP ON ERROR
5059
5060  013522                         3$:
5061  013522  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
5062  013524  104003                        ERROR   3               ;BAD INIT ERROR
5063  013526  004437  042260                JSR     R4,GENCOM       ;GENERATE DATA, PATTERN 1'
5064  013532  010011                        100'1                   ;MEM MANAGEMENT ON DESTINATION
5065  013534  003777                        3777                    ;RELOCATION ARGUMENT
5066  013536  000400                        400                     ;400 WORDS
5067
5068  013540  004437  035674                JSR     R4,LRLOAD       ;LOAD ''L'' REGS
5069  013544  000523                        WRDATA!BA16             ;WRITE DATA AND SET BA16
5070  013546  177400                        -400                    ;400 WORDS
5071  013550  177770                        177770                  ;ACCROSS 64K BOUNDARY
5072  013552     020                        .BYTE   20              ;SECTOR 20
5073  013553     000                        .BYTE   0               ;TRACK 0
5074  013554  000312                        312                     ;CYLINDER 312
5075
5076  013556  104417                        TLOADRK                 ;LOAD RK REGS
5077  013560  104430                        TWAT96                  ;WAIT FOR INTERRUPT
5078  013562  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5079
5080  013564  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5081  013566  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5082  013570  004437  042260                JSR     R4,GENCOM       ;CLEAR IBUFF TO 1'S
5083  013574  002007                        2007
5084  013576  001000                        '000
5085
5086  013600  004437  035674                JSR     R4,LRLOAD       ;LOAD ''L'' REGS
5087  013604  000121                        RDDATA                  ;RDDATA
5088  013606  177400                        -400                    ;-400 WORDS
5089  013610  070414                        IBUFF                   ;IBUFF IS BUFF ADDRESS
5090  013612     020                        .BYTE   20              ;SECTOR 20
5091  013613     000                        .BYTE   0               ;TRACK 0
5092  013614  000312                        312                     ;CYLINDER 312
5093  013616  104417                        TLOADRK                 ;LOAD RK REGS
5094  013620  104424                        TWAT32                  ;WAIT FOR INTERRUPT
5095  013622  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5096
5097  013624  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5098  013626  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5099  013630  004437  042260                JSR     R4,GENCOM       ;CHECK DATA
5100  013634  110000                        110000                  ;MEMORY MANAGEMENT WITH DESTINATION
5101  013636  003777                        3777                    ;RELOCATION ARGUMENT
5102  013640  000400                        400                     ;400 WORDS
5103  013642  000413                        BR      5$              ;NO MISCOMPARES-SKIP
5104  013644  104015                        ERROR   15              ;REPORT FIRST ERROR
5105
```

```
5106  013646  013700  001634            MOV     ERRLMT,R0       ;GET ERROR LIMIT
5107  013652  005300                64$:DEC     R0              ;DECREMENT COUNT
5108  013654  001406                    BEQ     65$             ;IF ZERO - EXIT
5109  013656  004437  042260            JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
5110  013662  050000                    50000
5111  013664  000402                    BR      65$             ;NO MORE ERRORS - EXIT
5112  013666  104016                    ERROR   16              ;REPORT NEXT ERROR
5113  013670  000770                    BR      64$             ;LOOP
5114  013672                        65$:
5115  013672                        5$:
5116                                ;:*****************************************************************
5117                                ;*TEST 35       READ DATA ADDRESS GREATER THAN 64K
5118                                ;*
5119                                ;*      ISSUE A READ DATA OF 400 WORDS WITH ADDRESS = 377770.
5120                                ;*      CHECK MEMORY FOR CORRECT TRANSFER.
5121                                ;*
5122                                ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF MORE THAN 64K
5123                                ;*              OF MEMORY IS PRESENT.
5124                                ;*
5125                                ;*****************************************************************
5126  013672  000004                *ST35:  SCOPE
5127  013674  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5128  013702  123727  001326  000002        CMPB    $MAMS1,#2       ;CHECK IF >64K MEMORY
5129  013710  002001                    BGE     2$              ;YES-SKIP
5130  013712  000462                1$:     BR      5$              ;EXIT
5131
5132  013714  012737  000032  001110  2$:   MOV     #32,$LPERR      ;SET LOCAL LOOP ON ERROR
5133
5134  013722                        3$:
5135  013722  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
5136  013724  104003                    ERROR   3               ;BAD INIT ERROR
5137  013726  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
5138  013732  000123                    WRDATA                  ;WRDATA
5139  013734  177400                    -400                    ;-400 WORDS
5140  013736  072414                    DBUFF                   ;DBUFF IS BUFF ADDRESS
5141  013740     021                    .BYTE   21              ;SECTOR 21
5142  013741     000                    .BYTE   0               ;TRACK 0
5143  013742  000312                    312                     ;CYLINDER 312
5144  013744  004437  042260            JSR     R4,GENCOM       ;GENERATE DATA
5145  013750  000012                    12                      ;PATTERN 12
5146  013752  000400                    400                     ;400 WORDS
5147
5148  013754  104417                    TLOADRK                 ;LOAD RK REGS
5149  013756  104430                    TWAT96                  ;WAIT FOR INTERRUPT
5150  013760  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5151
5152  013762  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5153  013764  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5154  013766  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
5155  013772  000521                    RDDATA!BA16             ;READ DATA AND SET BA16
5156  013774  177400                    -400                    ;400 WORDS
5157  013776  177770                    177770                  ;ACCROSS 64K BOUNDARY
5158  014000     021                    .BYTE   21              ;FROM SECTOR 21
5159  014001     000                    .BYTE   0               ;TRACK 0
5160  014002  000312                    312                     ;CYLINDER 312
5161
```

```
                                        TLOADRK                 ;LOAD RK REGS
                                        TWAT32                  ;WAIT FOR INTERRUPT
                                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

                                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
                                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
                                        JSR     R4,GENCOM       ;COMPARE DATA
                                        120000                  ;MEM MANAGEMENT WITH SOURCE
                                        3777                    ;RELOCATION ARGUMENT
                                        400                     ;400 WORDS
                                        BR      5$              ;NO MISCOMPARES-SKIP
                                        ERROR   15              ;REPORT FIRST ERROR

                                        MOV     ERRLMT,R0       ;GET ERROR LIMIT
                                64$:    DEC     R0              ;DECREMENT COUNT
                                        BEQ     65$             ;IF ZERO - EXIT
                                        JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
                                        60000
                                        BR      65$             ;NO MORE ERRORS - EXIT
                                        ERROR   16              ;REPORT NEXT ERROR
                                        BR      64$             ;LOOP
                                65$:

                                5$:
                                ;;**************************************************************
                                ;*TEST 36       WRITE DATA ADDRESS GREATER THAN 96K
                                ;*
                                ;*      ISSUE A WRITE DATA OF 400 WORDS WITH ADDRESS = 577770.
                                ;*      MAKE SURE CORRECT DATA IS ON DISK.
                                ;*
                                ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF MORE THAN 96K
                                ;*              OF MEMORY IS PRESENT.
                                ;*
                                ;;**************************************************************
                        TST36:  SCOPE
                                MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
                                CMPB    $MAMS1,#3       ;CHECK IF >96K MEMORY
                                BGE     3$              ;YES-SKIP
                        1$:     BIT     #MEMSZB,OPTFLG  ;TEST IF REPORT FLAG SET
                                BNE     2$              ;NO-SKIP

                                TYPE    ,OPR011         ;"INSUFFICIENT MEMORY-DATA TRANSFET WITH
                                TYPE    ,OPR014         ;ADDRESS >96K BYPASSED"
                                TYPE    ,OPR015
                                BIS     #MEMSZB,OPTFLG  ;SET REPORT FLAG
                        2$:     BR      6$

                        3$:     MOV     #4$,$LPERR      ;SET LOCAL LOOP ON ERROR

                        4$:
                                TSSINIT                 ;CLEAR SUBSYSTEM
                                ERROR   3               ;BAD INIT ERROR
                                JSR     R4,LRLOAD       ;LOAD "L" REG
                                WRDATA,BA17             ;WRITE DATA AND BA17
                                -400                    ;400 WORDS FROM
                                177770                  ;ACCROSS 96K BOUNDARY
```

```
5218  014160  000022                  .BYTE   22              ;TO SECTOR 22
5219  014161  000000                  .BYTE   0               ;TRACK 0
5220  014162  000312                  312                     ;CYL 312
5221  014164  004437  042260          JSR     R4,GENCOM       ;GENERATE DATA
5222  014170  010013                  10013                   ;PATTERN 13 MEM MAN WITH DEST.
5223  014172  005777                  5777                    ;RELOCATION ARGUMENT
5224  014174  000400                  400                     ;400 WORDS
5225
5226  014176  104417                  TLOADRK                 ;LOAD RK REGS
5227  014200  104430                  TWAT96                  ;WAIT FOR INTERRUPT
5228  014202  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5229
5230  014204  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5231  014206  104004                  ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5232
5233  014210  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
5234  014214  000121                  RDDATA                  ;RDDATA
5235  014216  177400                  -400                    ;-400 WORDS
5236  014220  070414                  IBUFF                   ;IBUFF IS BUFF ADDRESS
5237  014222  000022                  .BYTE   22              ;SECTOR 22
5238  014223  000000                  .BYTE   0               ;TRACK 0
5239  014224  000312                  312                     ;CYLINDER 312
5240
5241  014226  104417                  TLOADRK                 ;LOAD RK REGS
5242  014230  104424                  TWAT32                  ;WAIT FOR INTERRUPT
5243  014232  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5244
5245  014234  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5246  014236  104004                  ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5247
5248  014240  004437  042260          JSR     R4,GENCOM       ;COMPARE DATA
5249  014244  110000                  110000                  ;MEM MANAGEMENT WITH DESTINATION
5250  014246  005777                  5777                    ;RELOCATION ARGUMENT
5251  014250  000400                  400                     ;400 WORDS
5252  014252  000413                  BR      6$              ;NO MISCOMPARES-BRANCH
5253  014254  104015                  ERROR   15              ;REPORT 1ST ERROR
5254
5255  014256  013700  001634          MOV     ERRLMT,R0       ;GET ERROR LIMIT
5256  014262  005300          64$:    DEC     R0              ;DECREMENT COUNT
5257  014264  001406                  BEQ     65$             ;IF ZERO - EXIT
5258  014266  004437  042260          JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
5259  014272  050000                  50000
5260  014274  000402                  BR      65$             ;NO MORE ERRORS - EXIT
5261  014276  104016                  ERROR   16              ;REPORT NEXT ERROR
5262  014300  000770                  BR      64$             ;LOOP
5263  014302                  65$:
5264
5265  014302                  6$:
5266                          ;;*****************************************************************
5267                          ;*TEST 37       READ DATA ADDRESS GREATER THAN 96K
5268                          ;*
5269                          ;*      ISSUE A READ DATA OF 400 WORDS WITH ADDRESS = 577770.
5270                          ;*      CHECK MEMORY FOR CORRECT TRANSFER.
5271                          ;*
5272                          ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF MORE THAN 96K
5273                          ;*              OF MEMORY IS PRESENT.
```

```
                                        ;*
                                        ;*************************************************************
014302  000004                  TST37:  SCOPE
014304  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
014312  123727  001326  000003          CMPB    $MAMS1,#3       ;CHECK IF >96K MEMORY
014320  002001                          BGE     3$              ;YES-SKIP
014322  000462                  2$:     BR      6$
                                
014324  012737  014332  001110  3$:     MOV     #4$,$LPERR      ;SET LOCAL LOOP ON ERROR
                                
014332                          4$:
014332  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
014334  104003                          ERROR   3               ;BAD INIT ERROR
                                
014336  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
014342  000123                          WRDATA                  ;WRDATA
014344  177400                          -400                    ;-400 WORDS
014346  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
014350     005                          .BYTE   5               ;SECTOR 5
014351     000                          .BYTE   0               ;TRACK 0
014352  000312                          312                     ;CYLINDER 312
014354  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
014360  000014                          14                      ;PATTERN 14
014362  000400                          400                     ;400 WORDS
                                
014364  104417                          TLOADRK                 ;LOAD RK REGS
014366  104430                          TWAT96                  ;WAIT FOR INTERRUPT
014370  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
                                
014372  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
014374  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
014376  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
014402  001121                          RDDATA.BA17             ;READ DATA WITH BA17 SET
014404  177400                          -400                    ;400 WORDS
014406  177770                          177770                  ;ACCROSS 96K BOUNDARY
014410     005                          .BYTE   5               ;FROM SECTOR 5
014411     000                          .BYTE   0               ;TRACK 0
014412  000312                          312                     ;CYL 312
                                
014414  104417                          TLOADRK                 ;LOAD RK REGS
014416  104424                          TWAT32                  ;WAIT FOR INTERRUPT
014420  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
                                
014422  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
014424  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
014426  004437  042260                  JSR     R4,GENCOM       ;COMPARE DATA
014432  120000                          120000                  ;MEM MANAGEMENT WITH SOURCE
014434  005777                          5777                    ;RELOCATION ARGUMENT
014436  000400                          400                     ;400 WORDS
014440  000413                          BR      6$              ;NO MISCOMPARES-SKIP
014442  104015                          ERROR   15              ;REPORT FIRST ERROR
                                
014444  013700  001634                  MOV     @ERRLMT,R0      ;GET ERROR LIMIT
014450  005300                  64$:    DEC     R0              ;DECREMENT COUNT
014452  001406                          BEQ     65$             ;IF ZERO - EXIT
014454  004437  042260                  JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
```

```
5330  014460  060000                          60000
5331  014462  000402                          BR      65$             ;NO MORE ERRORS - EXIT
5332  014464  104016                          ERROR   16              ;REPORT NEXT ERROR
5333  014466  000770                          BR      64$             ;LOOP
5334  014470                          65$:
5335
5336  014470                          6$:
5337                                  ;;*****************************************************************
5338                                  ;*TEST 40       PARTIAL SECTOR WRITE DATA
5339                                  ;*
5340                                  ;*      ISSUE A WRITE DATA OF 103 WORDS TO CYLINDER 312,
5341                                  ;*      HEAD 0, SECTOR 0.  MAKE SURE THE SECTOR WAS
5342                                  ;*      ZERO FILLED CORRECTLY.
5343                                  ;*
5344                                  ;*****************************************************************
5345  014470  000004                  TST40:  SCOPE
5346  014472  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5347  014500  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
5348  014502  104003                          ERROR   3               ;BAD INIT ERROR
5349
5350  014504  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REG
5351  014510  000123                          WRDATA                  ;WRITE DATA
5352  014512  177675                          -103                    ;WORD COUNT PARTIAL SECTOR
5353  014514  072414                          OBUFF                   ;BUFF ADDRESS
5354  014516     007                          .BYTE   7               ;SECTOR 7
5355  014517     000                          .BYTE   0               ;TRACK 0
5356  014520  000312                          312                     ;CYLINDER 312
5357
5358  014522  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
5359  014526  000003                          3                       ;PATTERN 3
5360  014530  000400                          400                     ;400 WORDS
5361
5362  014532  104417                          TLOADRK                 ;LOAD RK REGS
5363  014534  104430                          TWAT96                  ;WAIT FOR INTERRUPT
5364  014536  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5365
5366  014540  104421                          TCHKOP                  ;CHECK FOR ANY ERROR
5367  014542  104004                          ERROR   4 ; OR 5,6,7    ;REPORT ALL ERROR
5368
5369  014544  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
5370
5371  014550  000121                          RDDATA                  ;READ DATA
5372  014552  177400                          -400                    ;ONE FULL SECTOR
5373  014554  070414                          IBUFF                   ;BUFF ADDRESS
5374  014556     007                          .BYTE   7               ;SECTOR 7
5375  014557     000                          .BYTE   0               ;TRACK 0
5376  014560  000312                          312                     ;CYLINDER 312
5377
5378  014562  004437  042260                  JSR     R4,GENCOM
5379  014566  002007                          2007                    ;CLEAR IBUFF TO ALL ONES
5380  014570  000400                          400
5381
5382  014572  104417                          TLOADRK                 ;LOAD RK REGS
5383  014574  104424                          TWAT32                  ;WAIT FOR INTERRUPT
5384  014576  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE
5385
```

```
5386  014600  10442*                        TCHKOP                  ;CHECK FOR ANY ERRORS
5387  014602  104004                        ERROR   4 ; OR 5,6,7    ;REPORT ALL ERRORS
5388
5389  014604  012701  072622                MOV     #OBUFF+206,R1   ;CLEAR THE LAST 205 WORDS
5390  014610  012700  000275                MOV     #275,R0         ;OF THE OUTPUT BUFFER TO ZERO
5391  014614  005021                1$:     CLR     (R1)+           ;TO VERIFY THE PARTIAL SECTOR
5392  014616  005300                        DEC     R0              ;WRITE 0 FILLED THE SECTOR
5393  014620  001375                        BNE     1$
5394  014622  004437  042260                JSR     R4,GENCOM
5395  014626  100000                        100000                  ;COMPARE OBUFF & IBUFF.
5396  014630  000400                        400                     ;ALL 400 WORDS
5397  014632  000413                        BR      3$              ;NO ERRORS-EXIT
5398  014634  104015                        ERROR   15              ;REPORT FIRST COMPARE ERROR
5399
5400  014636  013700  001634                MOV     ERRLMT,R0       ;GET ERROR LIMIT
5401  014642  005300                2$:     DEC     R0              ;DECREMENT IT
5402  014644  001406                        BEQ     3$              ;IF ZERO-EXIT
5403  014646  004437  042260                JSR     R4,GENCOM
5404  014652  040000                        40000                   ;CONTINUE COMPARE
5405  014654  000402                        BR      3$              ;NO MORE ERRORS-EXIT
5406  014656  104016                        ERROR   16              ;REPORT NEXT COMPARE ERROR
5407  014660  000770                        BR      2$              ;LOOP
5408
5409  014662                        3$:
5410                                ;;*****************************************************************
5411                                ;*TEST 41       PARTIAL SECTOR READ DATA
5412                                ;*
5413                                ;*      WRITE CYLINDER 312, TRACK 0, SECTOR ZERO WITH A
5414                                ;*      KNOWN CONFIGURATION.  ISSUE A READ DATA OF
5415                                ;*      103 WORDS TO CYLINDER 312, TRACK 0, SECTOR 0.
5416                                ;*      MAKE SURE ONLY 103 WORDS GET TRANSFERRED
5417                                ;*      TO MEMORY.
5418                                ;*
5419                                ;;*****************************************************************
5420  014662  000004                TST41:  SCOPE
5421  014664  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5422  014672  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
5423  014674  104003                        ERROR   3               ;BAD INIT ERROR
5424
5425  014676  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
5426  014702  000123                        WRDATA                  ;WRDATA
5427  014704  177400                        -400                    ;-400 WORDS
5428  014706  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
5429  014710     017                        .BYTE   17              ;SECTOR 17
5430  014711     000                        .BYTE   0               ;TRACK 0
5431  014712  000312                        312                     ;CYLINDER 312
5432  014714  004437  042260                JSR     R4,GENCOM       ;GENERATE DATA
5433  014720  000004                        4                       ;PATTERN 4
5434  014722  000400                        400                     ;400 WORDS
5435
5436  014724  104417                        TLOADRK                 ;LOAD RK REGS
5437  014726  104430                        TWAT96                  ;WAIT FOR INTERRUPT
5438  014730  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5439
5440  014732  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5441  014734  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
```

```
5442
5443  014736  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
5444  014742  000121                  RDDATA                  ;RDDATA
5445  014744  177675                  -103                    ;-103 WORDS
5446  014746  070414                  IBUFF                   ;IBUFF IS BUFF ADDRESS
5447  014750     017                  .BYTE   17              ;SECTOR 17
5448  014751     000                  .BYTE   0               ;TRACK 0
5449  014752  000312                  312                     ;CYLINDER 312
5450  014754  004437  042260          JSR     R4,GENCOM
5451  014760  002007                  2007                    ;CLEAR IBUFF
5452  014762  000400                  400
5453
5454  014764  104417                  TLOADRK                 ;LOAD RK REGS
5455  014766  104424                  TWAT32                  ;WAIT FOR INTERRUPT
5456  014770  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5457  014772  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5458  014774  104004                  ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5459
5460  014776  012700  072622          MOV     #OBUFF+206,R0   ;AFTER THE LAST 205 WORDS OF
5461  015002  012701  000275          MOV     #275,R1         ;THE OUTPUT BUFFER TO ALL ONES.
5462  015006  012720  177777    1$:   MOV     #-1,(R0)+       ;THESE SHOULD ALL BE ONES IN
5463  015012  005301                  DEC     R1              ;IBUFF BECAUSE THE PARTIAL
5464  015014  001374                  BNE     1$              ;READ FILLED ONLY 103 WORDS.
5465  015016  004437  042260          JSR     R4,GENCOM       ;GO COMPARE IBUFF & OBUFF
5466  015022  100000                  100000
5467  015024  000400                  400                     ;ALL 400 WORDS
5468  015026  000413                  BR      3$              ;NO ERRORS-EXIT
5469  015030  104015                  ERROR   15              ;REPORT FIRST COMPARE ERROR
5470
5471  015032  013700  001634          MOV     ERRLMT,R0       ;GET ERROR LIMIT
5472  015036  005300            64$:  DEC     R0              ;DECREMENT COUNT
5473  015040  001406                  BEQ     65$             ;IF ZERO - EXIT
5474  015042  004437  042260          JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
5475  015046  040000                  40000
5476  015050  000402                  BR      65$             ;NO MORE ERRORS - EXIT
5477  015052  104016                  ERROR   16              ;REPORT NEXT ERROR
5478  015054  000770                  BR      64$             ;LOOP
5479  015056                    65$:
5480
5481  015056                    3$:
5482                                  ;;*****************************************************************
5483                                  ;*TEST 42       WRITE DATA WITH NON-EXISTENT MEMORY
5484                                  ;*
5485                                  ;*      ISSUE A WRITE DATA OF 1 WORD USING ADDRESS 776000.
5486                                  ;*      MAKE SURE NON-EXISTENT MEMORY SETS.
5487                                  ;*
5488                                  ;;*****************************************************************
5489  015056  000004            TST42:  SCOPE
5490  015060  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5491  015066  104416                  TSSINIT                 ;CLEAR SUBSYSTEM
5492  015070  104003                  ERROR   3               ;BAD INIT ERROR
5493
5494  015072  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REG
5495  015076  001523                  BA16!BA17!WRDATA        ;BA16 & 17 SET WITH WRITE DATA
5496  015100  177777                  -1                      ;WORD COUNT OF 1
5497  015102  176000                  176000                  ;BUFF ADDRESS=IO PAGE BASE
```

```
5498  015104  013                                 .BYTE   13              ;SECT 13
5499  015105  000                                 .BYTE   0               ;TRACK 0
5500  015106  000312                              312                     ;CYLINDER 312
5501
5502  015110  104417                              TLOADRK                 ;LOAD RK REGS
5503  015112  104430                              TWAT96                  ;WAIT FOR INTERRUPT
5504  015114  104002                              ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5505  015116  104422                              TCHKWE                  ;CHECK OPERATION WITH ERROR
5506  015120  000000                              0
5507  015122  000000                              0
5508  015124  000040                              NEMERR                  ;NON-EXISTENT MEMORY ERROR
5509  015126  104004                              ERROR   4 ;OR5,6,7      ;REPORT ANY DISCREPENCIES
5510  015130  012737  054151  001450              MOV     #EM11A,EM10N    ;SET UP ERROR MESSAGE
5511  015136  012737  050650  061072              MOV     #OPER42,DF010A  ;WITH SUPPORT MESSAGE
5512  015144  113700  001541                      MOVB    T.CS1+1,R0      ;GET UPPER CS1
5513  015150  042700  177774                      BIC     #177774,R0      ;CLEAR UNUSED BITS
5514  015154  022700  000003                      CMP     #3,R0           ;TEST IF BOTH UPPER BUS BITS SET
5515  015160  001406                              BEQ     1$              ;YES - SKIP
5516  015162  010037  001204                      MOV     R0,$REG11       ;SET UP FOR ERROR REPORT
5517  015166  012737  000003  001202              MOV     #3,$REG10
5518  015174  104010                              ERROR   10
5519  015176  022737  176002  001544  1$:         CMP     #176002,T.BA    ;TEST IF BUSS ADDRESS LOW OKAY
5520  015204  001412                              BEQ     2$              ;YES - SKIP
5521  015206  012737  054123  001450              MOV     #EM11,EM10N     ;SET UP MESSGAE
5522  015214  012737  176002  001202              MOV     #176002,$REG10  ;STORE VALUE FOR REPORT
5523  015222  013737  001544  001204              MOV     T.BA,$REG11
5524  015230  104010                              ERROR   10
5525
5526  015232  005737  001542          2$:         TST     T.WC            ;TEST IF WORD COUNT CORRECT
5527  015236  001411                              BEQ     3$              ;YES - SKIP
5528  015240  012737  054076  001450              MOV     #EM10,EM10N     ;SET UP MESSAGE
5529  015246  005037  001202                      CLR     $REG10
5530  015252  013737  001542  001204              MOV     T.WC,$REG11
5531  015260  104010                              ERROR 10
5532
5533  015262                          3$:
5534
5535                                              ;;*********************************************************************
5536                                              ;*TEST 43       READ DATA WITH NON-EXISTENT MEMORY
5537                                              ;*
5538                                              ;*      ISSUE A READ DATA OF 1 WORD USING ADDRESS 776000.
5539                                              ;*      MAKE SURE NON-EXISTENT MEMORY SETS.
5540                                              ;*
5541                                              ;*********************************************************************
5542  015262  000004                              TST43:  SCOPE
5543  015264  012737  000012  001262              MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5544  015272  104416                              TSSINIT                 ;CLEAR SUBSYSTEM
5545  015274  104003                              ERROR   3               ;BAD INIT ERROR
5546
5547  015276  004437  035674                      JSR     R4,LRLOAD       ;LOAD "L" REG
5548  015302  001521                              BA16.BA17.RDDATA        ;BA16 & 17 WITH READ DATA
5549  015304  177777                              -1                      ;WORD COUNT OF 1
5550  015306  176000                              176000                  ;BUFF ADDRESS=IO PAGE BASE
5551  015310  013                                 .BYTE   13              ;SECTOR 13
5552  015311  000                                 .BYTE   0               ;TRACK 0
5553  015312  000312                              312                     ;CYL 312
```

```
5554
5555  015314  104417                          TLOADRK                 ;LOAD RK REGS
5556  015316  104430                          TWAT96                  ;WAIT FOR INTERRUPT
5557  015320  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5558  015322  104422                          TCHKWE                  ;CHECK OPERATION WITH ERRORS
5559  015324  000000                          0
5560  015326  000000                          0
5561  015330  000040                          NEMERR                  ;NON-EXISTENT MEMORY ERROR
5562  015332  104004                          ERROR   4; OR 5,6,7     ;REPORT ALL DISCREPANCIES
5563  015334  012737  054151  001450          MOV     #EM11A,EM10N    ;SET MESSAGE
5564  015342  012737  050724  061072          MOV     #OPER43,DF010A  ;SET SUPPORT MESSAGE
5565  015350  113700  001541                  MOVB    T.CS1+1,R0              ;GET UPPER CS1
5566  015354  042700  177774                  BIC     #177774,R0      ;CLEAR UNWANTED BITS
5567  015360  022700  000003                  CMP     #3,R0           ;TEST BOTH BUS 16 & 17 SET
5568  015364  001406                          BEQ     1$              ;YES - SKIP
5569  015366  012737  000003  001202          MOV     #3,$REG10       ;SET VALUES FOR REPORT
5570  015374  010037  001204                  MOV     R0,$REG11
5571  015400  104010                          ERROR   10
5572
5573  015402  022737  176002  001544  1$:     CMP     #176002,T.BA    ;TEST IF BUS ADDRESS CORRECT
5574  015410  001412                          BEQ     2$              ;YES - SKIP
5575  015412  012737  054123  001450          MOV     #EM11,EM10N     ;SET MESSAGE
5576  015420  012737  176002  001202          MOV     #176002,$REG10  ;SET VALUES FOR REPORT
5577  015426  013737  001544  001204          MOV     T.BA,$REG11
5578  015434  104010                          ERROR   10
5579
5580  015436  005737  001542          2$:     TST     T.WC            ;TEST IF WORD COUNT CORRECT
5581  015442  001411                          BEQ     3$              ;YES - SKIP
5582  015444  012737  054076  001450          MOV     #EM10,EM10N     ;SET MESSAGE
5583  015452  005037  001202                  CLR     $REG10          ;SET VALUES
5584  015456  013737  001542  001204          MOV     T.WC,$REG11
5585  015464  104010                          ERROR   10
5586
5587  015466                          3$:
5588
5589                                  ;;*****************************************************************
5590                                  ;*TEST 44       UNIBUS PARITY ERROR
5591                                  ;*
5592                                  ;*      INITIALIZE A MEMORY LOCATION WITH BAD
5593                                  ;*      PARITY. ISSUE A WRITE DATA OF 400 WORDS
5594                                  ;*      STARTING AT A LOCATION 112 WORDS BEFORE
5595                                  ;*      THE LOCATION WITH BAD PARITY.  MAKE SURE
5596                                  ;*      THAT UNIBUS PARITY ERROR SETS.
5597                                  ;*
5598                                  ;*      NOTE:   THIS TEST IS ONLY EXECUTED IF
5599                                  ;*              MEMORY PARITY OPTION EXISTS FOR
5600                                  ;*              BUFFER. IT WILL NOT BE EXECUTED
5601                                  ;*              ON 'ECC' TYPE MEMORY.
5602
5603                                  ;*
5604                                  ;;*****************************************************************
5605  015466  000004                  TST44:  SCOPE
5606  015470  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5607  015476  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
5608  015500  104003                          ERROR   3               ;BAD INIT ERROR
5609
```

```
5610  015502  032737  000100  001664          BIT     #PARPRE,OPTFLG  ;TEST IF PARITY OPTION PRESENT
5611  015510  001013                          BNE     1$              ;YES-SKIP
5612  015512  032737  000004  001664          BIT     #MEMPYB,OPTFLG  ;TEST IF PARITY OPTION REPORTED
5613  015520  001005                          BNE     25$             ;YES-SKIP TO EXIT
5614  015522  104401  051452                  TYPE    ,OPR010         ;PRINT BYPASS MESSAGE
5615  015526  052737  000004  001664          BIS     #MEMPYB,OPTFLG  ;SET OPTION REPORTED BIT
5616  015534  000137  016326          25$:    JMP     4$              ;SKIP TO EXIT
5617
5618  015540                          1$:
5619  015540  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
5620  015544  000123                          WRDATA                  ;WRDATA
5621  015546  177400                          -400                    ;-400 WORDS
5622  015550  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
5623  015552     010                          .BYTE   10              ;SECTOR 10
5624  015553     000                          .BYTE   0               ;TRACK 0
5625  015554  000312                          312                     ;CYLINDER 312
5626
5627  015556  032737  002000  001664          BIT     #CP1170,OPTFLG  ;TEST IF 11/70
5628  015564  001002                          BNE     3$              ;YES - SKIP
5629  015566  005077  164100                  CLR     @CSRPTR         ;CLEAR PARITY IE
5630
5631  015572  004437  042260          3$:     JSR     R4,GENCOM       ;GENERATE DATA
5632  015576  000007                          7                       ;PATTERN 7
5633  015600  000400                          400                     ;400 WORDS
5634
5635  015602  012746  000340                  MOV     #PR7,-(SP)      ;PUT PRIORITY 7 ON STACK
5636  015606  012746  015614                  MOV     #10$,-(SP)      ;PUT ADDRESS ON STACK
5637  015612  000002                          RTI                     ;SET PRI
5638  015614                          10$:
5639
5640  015614  012737  100200  072640          MOV     #100200,OBUFF+224 ;SET WORD IN BUFFER
5641  015622  032737  002000  001664          BIT     #CP1170,OPTFLG  ;TEST IF 11/70
5642  015630  001011                          BNE     5$              ;YES - SKIP
5643  015632  012777  000004  164032          MOV     #BIT2,@CSRPTR   ;SET WRITE WRONG PARITY BIT
5644  015640  012737  100200  072640          MOV     #100200,OBUFF+224  ;SET BAD PARITY IN MEMORY
5645  015646  012777  000001  164016          MOV     #BIT0,@CSRPTR   ;CLEAR CONTROL BIT, SET IE BIT
5646
5647  015654  013746  001622          5$:     MOV     RKPRI,-(SP)     ;SET OLD PRIORITY
5648  015660  012746  015666                  MOV     #11$,-(SP)      ;SET ADDRESS
5649  015664  000002                          RTI                     ;RESTORE PRI
5650  015666  013704  001672          11$:    MOV     CSRPTR,R4       ;SET R4 WITH CSR POINTER
5651  015672  005000                          CLR     R0              ;SET R0 FOR COUNTER
5652  015674  012701  001662                  MOV     #INTSET,R1      ;SET R1 FOR POINTER TO INTERRUPT FLAG
5653  015700  012777  070400  163712          MOV     #SPCHLR,@RKVEC  ;SET UP INTERRUPT VECTORS FOR
5654  015706  012777  070410  164002          MOV     #SPCPAR,@MMVECA ; RK611 AND PARITY ERROR
5655  015714  012737  016302  001264          MOV     #2$,$ESCAPE     ;SET UP ESCAPE FOR ERROR
5656  015722  104417                          TLOADRK                 ;LOAD RK REGS
5657  015724  032737  002000  001664          BIT     #CP1170,OPTFLG  ;TEST IF 11/70
5658  015732  001434                          BEQ     45$             ;NO - SKIP
5659  015734  012737  000016  177746          MOV     #16,177746      ;SET TO DISABLE CACHE AND UNIBUS ERROR
5660  015742  012777  000000  163740          MOV     #0,@KWLADD      ;TURN OFF CLOCK INTERRUPTS
5661  015750  012777  000000  163166          MOV     #0,@$TKS        ;TURN OFF KEYBOARD
5662  015756  012737  170000  177750          MOV     #170000,177750  ;SET FOR ERROR FORCE
5663
5664                          ;*********************
5665  015764  105711          40$:    TSTB    (R1)                    ;LOOP TO WAIT FOR INTERRUPT OR ABORT
```

```
5666  015766  003005                        BGT     43$             ;WAIT. THE CODE BETWEEN THE STARS IS SET
5667  015770  005300                        DEC     R0              ;SET UP SO ALL BYTES HAVE PARITY OF 1.
5668  015772  100774                        BMI     40$             ;IF THIS CODE IS CHANGED, REMEMBER ALL
5669  015774  000240                        NOP                     ;BYTES MUST HAVE AN EVEN NUMBER OF
5670  015776  003372                        BGT     40$             ;BITS.
5671  016000  000240                        NOP
5672  016002  005014              43$:      CLR     (R4)            ;CLEAR ERROR FORCE
5673                                        ;************************
5674
5675  016004  005037  177746                CLR     177746          ;ENABLE CACHE
5676  016010  012777  000100  163672        MOV     #BIT6,@KWLADD   ;TURN ON CLOCK INTERRUPTS
5677  016016  012777  000100  163120        MOV     #100,@$TKS      ;TURN ON KEYBOARD INTERRUPTS
5678  016024  104430              45$:      TWAT96                  ;WAIT FOR INTERRUPT
5679  016026  000414                        BR      46$             ;TO SLOW/NOT COMPLETE ERROR
5680  016030  032737  002000  001664        BIT     #CP1170,OPTFLG  ;TEST IF 11/70
5681  016036  001024                        BNE     48$             ;YES - SKIP
5682  016040  005077  163626                CLR     @CSRPTR         ;ELSE CLEAR CSR
5683  016044  005037  072640                CLR     OBUFF+224       ;CLEAR THE BAD PARITY WORD
5684  016050  012777  000001  163614        MOV     #1,@CSRPTR      ;SET PARITY DETECT AGAIN
5685  016056  000414                        BR      48$             ;SKIP
5686
5687  016060  032737  002000  001664  46$:  BIT     #CP1170,OPTFLG  ;TEST IF 11/70
5688  016066  001007                        BNE     47$             ;YES - SKIP
5689  016070  005077  163576                CLR     @CSRPTR         ;CLEAR CSR
5690  016074  005037  072640                CLR     OBUFF+224       ;CLEAR BAD PARITY WORD
5691  016100  012777  000001  163564        MOV     #1,@CSRPTR      ;SET UP PARITY DETECT AGAIN
5692  016106  104002              47$:      ERROR   2               ;REPORT TO SLOW ERROR
5693  016110                      48$:
5694  016110  104422                        TCHKWE                  ;CHECK OPERATION WITH ERROR
5695  016112  000000                        0
5696  016114  000000                        0
5697  016116  000100                        UPERR                   ;UNIBUS PARITY ERROR
5698  016120  104004                        ERROR   4; OR 5,6,7     ;REPORT ALL DISCREPANCIES
5699
5700  016122  005037  001264                CLR     $ESCAPE         ;CLEAR ESCAPE
5701  016126  012737  050777  061072        MOV     #OPER44,DF010A  ;SET MESSAGES FOR REPORT
5702  016134  012737  054123  001450        MOV     #EM11,EM10N
5703  016142  023727  001544  072642        CMP     T.BA,#OBUFF+226 ;CHECK IF BA IN RANGE
5704  016150  103010                        BHIS    14$             ;NOT TO LOW - SKIP
5705  016152  012737  072642  001202        MOV     #OBUFF+226,$REG10 ;SET VALUES FOR REPORT
5706  016160  013737  001544  001204        MOV     T.BA,$REG11
5707  016166  104010                        ERROR   10
5708  016170  000413                        BR      16$
5709
5710  016172  023727  001544  072646  14$:  CMP     T.BA,#OBUFF+232 ;CHECK IF BA IN RANGE
5711  016200  101407                        BLOS    16$             ;YES - SKIP
5712  016202  012737  072646  001202        MOV     #OBUFF+232,$REG10 ;SET VALUES
5713  016210  012737  001544  001204        MOV     #T.BA,$REG11
5714  016216  104010                        ERROR   10
5715
5716  016220  012737  054076  001450  16$:  MOV     #EM10,EM10N     ;SET MESSAGE
5717  016226  023727  001542  177513        CMP     T.WC,#-265      ;CHECK IF WORD COUNT WITHIN RANGE
5718  016234  103007                        BHIS    20$             ;YES - SKIP
5719  016236  012737  177513  001202        MOV     #-265,$REG10    ;SET VALUES
5720  016244  013737  001542  001204        MOV     T.WC,$REG11
5721  016252  104010                        ERROR   10
```

```
 5722
 5723  016254  023727  001542  177515  20$:    CMP     T.WC,#-263      ;STILL CHECKING IF WC IN RANGE
 5724  016262  101407                          BLOS    2$              ;YES - SKIP
 5725  016264  012737  177515  001202          MOV     #-263,$REG10    ;SET VALUES
 5726  016272  013737  001542  001204          MOV     T.WC,$REG11
 5727  016300  104010                          ERROR   10
 5728
 5729  016302                          2$:
 5730  016302  005037  001264                  CLR     $ESCAPE         ;REV 006
```

```
5731  016306  012777  034442  163304          MOV     #INTHLR,@RKVEC  ;RESET INT. VECTORS FOR RK06
5732  016314  004737  034522                  JSR     PC,OP**ST
5733  016320  012777  000100  162616          MOV     #100,@$TKS      ;INSURE KEYBOARD IS ENABLED
5734
5735  016326                                4$:
5736
5737
5738                                        .SBTTL  **MULTIPLE SECTOR OPERATIONS
5739
5740                                        ;;*****************************************************************
5741                                        ;*TEST 45       TWO SECTOR WRITE DATA (PART 1)
5742                                        ;*
5743                                        ;*      ISSUE A WRITE DATA OF 1000 WORDS TO CYLINDER 312,
5744                                        ;*      TRACK 0, SECTOR 0.  READ DATA BACK ONE SECTOR
5745                                        ;*      AT A TIME AND MAKE SURE IT IS CORRECT.
5746                                        ;*
5747                                        ;*****************************************************************
5748  016326  000004                        TST45:  SCOPE
5749  016330  012737  000012  001262                MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5750  016336  104416                                TSSINIT                 ;CLEAR SUBSYSTEM
5751  016340  104003                                ERROR   3               ;BAD INIT ERROR
5752
5753  016342  004437  035674                        JSR     R4,LRLOAD       ;LOAD "L" REGS
5754  016346  000123                                WRDATA                  ;WRDATA
5755  016350  177000                                -1000                   ;-1000 WORDS
5756  016352  072414                                OBUFF                   ;OBUFF IS BUFF ADDRESS
5757  016354     000                                .BYTE   0               ;SECTOR 0
5758  016355     000                                .BYTE   0               ;TRACK 0
5759  016356  000312                                312                     ;CYLINDER 312
5760
5761  016360  004437  042260                        JSR     R4,GENCOM       ;GENERATE DATA
5762  016364  000015                                15                      ;PATTERN 15
5763  016366  001000                                1000                    ;1000 WORDS
5764
5765  016370  104417                                TLOADRK                 ;LOAD RK REGS
5766  016372  104430                                TWAIT96                 ;WAIT FOR INTERRUPT
5767  016374  104002                                ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5768
5769  016376  104421                                TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5770  016400  104004                                ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5771
5772  016402  004437  042260                        JSR     R4,GENCOM       ;CLEAR IBUFF
5773  016406  002007                                2007                    ;TO ALL 1'S
5774  016410  001000                                1000
5775
5776  016412  004437  035674                        JSR     R4,LRLOAD       ;LOAD "L" REGS
5777  016416  000121                                RDDATA                  ;RDDATA
5778  016420  177400                                -400                    ;-400 WORDS
5779  016422  070414                                IBUFF                   ;IBUFF IS BUFF ADDRESS
5780  016424     000                                .BYTE   0               ;SECTOR 0
5781  016425     000                                .BYTE   0               ;TRACK 0
5782  016426  000312                                312                     ;CYLINDER 312
5783
5784  016430  104417                                TLOADRK                 ;LOAD RK REGS
5785  016432  104424                                TWAIT32                 ;WAIT FOR INTERRUPT
5786  016434  104002                                ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
```

```
5787
5788  016436  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5789  016440  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5790
5791  016442  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
5792  016446  000121                        RDDATA                  ;RDDATA
5793  016450  177400                        -400                    ;-400 WORDS
5794  016452  071414                        IBUFF+1000                      ;IBUFF+1000 IS BUFF ADDRESS
5795  016454     001                        .BYTE   1               ;SECTOR 1
5796  016455     000                        .BYTE   0               ;TRACK 0
5797  016456  000312                        312                     ;CYLINDER 312
5798
5799  016460  104417                        TLOADRK                 ;LOAD RK REGS
5800  016462  104424                        TWAT32                  ;WAIT FOR INTERRUPT
5801  016464  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5802
5803  016466  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5804  016470  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5805
5806  016472  004437  042260                JSR     R4,GENCOM       ;COMPARE DATA
5807  016476  100000                        100000                  ;
5808  016500  001000                        1000                    ;1000 WORDS
5809  016502  000413                        BR      2$              ;NO MISCOMPARES-EXIT
5810  016504  104015                        ERROR   15              ;REPORT FIRST ERROR
5811
5812  016506  013700  001634                MOV     ERRLMT,R0       ;GET ERROR LIMIT
5813  016512  005300                64$:    DEC     R0              ;DECREMENT COUNT
5814  016514  001406                        BEQ     65$             ;IF ZERO - EXIT
5815  016516  004437  042260                JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
5816  016522  040000                        40000
5817  016524  000402                        BR      65$             ;NO MORE ERRORS - EXIT
5818  016526  104016                        ERROR   16              ;REPORT NEXT ERROR
5819  016530  000770                        BR      64$             ;LOOP
5820  016532                        65$:
5821
5822  016532                        2$:
5823                                ;;*****************************************************************
5824                                ;*TEST 46       TWO SECTOR WRITE DATA (PART 2)
5825                                ;*
5826                                ;*      ISSUE A WRITE DATA OF 1000 WORDS TO CYLINDER 312,
5827                                ;*      TRACK 0, SECTOR 23.  READ DATA BACK ONE SECTOR
5828                                ;*      AT A TIME AND MAKE SURE A MID-TRANSFER
5829                                ;*      SEEK DID NOT TAKE PLACE.
5830                                ;*
5831                                ;*****************************************************************
5832  016532  000004                TST46:  SCOPE
5833  016534  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5834  016542  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
5835  016544  104003                        ERROR   3               ;BAD INIT ERROR
5836
5837  016546  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
5838  016552  000123                        WRDATA                  ;WRDATA
5839  016554  177000                        -1000                   ;-1000 WORDS
5840  016556  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
5841  016560     023                        .BYTE   23              ;SECTOR 23
5842  016561     000                        .BYTE   0               ;TRACK 0
```

```
5843  016562  000312                          312                     ;CYLINDER 312
5844
5845  016564  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
5846  016570  000016                          16                      ;PATTERN 16
5847  016572  001000                          1000                    ;1000 WORDS
5848
5849  016574  104417                          TLOADRK                 ;LOAD RK REGS
5850  016576  104430                          TWAT96                  ;WAIT FOR INTERRUPT
5851  016600  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5852
5853  016602  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5854  016604  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5855
5856                          ;               IF THE TRACK ADDRESS AT THE END OF OPERATION IS IN ERROR
5857                          ;               THE CONTROLLER DID A MID-TRANSFER SEEK AS THOUGH I'
5858                          ;               WERE IN 24(8) SECTORS PER TRACK MODE.
5859
5860  016606  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
5861  016612  000121                          RDDATA                  ;RDDATA
5862  016614  177400                          -400                    ;-400 WORDS
5863  016616  070414                          IBUFF                   ;IBUFF IS BUFF ADDRESS
5864  016620     023                          .BYTE   23              ;SECTOR 23
5865  016621     000                          .BYTE   0               ;TRACK 0
5866  016622  000312                          312                     ;CYLINDER 312
5867
5868  016624  004437  042260                  JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
5869  016630  002007                          2007
5870  016632  001000                          1000
5871
5872  016634  104417                          TLOADRK                 ;LOAD RK REGS
5873  016636  104424                          TWAT32                  ;WAIT FOR INTERRUPT
5874  016640  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5875
5876  016642  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5877  016644  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5878
5879  016646  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
5880  016652  000121                          RDDATA                  ;RDDATA
5881  016654  177400                          -400                    ;-400 WORDS
5882  016656  071414                          IBUFF+1000                      ;IBUFF+1000 IS BUFF ADDRESS
5883  016660     024                          .BYTE   24              ;SECTOR 24
5884  016661     000                          .BYTE   0               ;TRACK 0
5885  016662  000312                          312                     ;CYLINDER 312
5886
5887  016664  104417                          TLOADRK                 ;LOAD RK REGS
5888  016666  104424                          TWAT32                  ;WAIT FOR INTERRUPT
5889  016670  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5890
5891  016672  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5892  016674  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5893
5894  016676  004437  042260                  JSR     R4,GENCOM       ;COMPARE DATA
5895  016702  100000                          100000
5896  016704  001000                          1000                    ;1000 WORDS
5897  016706  000413                          BR      1$              ;NO ERRORS-SKIP
5898  016710  104015                          ERROR   15              ;REPORT FIRST ERROR
```

```
                                        ;GET ERROR LIMIT
016712  013700  001634          MOV     ERRLMT,R0
016716  005300          64$:    DEC     R0              ;DECREMENT COUNT
016720  001406                  BEQ     65$             ;IF ZERO - EXIT
016722  004437  042260          JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
016726  040000                  40000
016730  000402                  BR      65$             ;NO MORE ERRORS - EXIT
016732  104016                  ERROR   16              ;REPORT NEXT ERROR
016734  000770                  BR      64$             ;LOOP
016736                  65$:
016736                  1$:
                        ;;*****************************************************************
                        ;*TEST 47        TWO SECTOR WRITE DATA (PART 3)
                        ;*
                        ;*      ISSUE A WRITE DATA OF 401 WORDS TO CYLINDER 312,
                        ;*      TRACK 0, SECTOR 10.  READ DATA BACK ONE SECTOR AT
                        ;*      A TIME AND CHECK ZERO FILL OF SECOND SECTOR.
                        ;*
                        ;*****************************************************************
016736  000004          TST47:  SCOPE
016740  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
016746  104416                  TSSINIT                 ;CLEAR SUBSYSTEM
016750  104003                  ERROR   3               ;BAD INIT ERROR

016752  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
016756  000123                  WRDATA                  ;WRDATA
016760  177377                  -401                    ;-401 WORDS
016762  072414                  OBUFF                   ;OBUFF IS BUFF ADDRESS
016764     010                  .BYTE   10              ;SECTOR 10
016765     000                  .BYTE   0               ;TRACK 0
016766  000312                  312                     ;CYLINDER 312

016770  004437  042260          JSR     R4,GENCOM       ;GENERATE DATA
016774  000002                  2                       ;PATTERN 2
016776  001000                  1000                    ;1000 WORDS

017000  104417                  TLOADRK                 ;LOAD RK REGS
017002  104430                  TWAT96                  ;WAIT FOR INTERRUPT
017004  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

017006  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
017010  104004                  ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
                        ;       CLEAR LAST 377 WORDS OF OBUFF FOR EXPECTED ZEROS FROM ZERO FILL
017012  012700  073416          MOV     #OBUFF+1002,R0  ;GET STARTING ADDRESS TO BE CLEARED
017016  012701  000377          MOV     #377,R1         ;NUMBER OF WORDS
017022  005020          1$:     CLR     (R0)+           ;CLEAR WORD
017024  005301                  DEC     R1              ;DEC COUNT
017026  001375                  BNE     1$              ;LOOP UNTIL COUNT ZERO
017030  004437  042260          JSR     R4,GENCOM       ;CLEAR IBUFF TO ONES
017034  002007                  2007
017036  001000                  1000

017040  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
017044  000121                  RDDATA                  ;RDDATA
017046  177400                  -400                    ;-400 WORDS
017050  070414                  IBUFF                   ;IBUFF IS BUFF ADDRESS
```

```
5955  017052  010                        .BYTE   10              ;SECTOR 10
5956  017053  000                        .BYTE   0               ;TRACK 0
5957  017054  000312                     312                     ;CYLINDER 312
5958
5959  017056  104417                     TLOADRK                 ;LOAD RK REGS
5960  017060  104424                     TWAT32                  ;WAIT FOR INTERRUPT
5961  017062  104002                     ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5962
5963  017064  104421                     TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
5964  017066  104004                     ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
5965  017070  004437  035674             JSR     R4,LRLOAD       ;LOAD "L" REGS
5966  017074  000121                     RDDATA                  ;RDDATA
5967  017076  177400                     -400                    ;-400 WORDS
5968  017100  071414                     IBUFF+1000                      ;IBUFF+1000 IS BUFF ADDRESS
5969  017102  011                        .BYTE   11              ;SECTOR 11
5970  017103  000                        .BYTE   0               ;TRACK 0
5971  017104  000312                     312                     ;CYLINDER 312
5972
5973  017106  104417                     TLOADRK                 ;LOAD RK REGS
5974  017110  104424                     TWAT32                  ;WAIT FOR INTERRUPT
5975  017112  104002                     ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
5976
5977  017114  004437  042260             JSR     R4,GENCOM       ;DATA COMPARE
5978  017120  100000                     100000
5979  017122  001000                     1000                    ;1000 WORDS
5980  017124  000413                     BR      2$              ;NO ERROR-SKIP
5981  017126  104015                     ERROR   15              ;REPORT FIRST ERROR
5982
5983  017130  013700  001634             MOV     ERRLMT,R0       ;GET ERROR LIMIT
5984  017134  005300              64$:   DEC     R0              ;DECREMENT COUNT
5985  017136  001406                     BEQ     65$             ;IF ZERO - EXIT
5986  017140  004437  042260             JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
5987  017144  040000                     40000
5988  017146  000402                     BR      65$             ;NO MORE ERRORS - EXIT
5989  017150  104016                     ERROR   16              ;REPORT NEXT ERROR
5990  017152  000770                     BR      64$             ;LOOP
5991  017154                     65$:
5992
5993  017156                     2$:
5994                                     ;;*****************************************************************
5995                                     ;*TEST 50       MID-TRANSFER SEEK ON WRITE (PART 1)
5996                                     ;*
5997                                     ;*      ISSUE A WRITE DATA OF 1000 WORDS TO CYLINDER 312,
5998                                     ;*      TRACK 0, SECTOR 25.  READ DATA BACK ONE SECTOR
5999                                     ;*      AT A TIME AND MAKE SURE A MID-TRANSFER SEEK
6000                                     ;*      DID TAKE PLACE.
6001                                     ;*
6002                                     ;*****************************************************************
6003  017154  000004             TST50:  SCOPE
6004  017156  012737  000012  001262     MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6005  017164  104416                     TSSINIT                 ;CLEAR SUBSYSTEM
6006  017166  104003                     ERROR   3               ;BAD INIT EPROR
6007
6008  017170  004437  035674             JSR     R4,LRLOAD       ;LOAD "L" REGS
6009  017174  000123                     WRDATA                  ;WRDATA
6010  017176  177000                     -1000                   ;-1000 WORDS
```

```
6011  017200  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
6012  017202     025                        .BYTE   25              ;SECTOR 25
6013  017203     000                        .BYTE   0               ;TRACK 0
6014  017204  000312                        312                     ;CYLINDER 312
6015
6016  017206  004437  042260                JSR     R4,GENCOM       ;GENERATE DATA
6017  017212  000003                        3                       ;PATTERN 3
6018  017214  001000                        1000                    ;1000 WORDS
6019
6020  017216  104417                        TLOADRK                 ;LOAD RK REGS
6021  017220  104430                        TWAT96                  ;WAIT FOR INTERRUPT
6022  017222  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6023
6024  017224  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6025  017226  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6026                                ;       A TRACK ERROR PRINTED OUT AT THE END OF THE OPERATION INDICATES A
6027                                ;       MID-TRANSFER HEAD SWITCH DID NOT OCCUR.
6028  017230  004437  042260                JSR     R4,GENCOM
6029  017234  002007                        2007
6030  017236  001000                        1000
6031
6032  017240  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
6033  017244  000121                        RDDATA                  ;RDDATA
6034  017246  177400                        -400                    ;-400 WORDS
6035  017250  070414                        IBUFF                   ;IBUFF IS BUFF ADDRESS
6036  017252     025                        .BYTE   25              ;SECTOR 25
6037  017253     000                        .BYTE   0               ;TRACK 0
6038  017254  000312                        312                     ;CYLINDER 312
6039
6040  017256  104417                        TLOADRK                 ;LOAD RK REGS
6041  017260  104425                        TWAT48                  ;WAIT FOR INTERRUPT
6042  017262  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6043
6044  017264  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6045  017266  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6046
6047  017270  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
6048  017274  000121                        RDDATA                  ;RDDATA
6049  017276  177400                        -400                    ;-400 WORDS
6050  017300  071414                        IBUFF+1000                      ;IBUFF+1000 IS BUFF ADDRESS
6051  017302     000                        .BYTE   0               ;SECTOR 0
6052  017303     001                        .BYTE   1               ;TRACK 1
6053  017304  000312                        312                     ;CYLINDER 312
6054
6055  017306  104417                        TLOADRK                 ;LOAD RK REGS
6056  017310  104425                        TWAT48                  ;WAIT FOR INTERRUPT
6057  017312  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6058
6059  017314  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6060  017316  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6061
6062  017320  004437  042260                JSR     R4,GENCOM       ;COMPARE DATA
6063  017324  100000                        100000
6064  017326  001000                        1000                    ;1000 WORDS
6065  017330  000413                        BR      1$              ;NO ERRORS-SKIP
6066  017332  104015                        ERROR   15              ;REPORT FIRST ERROR
```

```
                                        MOV     ERRLMT,R0       ;GET ERROR LIMIT
                                64$:    DEC     R0              ;DECREMENT COUNT
                                        BEQ     65$             ;IF ZERO - EXIT
                                        JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
                                        40000
                                        BR      65$             ;NO MORE ERRORS - EXIT
                                        ERROR   16              ;REPORT NEXT ERROR
                                        BR      64$             ;LOOP
                                65$:

                                1$:
                                ;;*****************************************************************
                                ;*TEST 51        MID-TRANSFER SEEK ON WRITE (PART 2)
                                ;*
                                ;*      ISSUE A WRITE DATA OF 1000 WORDS TO CYLINDER 312,
                                ;*      TRACK 2, SECTOR 25.  READ DATA BACK ONE SECTOR
                                ;*      AT A TIME AND MAKE SURE A MID-TRANSFER SEEK
                                ;*      DID TAKE PLACE.
                                ;*
                                ;*****************************************************************
                                TST51:  SCOPE
                                        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
                                        TSSINIT                 ;CLEAR SUBSYSTEM
                                        ERROR   3               ;BAD INIT ERROR

                                        JSR     R4,LRLOAD       ;LOAD "L" REGS
                                        WRDATA                  ;WRDATA
                                        -1000                   ;-1000 WORDS
                                        OBUFF                   ;OBUFF IS BUFF ADDRESS
                                        .BYTE   25              ;SECTOR 25
                                        .BYTE   2               ;TRACK 2
                                        312                     ;CYLINDER 312

                                        JSR     R4,GENCOM       ;GENERATE DATA
                                        4                       ;PATTERN 4
                                        1000                    ;1000 WORDS

                                        TLOADRK                 ;LOAD RK REGS
                                        TWAT96                  ;WAIT FOR INTERRUPT
                                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
                                ;       A CYLINDER ERROR REPORTED AT THE END OF THE OPERATION INDICATES A
                                ;       MID-TRANSFER SEEK DID NOT OCCUR.
                                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
                                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS

                                        JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
                                        2007
                                        1000

                                        JSR     R4,LRLOAD       ;LOAD "L" REGS
                                        RDDATA                  ;RDDATA
                                        -400                    ;-400 WORDS
                                        IBUFF                   ;IBUFF IS BUFF ADDRESS
                                        .BYTE   25              ;SECTOR 25
                                        .BYTE   2               ;TRACK 2
```

```
 6123  017460  000312                          312                     ;CYLINDER 312
 6124
 6125  017462  104417                          TLOADRK                 ;LOAD RK REGS
 6126  017464  104425                          TWAT48                  ;WAIT FOR INTERRUPT
 6127  017466  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 6128
 6129  017470  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 6130  017472  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 6131
 6132  017474  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
 6133  017500  000121                          RDDATA                  ;RDDATA
 6134  017502  177400                          -400                    ;-400 WORDS
 6135  017504  071414                          IBUFF+1000                      ;IBUFF+1000 IS BUFF ADDRESS
 6136  017506     000                          .BYTE   0               ;SECTOR 0
 6137  017507     000                          .BYTE   0               ;TRACK 0
 6138  017510  000313                          313                     ;CYLINDER 313
 6139
 6140  017512  104417                          TLOADRK                 ;LOAD RK REGS
 6141  017514  104425                          TWAT48                  ;WAIT FOR INTERRUPT
 6142  017516  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 6143
 6144  017520  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 6145  017522  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 6146
 6147  017524  004437  042260                  JSR     R4,GENCOM       ;COMPARE DATA
 6148  017530  100000                          100000
 6149  017532  001000                          1000                    ;1000 WORDS
 6150  017534  000413                          BR      1$              ;NO MISCOMPARES-SKIP
 6151  017536  104015                          ERROR   15              ;REPORT 1ST ERROR
 6152
 6153  017540  013700  001634          64$:    MOV     ERRLMT,R0       ;GET ERROR LIMIT
 6154  017544  005300                          DEC     R0              ;DECREMENT COUNT
 6155  017546  001406                          BEQ     65$             ;IF ZERO - EXIT
 6156  017550  004437  042260                  JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
 6157  017554  040000                          40000
 6158  017556  000402                          BR      65$             ;NO MORE ERRORS - EXIT
 6159  017560  104016                          ERROR   16              ;REPORT NEXT ERROR
 6160  017562  000770                          BR      64$             ;LOOP
 6161  017564                          65$:
 6162
 6163  017564                          1$:
 6164                                          ;;*****************************************************************
 6165                                          ;*TEST 52       TWO SECTOR READ DATA (PART 1)
 6166                                          ;*
 6167                                          ;*      ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312,
 6168                                          ;*      TRACK 0, SECTOR 0, VERIFY THAT CORRECT DATA IS
 6169                                          ;*      READ.
 6170                                          ;*
 6171                                          ;*      NOTE:   TWO SECTOR WRITE DATA (PART 1) MUST BE
 6172                                          ;*              EXECUTED BEFORE THIS TEST.
 6173                                          ;*
 6174                                          ;*****************************************************************
 6175  017564  000004                  TST52:  SCOPE
 6176  017566  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
 6177  017574  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
 6178  017576  104003                          ERROR   3               ;BAD INIT ERROR
```

```
                                        ;GENERATE SAME DATA AS USED IN TWO SECTOR WRITE DATA (PART 1)

                                ;       GENERATE SAME DATA AS USED IN TWO SECTOR WRITE DATA PART 1
017600  004437  042260                JSR     R4,GENCOM       ;GENERATE DATA
017604  000015                      15                      ;PATTERN 15
017606  001000                      1000                    ;1000 WORDS

017610  004437  042260                JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
017614  002007                      2007
017616  001000                      1000

017620  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
017624  000121                      RDDATA                  ;RDDATA
017626  177000                      -1000                   ;-1000 WORDS
017630  070414                      IBUFF                   ;IBUFF IS BUFF ADDRESS
017632     000                      .BYTE   0               ;SECTOR 0
017633     000                      .BYTE   0               ;TRACK 0
017634  000312                      312                     ;CYLINDER 312

017636  104417                      TLOADRK                 ;LOAD RK REGS
017640  104430                      TWAT96                  ;WAIT FOR INTERRUPT
017642  104002                      ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

017644  104421                      TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
017646  104004                      ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS

017650  004437  042260                JSR     R4,GENCOM       ;COMPARE DATA
017654  100000                      100000
017656  001000                      1000                    ;1000 WORDS
017660  000413                      BR      1$              ;NO MISCOMPARES-SKIP
017662  104015                      ERROR   15

017664  013700  001634                MOV     ERRLMT,R0       ;GET ERROR LIMIT
017670  005300              64$:    DEC     R0              ;DECREMENT COUNT
017672  001406                      BEQ     65$             ;IF ZERO - EXIT
017674  004437  042260                JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
017700  040000                      40000
017702  000402                      BR      65$             ;NO MORE ERRORS - EXIT
017704  104016                      ERROR   16              ;REPORT NEXT ERROR
017706  000770                      BR      64$             ;LOOP
017710                      65$:

017710                      1$:
                                ;;*****************************************************************
                                ;*TEST 53       TWO SECTOR READ DATA (PART 2)
                                ;*
                                ;*      ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312,
                                ;*      TRACK 0, SECTOR 23.  VERIFY THAT CORRECT DATA IS
                                ;*      READ AND A MID-TRANSFER SEEK DOES NOT OCCUR.
                                ;*
                                ;*      NOTE:   TWO SECTOR WRITE DATA (PART 2) MUST BE
                                ;*              EXECUTED BEFORE THIS TEST.
                                ;*
                                ;;*****************************************************************
017710  000004              TST53:  SCOPE
```

```
6235  017712  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6236  017720  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
6237  017722  104003                          ERROR   3               ;BAD INIT ERROR
6238
6239                                          ;GENERATE SAME DATA AS USED IN TWO SECTOR WRITE (PART 2)
6240
6241  017724  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
6242  017730  000016                          16                      ;PATTERN 16
6243  017732  001000                          1000                    ;1000 WORDS
6244
6245  017734  004437  042260                  JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
6246  017740  002007                          2007
6247  017742  001000                          1000
6248  017744  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
6249  017750  000121                          RDDATA                  ;RDDATA
6250  017752  177000                          -1000                   ;-1000 WORDS
6251  017754  070414                          IBUFF                   ;IBUFF IS BUFF ADDRESS
6252  017756     023                          .BYTE   23              ;SECTOR 23
6253  017757     000                          .BYTE   0               ;TRACK 0
6254  017760  000312                          312                     ;CYLINDER 312
6255
6256  017762  104417                          TLOADRK                 ;LOAD RK REGS
6257  017764  104430                          TWAT96                  ;WAIT FOR INTERRUPT
6258  017766  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6259
6260  017770  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6261  017772  104004                          FRROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6262
6263  017774  004437  042260                  JSR     R4,GENCOM       ;COMPARE DATA
6264  020000  100000                          100000
6265  020002  001000                          1000                    ;1000 WORDS
6266  020004  000413                          BR      1$              ;NO MISCOMPARES-SKIP
6267  020006  104015                          ERROR   15              ;REPORT 1ST ERROR
6268
6269  020010  013700  001634                  MOV     ERRLMT,R0       ;GET ERROR LIMIT
6270  020014  005300                  64$:    DEC     R0              ;DECREMENT COUNT
6271  020016  001406                          BEQ     65$             ;IF ZERO - EXIT
6272  020020  004437  042260                  JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
6273  020024  040000                          40000
6274  020026  000402                          BR      65$             ;NO MORE ERRORS - EXIT
6275  020030  104016                          ERROR   16              ;REPORT NEXT ERROR
6276  020032  000770                          BR      64$             ;LOOP
6277  020034                          65$:
6278
6279  020034                          1$:
6280                                          ;;*****************************************************************
6281                                          ;*TEST 54        TWO SECTOR READ DATA (PART 3)
6282                                          ;*
6283                                          ;*      ISSUE A READ DATA OF 401 WORDS TO CYLINDER 312,
6284                                          ;*      TRACK 0, SECTOR 10.  VERIFY THAT ALL 401 WORDS
6285                                          ;*      ARE PLACED IN MEMORY.
6286                                          ;*
6287                                          ;*      NOTE:   TWO SECTOR WRITE DATA (PART 3) MUST BE
6288                                          ;*              EXECUTED BEFORE THIS TEST.
6289                                          ;*
6290                                          ;;*****************************************************************
```

```
6291  020034  000004                    TST54:  SCOPE
6292  020036  012737  000012  001262            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6293  020044  104416                            TSSINIT                 ;CLEAR SUBSYSTEM
6294  020046  104003                            ERROR   3               ;BAD INIT ERROR
6295
6296                                    ;       GENERATE SAME DATA AS USED IN TWO SECTOR WRITE (PART 3)
6297
6298  020050  004437  042260                    JSR     R4,GENCOM       ;GENERATE DATA
6299  020054  000002                            2                       ;PATTERN 2
6300  020056  000401                            401                     ;401 WORDS
6301
6302  020060  004437  042260                    JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
6303  020064  002007                            2007
6304  020066  001000                            1000
6305
6306  020070  004437  035674                    JSR     R4,LRLOAD       ;LOAD "L" REGS
6307  020074  000121                            RDDATA                  ;RDDATA
6308  020076  177377                            -401                    ;-401 WORDS
6309  020100  070414                            IBUFF                   ;IBUFF IS BUFF ADDRESS
6310  020102      010                           .BYTE   10              ;SECTOR 10
6311  020103      000                           .BYTE   0               ;TRACK 0
6312  020104  000312                            312                     ;CYLINDER 312
6313
6314  020106  104417                            TLOADRK                 ;LOAD RK REGS
6315  020110  104430                            TWAT96                  ;WAIT FOR INTERRUPT
6316  020112  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6317
6318  020114  104421                            TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6319  020116  104004                            ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6320
6321  020120  004437  042260                    JSR     R4,GENCOM       ;COMPARE DATA
6322  020124  100000                            100000
6323  020126  000401                            401                     ;401 WORDS
6324  020130  000413                            BR      1$              ;NO MISCOMPARES-SKIP
6325  020132  104015                            ERROR   15              ;PRINT FIRST ERROR
6326
6327  020134  013700  001634                    MOV     ERRLMT,R0       ;GET ERROR LIMIT
6328  020140  005300                    64$:    DEC     R0              ;DECREMENT COUNT
6329  020142  001406                            BEQ     65$             ;IF ZERO - EXIT
6330  020144  004437  042260                    JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
6331  020150  040000                            40000
6332  020152  000402                            BR      65$             ;NO MORE ERRORS - EXIT
6333  020154  104016                            ERROR   16              ;REPORT NEXT ERROR
6334  020156  000770                            BR      64$             ;LOOP
6335  020160                            65$:
6336  020160                            1$:
6337                                    ;;*****************************************************************
6338                                    ;*TEST 55       MID-TRANSFER SEEK ON READ (PART 1)
6339                                    ;*
6340                                    ;*      ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312,
6341                                    ;*      TRACK 0, SECTOR 25.  VERIFY THAT CORRECT DATA IS
6342                                    ;*      READ AND A MID-TRANSFER SEEK DOES OCCUR.
6343                                    ;*
6344                                    ;*      NOTE:   MID-TRANSFER SEEK ON WRITE (PART 1) MUST BE
6345                                    ;*              EXECUTED BEFORE THIS TEST.
6346                                    ;*
```

```
                                ;;*****************************************************************
020160  000004                  TST55:  SCOPE
020162  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
020170  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
020172  104003                          ERROR   3               ;BAD INIT ERROR
                                ;
                                ;       GENERATE SAME DATA AS USED IN MID TRANSFER SEEK ON WRITE (PART 1)
020174  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
020200  000003                          3                       ;PATTERN 3
020202  001000                          1000                    ;1000 WORDS
                                ;
020204  004437  042260                  JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
020210  002007                          2007
020212  001000                          1000
                                ;
020214  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
020220  000121                          RDDATA                  ;RDDATA
020222  177000                          -1000                   ;-1000 WORDS
020224  070414                          IBUFF                   ;IBUFF IS BUFF ADDRESS
020226     025                          .BYTE   25              ;SECTOR 25
020227     000                          .BYTE   0               ;TRACK 0
020230  000312                          312                     ;CYLINDER 312
                                ;
020232  104417                          TLOADRK                 ;LOAD RK REGS
020234  104430                          TWAT96                  ;WAIT FOR INTERRUPT
020236  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
                                ;
020240  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
020242  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
                                ;
020244  004437  042260                  JSR     R4,GENCOM       ;COMPARE DATA
020250  100000                          100000
020252  001000                          1000                    ;1000 WORDS
020254  000413                          BR      1$              ;NO MISCOMPARES-SKIP
020256  104015                          ERROR   15              ;PRINT FIRST ERROR
                                ;
020260  013700  001634                  MOV     ERRLMT,R0       ;GET ERROR LIMIT
020264  005300                  64$:    DEC     R0              ;DECREMENT COUNT
020266  001406                          BEQ     65$             ;IF ZERO - EXIT
020270  004437  042260                  JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
020274  040000                          40000
020276  000402                          BR      65$             ;NO MORE ERRORS - EXIT
020300  104016                          ERROR   16              ;REPORT NEXT ERROR
020302  000770                          BR      64$             ;LOOP
020304                          65$:
020304                          1$:
                                ;;*****************************************************************
                                ;*TEST 56        MID-TRANSFER SEEK ON READ (PART 2)
                                ;*
                                ;*       ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312,
                                ;*       TRACK 2, SECTOR 25.  VERIFY THAT CORRECT DATA IS
                                ;*       READ AND A MID-TRANSFER SEEK DOES OCCUR.
                                ;*
                                ;*       NOTE:   MID-TRANSFER SEEK ON WRITE (PART 2) MUST BE
                                ;*               EXECUTED BEFORE THIS TEST.
                                ;*
```

```
                                ;;*****************************************************************
020304  000004                  TST56:  SCOPE
020306  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
020314  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
020316  104003                        ERROR   3               ;BAD INIT ERROR

                                ;       GENERATE SAME DATA AS USED IN MID TRANSFER SEEK ON WRITE (PART 2)
020320  004437  042260                JSR     R4,GENCOM       ;GENERATE DATA
020324  000004                        4                       ;PATTERN 4
020326  001000                        1000                    ;1000 WORDS

020330  004437  042260                JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
020334  002007                        2007
020336  001000                        1000

020340  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
020344  000121                        RDDATA                  ;RDDATA
020346  177000                        -1000                   ;-1000 WORDS
020350  070414                        IBUFF                   ;IBUFF IS BUFF ADDRESS
020352     025                        .BYTE   25              ;SECTOR 25
020353     002                        .BYTE   2               ;TRACK 2
020354  000312                        312                     ;CYLINDER 312

020356  104417                        TLOADRK                 ;LOAD RK REGS
020360  104430                        TWAT96                  ;WAIT FOR INTERRUPT
020362  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

020364  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
020366  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS

020370  004437  042260                JSR     R4,GENCOM       ;COMPARE DATA
020374  100000                        100000
020376  001000                        1000                    ;1000 WORDS
020400  000413                        BR      1$              ;NO MISCOMPARES-SKIP
020402  104015                        ERROR   15              ;REPORT FIRST ERROR

020404  013700  001634                MOV     ERRLMT,R0       ;GET ERROR LIMIT
020410  005300                64$:    DEC     R0              ;DECREMENT COUNT
020412  001406                        BEQ     65$             ;IF ZERO - EXIT
020414  004437  042260                JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
020420  040000                        40000
020422  000402                        BR      65$             ;NO MORE ERRORS - EXIT
020424  104016                        ERROR   16              ;REPORT NEXT ERROR
020426  000770                        BR      64$             ;LOOP
020430                          65$:
020430                          1$:
                                ;;*****************************************************************
                                ;*TEST 57        CYLINDER ADDRESS OVERFLOW (PART 1)
                                ;*
                                ;*      ISSUE A READ DATA OF 400 WORDS TO CYLINDER 632,
                                ;*      TRACK 2, SECTOR 25.  MAKE SURE CYLINDER ADDRESS
                                ;*      OVERFLOW ERROR DOES NOT OCCUR.
                                ;*      CYLINDER 1456 IS USED FOR THE RK07.
                                ;*
                                ;;*****************************************************************
020430  000004                  TST57:  SCOPE
```

```
6459  020432  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6460  020440  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
6461  020442  104003                          ERROR   3               ;BAD INIT ERROR
6462
6463  020444  013737  036120  020466          MOV     LSTCYL,1$
6464  020452  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
6465  020456  000121                          RDDATA
6466  020460  177400                          -400                    ;400 WORDS
6467  020462  070414                          IBUFF                   ;IBUFF IS BUFF ADDR
6468  020464     025                          .BYTE   25              ;SECTOR 25
6469  020465     002                          .BYTE   2               ;TRK 2
6470  020466  000000                  1$:     0                       ;CYL 632/1456
6471
6472  020470  104417                          TLOADRK                 ;LOAD RK REGS
6473  020472  104434                          TWAIT59                 ;WAIT FOR INTERRUPT
6474  020474  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6475
6476  020476  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6477  020500  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6478                          ;;*****************************************************************
6479                          ;*TEST 60        CYLINDER ADDRESS OVERFLOW (PART 2)
6480                          ;*
6481                          ;*      ISSUE A READ DATA OF 401 WORDS TO CYLINDER 632,
6482                          ;*      TRACK 2, SECTOR 25.  MAKE SURE CYLINDER ADDRESS
6483                          ;*      OVERFLOW ERROR DOES OCCUR.
6484                          ;*      CYLINDER 1456 IS USED FOR THE RK07.
6485                          ;*
6486                          ;*****************************************************************
6487  020502  000004                  TST60:  SCOPE
6488  020504  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6489  020512  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
6490  020514  104003                          ERROR   3               ;BAD INIT ERROR
6491  020516  013737  036120  020540          MOV     LSTCYL,1$
6492  020524  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
6493  020530  000121                          RDDATA
6494  020532  177377                          -401                    ;401 WORDS
6495  020534  070414                          IBUFF                   ;IBUFF IS BUFF ADDR
6496  020536     025                          .BYTE   25              ;SEC 25
6497  020537     002                          .BYTE   2               ;TRK 2
6498  020540  000000                  1$:     0                       ;CYL 632/1456
6499
6500  020542  104417                          TLOADRK                 ;LOAD RK REGS
6501  020544  104434                          TWAIT59                 ;WAIT FOR INTERRUPT
6502  020546  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6503
6504  020550  104422                          TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
6505  020552  001000                          COERR                   ;CYLINDER OVERFLOW
6506  020554  000000                          0
6507  020556  000000                          0
6508  020560  104004                          ERROR   4; OR 5,6,7     ;REPORT ANY DISCREPANCIES
6509
6510
6511                          .SBTTL  **18 BIT DATA TRANSFER TESTS
6512
6513                          ;;*****************************************************************
6514                          ;*TEST 61        FORMAT IN 24 SECTOR FORMAT
```

```
                        ;*
                        ;*      FORMAT CYLINDER 312, TRACK 0, AND TRACK 1 FOR 24 SECTOR
                        ;*      FORMAT.  VERIFY FORMAT AND THAT DATA LATE DID NOT
                        ;*      OCCUR WITH WRITE HEADER ON IN READING DATA BUFFER
                        ;*      AFTER READ HEADER.
                        ;*
                        ;*****************************************************************
020562  000004         TST61:  SCOPE
020564  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
020572  012737  000312  001676          MOV     #312,REFMT      ;SET REFORMAT SWITCH
020600  012737  020610  001110          MOV     #1$,$LPERR      ;SET LOCAL LOOP ON ERROR
020606  005001                          CLR     R1              ;CLEAR R1 FOR TRACK COUNTER
020610                          1$:
020610  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
020612  104003                          ERROR   3               ;BAD INIT ERROR
020614  012737  010127  001600          MOV     #WRHEAD!CFMT,L.CS1  ;SET UP FOR WRITE HEADER 24(8) SECTOR MODE
020622  053737  001720  001600          BIS     DTYPE,L.CS1     ;SET DRV TYP
020630  013737  001626  001610          MOV     DRVNUM,L.CS2    ;SET DRIVE NUMBER
020636  012737  000074  001602          MOV     #74,L.WC        ;SET WORD COUNT
020644  110137  001607                  MOVB    R1,L.DT         ;LOAD TRACK ADDRESS
020650  012737  072414  001604          MOV     #OBUFF,L.BA     ;       SET BUS ADDRESS
020656  012737  000312  001614          MOV     #312,L.DCYL     ;      CYLINDER ADDRESS

020664  004437  042260                  JSR     R4,GENCOM       ;GENERATE HEADER
020670  001200                          1200                    ;INCLUDE BAD SECTOR BITS

020672  104417                          TLOADRK                 ;LOAD RK REGS
020674  104434                          TWAT159                 ;WAIT FOR INTERRUPT
020676  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

020700  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
020702  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS

020704  104415                          SCOP1                   ;LOCAL LOOP ON ERROR TO 1$

020706  005701                          TST     R1              ;R1 POINTING TO TRACK 0
020710  001002                          BNE     2$              ;NO-SKIP
020712  005201                          INC     R1              ;BUMP TO TRACK 1
020714  000735                          BR      1$              ;LOOP
020716  012737  020726  001110  2$:     MOV     #3$,$LPERR      ;SET LOCAL LOOP ON ERROR
020724  005001                          CLR     R1              ;CLEAR TRACK POINTER
020726                          3$:
020726  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
020730  104003                          ERROR   3               ;BAD INIT ERROR
020732  012737  010125  001600          MOV     #RDHEAD.CFMT,L.CS1  ;LOAD READ 24(8) SECTOR FORMAT
020740  013737  001626  001610          MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
020746  110137  001607                  MOVB    R1,L.DT         ;LOAD TRACK
020752  012737  000312  001614          MOV     #312,L.DCYL     ;LOAD CYLINDER

020760  004437  036362                  JSR     R4,RDSTHD       ;GO READ STANDARD HEADER
020764  104421                          TCHKOP                  ;RETURN IF CERR W/O DATA LATE SET
020766  104004                          ERROR   4; OR 5,6,7     ;REPORT ALL OTHER ERRORS
020770  104013                          ERROR   13              ;REPORT DATA LATE
020772  104002                          ERROR   2               ;REPORT "OPERATION TO SLOW" OR "HEADER
                                                                ;0 NOT FOUND" MESSAGE
```

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6571  020774  104415                  SCOP1                   ;LOCAL LOOP TO 3$ ON ERROR
6572  020776  004437  042260          JSR     R4,GEN.COM      ;GENERATE & COMPARE HEADERS
6573  021002  101200                  101200                  ;INCLUDING BAD SECTOR LISTS
6574  021004  000413                  BR      4$              ;NO MISCOMPARES-SKIP
6575  021006  104015                  ERROR   15              ;REPORT FIRST MISCOMPARE
6576
6577  021010  013700  001634          MOV     ERRLMT,R0       ;GET ERROR LIMIT
6578  021014  005300          64$:    DEC     R0              ;DECREMENT COUNT
6579  021016  001406                  BEQ     65$             ;IF ZERO - EXIT
6580  021020  004437  042260          JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
6581  021024  040000                  40000
6582  021026  000402                  BR      65$             ;NO MORE ERRORS - EXIT
6583  021030  104016                  ERROR   16              ;REPORT NEXT ERROR
6584  021032  000770                  BR      64$             ;LOOP
6585  021034                  65$:
6586
6587  021034  104415          4$:     SCOP1                   ;LOCAL LOOP TO 3$
6588  021036  005701                  TST     R1              ;POINTING TO TRACK 1
6589  021040  001002                  BNE     5$              ;NO-EXIT
6590  021042  005201                  INC     R1              ;BUMP TO TRACK 1
6591  021044  000730                  BR      3$              ;LOOP
6592
6593  021046                  5$:
6594                                  ;;*****************************************************************
6595                                  ;*TEST 62       24 SECTOR FORMAT DATA TRANSFER (PART 1)
6596                                  ;*
6597                                  ;*      ISSUE A WRITE DATA OF 400 WORDS IN 24 SECTOR FORMAT
6598                                  ;*      TO CYLINDER 312, TRACK 0, SECTOR 0.  READ SECTOR BACK
6599                                  ;*      AND MAKE SURE IT IS CORRECT.
6600                                  ;*
6601                                  ;;*****************************************************************
6602  021046  000004          TST62:  SCOPE
6603  021050  012737  000012  001262  MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6604  021056  012737  000312  001676  MOV     #312,REFMT      ;SET REFORMAT SWITCH
6605  021064  104416                  TSSINIT                 ;CLEAR SUBSYSTEM
6606  021066  104003                  ERROR   3               ;BAD INIT ERROR
6607
6608  021070  004437  042260          JSR     R4,GENCOM       ;GENERATE DATA
6609  021074  000013                  13                      ;PATTERN 13
6610  021076  000400                  400                     ;400 WORDS
6611
6612  021100  004437  042260          JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
6613  021104  002007                  2007
6614  021106  000400                  400
6615
6616  021110  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
6617  021114  010123                  WRDATA!CFMT                     ;WRDATA!CFMT
6618  021116  177400                  -400                    ;-400 WORDS
6619  021120  072414                  OBUFF                   ;OBUFF IS BUFF ADDRESS
6620  021122     000                  .BYTE   0               ;SECTOR 0
6621  021123     000                  .BYTE   0               ;TRACK 0
6622  021124  000312                  312                     ;CYLINDER 312
6623
6624  021126  104417                  TLOADRK                 ;LOAD RK REGS
6625  021130  104430                  TWAT96                  ;WAIT FOR INTERRUPT
6626  021132  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
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6627
6628  021134  104427                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6629  021136  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6630
6631  021140  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
6632  021144  010721                        RDDATA.CFMT                     ;RDDATA.CFMT
6633  021146  177400                        -400                    ;-400 WORDS
6634  021150  070414                        IBUFF                   ;IBUFF IS BUFF ADDRESS
6635  021152  000                           .BYTE   0               ;SECTOR 0
6636  021153  000                           .BYTE   0               ;TRACK 0
6637  021154  000312                        312                     ;CYLINDER 312
6638
6639  021156  104417                        TLOADRK                 ;LOAD RK REGS
6640  021160  104424                        TWAT32                  ;WAIT FOR INTERRUPT
6641  021162  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6642
6643  021164  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6644  021166  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6645
6646  021170  004437  042260                JSR     R4,GENCOM       ;COMPARE DATA
6647  021174  100000                        100000
6648  021176  000400                        400                     ;400 WORDS
6649  021200  000413                        BR      1$              ;NO MISCOMPARES-SKIP
6650  021202  104015                        ERROR   15              ;REPORT 1ST ERROR
6651
6652  021204  013700  001634                MOV     ERRLMT,R0       ;GET ERROR LIMIT
6653  021210  005300              64$:      DEC     R0              ;DECREMENT COUNT
6654  021212  001406                        BEQ     65$             ;IF ZERO - EXIT
6655  021214  004437  042260                JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
6656  021220  040000                        40000
6657  021222  000402                        BR      65$             ;NO MORE ERRORS - EXIT
6658  021224  104016                        ERROR   16              ;REPORT NEXT ERROR
6659  021226  000770                        BR      64$             ;LOOP
6660  021230                        65$:
6661
6662  021230                        1$:
6663
6664
6665                                        ;;*******************************************************************
6666                                        ;*TEST 63       24 SECTOR FORMAT DATA TRANSFER (PART 2)
6667                                        ;*
6668                                        ;*      ISSUE A WRITE DATA OF 1000 WORDS IN 24 SECTOR FORMAT
6669                                        ;*      TO CYLINDER 312, TRACK 0, SECTOR 23.  READ SECTOR BACK
6670                                        ;*      AND MAKE SURE IT IS CORRECT.  MAKE SURE THAT MID-TRANSFER
6671                                        ;*      SEEK HAS TAKEN PLACE.
6672                                        ;*
6673                                        ;;*******************************************************************
6674  021230  000004              TST63:    SCOPE
6675  021232  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6676  021240  012737  000312  001676        MOV     #312,REFMT      ;SET REFORMAT SWITCH
6677  021246  004737  034522                JSR     PC,OPTTST       ;SET UP OPTIONS
6678  021252  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
6679  021254  104003                        ERROR   3               ;BAD INIT ERROR
6680
6681  021256  004437  042260                JSR     R4,GENCOM       ;GENERATE DATA
6682  021262  000015                        15                      ;PATTERN 15
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6683  021264  001000                    1000                    ;1000 WORDS
6684
6685  021266  004437  042260            JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
6686  021272  002007                    2007
6687  021274  001000                    1000
6688
6689  021276  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
6690  021302  010123                    WRDATA!CFMT                     ;WRDATA!CFMT
6691  021304  177000                    -1000                   ;-1000 WORDS
6692  021306  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
6693  021310     023                    .BYTE   23              ;SECTOR 23
6694  021311     000                    .BYTE   0               ;TRACK 0
6695  021312  000312                    312                     ;CYLINDER 312
6696
6697  021314  104417                    TLOADRK                 ;LOAD RK REGS
6698  021316  104430                    TWAT96                  ;WAIT FOR INTERRUPT
6699  021320  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6700
6701  021322  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6702  021324  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6703
6704  021326  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
6705  021332  010121                    RDDATA!CFMT                     ;RDDATA.CFMT
6706  021334  177000                    -1000                   ;-1000 WORDS
6707  021336  070414                    IBUFF                   ;IBUFF IS BUFF ADDRESS
6708  021340     023                    .BYTE   23              ;SECTOR 23
6709  021341     000                    .BYTE   0               ;TRACK 0
6710  021342  000312                    312                     ;CYLINDER 312
6711
6712  021344  104417                    TLOADRK                 ;LOAD RK REGS
6713  021346  104426                    TWAT64                  ;WAIT FOR INTERRUPT
6714  021350  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6715
6716  021352  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6717  021354  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6718
6719  021356  004437  042260            JSR     R4,GENCOM       ;COMPARE DATA
6720  021362  100000                    100000
6721  021364  001000                    1000                    ;1000 WORDS
6722  021366  000413                    BR      1$              ;NO MISCOMPARES-SKIP
6723  021370  104015                    ERROR   15              ;REPORT FIRST ERROR
6724
6725  021372  013700  001634            MOV     ERRLMT,R0       ;GET ERROR LIMIT
6726  021376  005300          64$:      DEC     R0              ;DECREMENT COUNT
6727  021400  001406                    BEQ     65$             ;IF ZERO - EXIT
6728  021402  004437  042260            JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
6729  021406  040000                    40000
6730  021410  000402                    BR      65$             ;NO MORE ERRORS - EXIT
6731  021412  104016                    ERROR   16              ;REPORT NEXT ERROR
6732  021414  000770                    BR      64$             ;LOOP
6733  021416                    65$:
6734
6735  021416                    1$:
6736
6737                            .SBTTL  **SPECIAL DATA TRANSFER TESTS
6738
```

```
                        ;;*****************************************************************
                        ;*TEST 64       MULTI-SECTOR DATA TRANSFER AND BSE
                        ;*
                        ;*      FORMAT CYLINDER 312, TRACK 0 IN 26 SECTOR FORMAT WITH
                        ;*      SECTOR 1 MARKED BAD.  ISSUE A WRITE DATA OF 1000 WORDS
                        ;*      TO CYLINDER 312, TRACK 0, SECTOR 0.  MAKE SURE BAD SECTOR
                        ;*      ERROR SETS AND RKDA IS CORRECT.  READ SECTOR 0 AND
                        ;*      MAKE SURE IT IS CORRECT.
                        ;*
                        ;*      ISSUE A READ DATA OF 1000 WORDS TO CYLINDER 312, TRACK 0,
                        ;*      SECTOR 0.  MAKE SURE BAD SECTOR ERROR SETS AND THE
                        ;*      PREVIOUS SECTOR IS LOADED CORRECTLY INTO MEMORY.
                        ;*
                        ;*****************************************************************
021416  000004         TST64:  SCOPE
021420  012737  000012  001262        MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
021426  012737  000312  001676        MOV     #312,REFMT      ;SET REFORMAT SWITCH
021434  104416                       TSSINIT                 ;CLEAR SUBSYSTEM
021436  104003                       ERROR   3               ;BAD INIT ERROR

021440  004437  035674               JSR     R4,LRLOAD       ;LOAD "L" REGS
021444  000127                       WRHEAD                  ;WRHEAD
021446  177676                       -102                    ;-102 WORDS
021450  072414                       OBUFF                   ;OBUFF IS BUFF ADDRESS
021452     000                       .BYTE   0               ;SECTOR 0
021453     000                       .BYTE   0               ;TRACK 0
021454  000312                       312                     ;CYLINDER 312

021456  004437  042260               JSR     R4,GENCOM       ;BUILD HEADERS
021462  000600                       600

021464  042737  040000  072424       BIC     #BIT14,OBUFF+10 ;MARK SECTOR 1 BAD
021472  042737  040000  072426       BIC     #BIT14,OBUFF+12 ;CORRECT HURC

021500  104417                       TLOADRK                 ;LOAD RK REGS
021502  104431                       TWAIT12                 ;WAIT FOR INTERRUPT
021504  104002                       ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

021506  104421                       TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
021510  104004                       ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS

021512  004437  042260               JSR     R4,GENCOM       ;GENERATE DATA
021516  000016                       16                      ;PATTERN 16
021520  001000                       1000                    ;1000 WORDS

021522  004437  042260               JSR     R4,GENCOM       ;CLEAR IBUFF TO ALL ONES
021526  002007                       2007
021530  001000                       1000

021532  004437  035674               JSR     R4,LRLOAD       ;LOAD "L" REGS
021536  000123                       WRDATA                  ;WRDATA
021540  177000                       -1000                   ;-1000 WORDS
021542  072414                       OBUFF                   ;OBUFF IS BUFF ADDRESS
021544     000                       .BYTE   0               ;SECTOR 0
021545     000                       .BYTE   0               ;TRACK 0
021546  000312                       312                     ;CYLINDER 312
```

```
6795
6796  021550  104417                          TLOADRK                 ;LOAD RK REGS
6797  021552  104424                          TWAT32                  ;WAIT FOR INTERRUPT
6798  021554  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6799
6800  021556  104422                          TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERR
6801  021560  000000                          0
6802  021562  000100                          BSERR                   ;BAD SECTOR ERROR
6803  021564  000000                          0
6804  021566  104004                          ERROR   4; OR 5,6,7     ;REPORT ALL DISCREPANCIES
6805  021570  005037  050072                  CLR     GRP4ER          ;CLEAR GROUP 4 ERRORS
6806  021574  004437  037642                  JSR     R4,CHKCTS       ;CHECK CYL, TRK, SECT CORRECT AFTER ABORTED WRITE
6807  021600  032737  000020  050072          BIT     #TRKERR,GRP4ER  ;TRK IN ERROR?
6808  021606  001416                          BEQ     1$              ;NO-SKIP
6809  021610  012737  054260  001450          MOV     #EM13,EM10N     ;"TRACK ADDRESS INCORRECT"
6810  021616  013737  050046  001202          MOV     EXPTRK,$REG10   ;EXPECTED VALUE
6811  021624  013737  050060  001204          MOV     REALTRK,$REG11  ;REAL VALUE
6812  021632  012737  050557  061072          MOV     #OPER37,DF010A  ;"AFTER WRITE DATA TERMINATED WITH BSE"
6813  021640  104010                          ERROR   10
6814  021642  000527                          BR      5$              ;EXIT
6815
6816  021644  032737  000040  050072  1$:     BIT     #SECERR,GRP4ER  ;SECTOR IN ERROR?
6817  021652  001422                          BEQ     3$              ;NO-SKIP
6818  021654  012737  054310  001450          MOV     #EM14,EM10N     ;"SECTOR ADDRESS INCORRECT"
6819  021662  012737  050557  061072          MOV     #OPER37,DF010A  ;"AFTER WRITE DATA ABORTED WITH BSE"
6820  021670  013737  050044  001202          MOV     EXPSEC,$REG10   ;EXPECTED VALUE
6821  021676  013737  050062  001204          MOV     REALSEC,$REG11  ;REAL VALUE
6822  021704  104010                          ERROR   10
6823  021706  000505                          BR      5$              ;EXIT
6824  021710  104415                          SCOP1                   ;LOCAL LOOP TO BEGINNING OF TEST
6825  021712  012737  021720  001110          MOV     #3$,$LPERR      ;SET LOCAL LOOP ON ERROR
6826  021720                          3$:
6827  021720  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
6828  021722  104003                          ERROR   3               ;BAD INIT ERROR
6829  021724  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
6830  021730  000121                          RDDATA                  ;RDDATA
6831  021732  177400                          -400                    ;-400 WORDS
6832  021734  070414                          IBUFF                   ;IBUFF IS BUFF ADDRESS
6833  021736     000                          .BYTE   0               ;SECTOR 0
6834  021737     000                          .BYTE   0               ;TRACK 0
6835  021740  000312                          312                     ;CYLINDER 312
6836
6837  021742  104417                          TLOADRK                 ;LOAD RK REGS
6838  021744  104424                          TWAT32                  ;WAIT FOR INTERRUPT
6839  021746  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6840
6841  021750  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6842  021752  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
6843
6844  021754  004437  042260                  JSR     R4,GENCOM       ;COMPARE DATA
6845  021760  100000                          100000
6846  021762  000400                          400                     ;400 WORDS
6847  021764  000413                          BR      4$              ;NO MISCOMPARES-EXIT
6848  021766  104015                          ERROR   15              ;REPORT FIRST ERROR
6849
6850  021770  013700  001634                  MOV     ERRLMT,R0       ;GET ERROR LIMIT
```

```
6851  021774  005300              64$:    DEC     R0              ;DECREMENT COUNT
6852  021776  001406                      BEQ     65$             ;IF ZERO - EXIT
6853  022000  004437  042260              JSR     R4,GENCCM       ;CONTINUE DATA COMPARE
6854  022004  040000                      40000
6855  022006  000402                      BR      65$             ;NO MORE ERRORS - EXIT
6856  022010  104016                      ERROR   16              ;REPORT NEXT ERROR
6857  022012  000770                      BR      64$             ;LOOP
6858  022014                      65$:
6859
6860  022014  004437  042260      4$:     JSR     R4,GENCOM       ;CLEAR IBUFF
6861  022020  002007                      2007
6862  022022  001000                      1000
6863
6864  022024  004437  035674              JSR     R4,LRLOAD       ;LOAD "L" REGS
6865  022030  000121                      RDDATA                  ;RDDATA
6866  022032  177000                      -1000                   ;-1000 WORDS
6867  022034  070414                      IBUFF                   ;IBUFF IS BUFF ADDRESS
6868  022036     000                      .BYTE   0               ;SECTOR 0
6869  022037     000                      .BYTE   0               ;TRACK 0
6870  022040  000312                      312                     ;CYLINDER 312
6871
6872  022042  104417                      TLOADRK                 ;LOAD RK REGS
6873  022044  104424                      TWAT32                  ;WAIT FOR INTERRUPT
6874  022046  104002                      ERROR   2               ;TO SLOW,NOT COMPLETE ERROR
6875
6876  022050  104422                      TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
6877  022052  000000                      0
6878  022054  000100                      BSERR                   ;BAD SECTOR ERROR
6879  022056  000000                      0
6880  022060  104004                      ERROR   4; OR 5,6,7     ;REPORT ALL DISCREPANCIES
6881
6882  022062  004437  042260              JSR     R4,GENCOM       ;COMPARE DATA AGAIN
6883  022066  100000                      100000
6884  022070  000400                      400                     ;400 WORDS
6885  022072  000413                      BR      5$              ;NO MISCOMPARES
6886  022074  104015                      ERROR   15              ;REPORT FIRST ERROR
6887
6888  022076  013700  001634              MOV     ERRLMT,R0       ;GET ERROR LIMIT
6889  022102  005300              66$:    DEC     R0              ;DECREMENT COUNT
6890  022104  001406                      BEQ     67$             ;IF ZERO - EXIT
6891  022106  004437  042260              JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
6892  022112  040000                      40000
6893  022114  000402                      BR      67$             ;NO MORE ERRORS - EXIT
6894  022116  104016                      ERROR   16              ;REPORT NEXT ERROR
6895  022120  000770                      BR      66$             ;LOOP
6896  022122                      67$:
6897
6898  022122                      5$:
6899                                      ;;*****************************************************************
6900                                      ;*TEST 65       FORMAT TEST
6901                                      ;*
6902                                      ;*      FORMAT CYLINDER 312, TRACKS 0 AND 1 IN 26 SECTOR FORMAT.
6903                                      ;*      MAKE SURE NO ERRORS SET.  READ SECTORS 0-25 AND MAKE
6904                                      ;*      SURE DATA CHECK DOES NOT OCCUR.
6905                                      ;*
6906                                      ;;*****************************************************************
```

```
6907  022122  000004                    TST65:  SCOPE
6908  022124  012737  000001  001262            MOV     #1,$TIMES       ;;DO 1 ITERATION
6909  022132  005000                            CLR     R0              ;CLEAR TRACK COUNTER
6910  022134  012737  022142  001110            MOV     #1$,$LPERR      ;SET LOCAL LOOP
6911
6912  022142                            1$:
6913  022142  104416                            TSSINIT                 ;CLEAR SUBSYSTEM
6914  022144  104003                            ERROR   3               ;BAD INIT ERROR
6915
6916  022146  013737  001626  001610            MOV     DRVNUM,L.CS2    ;LOAD DRIVE NUMBER
6917  022154  012737  000127  001600            MOV     #WRHEAD,L.CS1   ;LOAD WRITE HEADER
6918  022162  053737  001720  001600            BIS     DTYPE,L.CS1     ;SET DRV TYP
6919  022170  110037  001607                    MOVB    R0,L.DT         ;LOAD DESIRED TRACK FROM TRACK COUNTER
6920  022174  012737  072414  001604            MOV     #OBUFF,L.BA     ;LOAD BUS ADDRESS
6921  022202  012737  177676  001602            MOV     #-102,L.WC      ;       WORD COUNT
6922  022210  012737  000312  001614            MOV     #312,L.DCYL     ;       CYLINDER
6923
6924  022216  004437  042260                    JSR     R4,GENCOM       ;BUILD HEADER
6925  022222  001200                            1200                    ;WITH BSE FLAGGED
6926
6927  022224  104417                            TLOADRK                 ;LOAD RK REGS
6928  022226  104431                            TWAT112                 ;WAIT FOR INTERRUPT
6929  022230  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6930
6931  022232  104421                            TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6932  022234  104004                            ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
6933
6934  022236  104415                            SCOP1                   ;LOCAL LOOP TO 1$
6935
6936  022240  005700                            TST     R0              ;R0 AT ZERO?
6937  022242  001002                            BNE     2$              ;NO-EXIT
6938  022244  005200                            INC     R0              ;BUMP COUNTER
6939  022246  000735                            BR      1$              ;LOOP
6940  022250  005000                    2$:     CLR     R0              ;CLEAR SECTOR COUNTER
6941  022252  012737  022260  001110            MOV     #113$,$LPERR    ;SET LOCAL LOOP ON ERROR
6942
6943  022260                            113$:
6944  022260  104416                            TSSINIT                 ;CLEAR SUBSYSTEM
6945  022262  104003                            ERROR   3               ;BAD INIT ERROR
6946  022264                            3$:
6947  022264  004437  035674                    JSR     R4,LRLOAD       ;LOAD "L" REGS
6948  022270  000121                            RDDATA                  ;RDDATA
6949  022272  177400                            -400                    ;-400 WORDS
6950  022274  070414                            IBUFF                   ;IBUFF IS BUFF ADDRESS
6951  022276     000                            .BYTE   0               ;SECTOR 0
6952  022277     000                            .BYTE   0               ;TRACK 0
6953  022300  000312                            312                     ;CYLINDER 312
6954
6955  022302  110037  001606                    MOVB    R0,L.DS         ;LOAD SECTOR COUNTER INTO DESIRED SECTOR
6956
6957  022306  104417                            TLOADRK                 ;LOAD RK REGS
6958  022310  104424                            TWAT32                  ;WAIT FOR INTERRUPT
6959  022312  104002                            ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
6960
6961  022314  104421                            TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
6962  022316  104004                            ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
```

```
                                        SCOP1                   ;LOCAL LOOP TO 3$ ON ERROR

[illegible]  022322  022700  000024      CMP     #24,R0          ;LAST SECTOR READ?
[illegible]  022326  001402              BEQ     4$              ;YES-EXIT
6968  022330  005200                    INC     R0              ;BUMP SECTOR COUNTER
6969  022332  000754                    BR      3$              ;LOOP
6970
6971  022334  005037  001676    4$:     CLR     REFMT           ;CLEAR REFORMAT SWITCH
6972
6973                            .SBTTL  **WRITE CHECK TESTS
6974
6975                            ;;*****************************************************************
6976                            ;*TEST 66       WRITE-CHECK WITH NO ERROR
6977                            ;*
6978                            ;*      WRITE CYLINDER 312, TRACK 0, SECTOR 0 WITH A KNOWN PATTERN.
6979                            ;*      DO A WRITE-CHECK OF 400 WORDS.  MAKE SURE NO
6980                            ;*      ERROR OCCURS.
6981                            ;*
6982                            ;;*****************************************************************
6983  022340  000004            TST66:  SCOPE
6984  022342  012737  000012  001262    MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
6985  022350  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
6986  022352  104003                    ERROR   3               ;BAD INIT ERROR
6987
6988  022354  004437  035674           JSR     R4,LRLOAD       ;LOAD "L" REGS
6989  022360  000123                    WRDATA                  ;WRDATA
6990  022362  177400                    -400                    ;-400 WORDS
6991  022364  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
6992  022366     000                    .BYTE   0               ;SECTOR 0
6993  022367     000                    .BYTE   0               ;TRACK 0
6994  022370  000312                    312                     ;CYLINDER 312
6995
6996  022372  004437  042260           JSR     R4,GENCOM       ;GENERATE DATA
6997  022376  000002                    2                       ;PATTERN 2
6998  022400  000400                    400                     ;400 WORDS
6999
7000  022402  104417                    TLOADRK                 ;LOAD RK REGS
7001  022404  104430                    TWAT96                  ;WAIT FOR INTERRUPT
7002  022406  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7003
7004  022410  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7005  022412  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7006
7007  022414  004437  035674           JSR     R4,LRLOAD       ;LOAD "L" REGS
7008  022420  000131                    WRTCHK                  ;WRTCHK
7009  022422  177400                    -400                    ;-400 WORDS
7010  022424  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
7011  022426     000                    .BYTE   0               ;SECTOR 0
7012  022427     000                    .BYTE   0               ;TRACK 0
7013  022430  000312                    312                     ;CYLINDER 312
7014
7015  022432  104417                    TLOADRK                 ;LOAD RK REGS
7016  022434  104424                    TWAT32                  ;WAIT FOR INTERRUPT
7017  022436  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7018
```

```
7019  022440  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7020  022442  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7021                            ;;*****************************************************************
7022                            ;*TEST 67       WRITE CHECK ERROR (PART 1)
7023                            ;*
7024                            ;*      WRITE CYLINDER 312, TRACK 0, SECTOR 0 WITH ALL ZEROES.
7025                            ;*      WRITE CHECK CYLINDER 312, TRACK 0, SECTOR 0 WITH SAME
7026                            ;*      DATA EXCEPT WORD 110 HAS ONE OF THE FOLLOWING
7027                            ;*      CONFIGURATIONS:
7028                            ;*
7029                            ;*      000001  000020  000400  010000
7030                            ;*      000002  000040  001000  020000
7031                            ;*      000004  000100  002000  040000
7032                            ;*      000010  000200  004000  100000
7033                            ;*
7034                            ;*      MAKE SURE WRITE CHECK ERROR SET FOR EACH
7035                            ;*      OF THE CONFIGURATIONS AND THAT THE BUS ADDRESS
7036                            ;*      AND WORD COUNT IS CORRECT.
7037                            ;*
7038                            ;;*****************************************************************
7039  022444  000004            TST67:  SCOPE
7040  022446  012737  000012  001262    MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
7041  022454  012700  000001            MOV     #BIT0,R0        ;SET LO ORDER BIT IN R0 FOR
7042                                                            ;CAUSING WRITE CHECK ERROR
7043  022460  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
7044  022462  104003                    ERROR   3               ;BAD INIT ERROR
7045  022464  004437  042260            JSR     R4,GENCOM       ;GENERATE DATA, ALL 0'S
7046  022470  000001                    1
7047  022472  000400                    400
7048
7049  022474  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7050  022500  000123                    WRDATA                  ;WRDATA
7051  022502  177400                    -400                    ;-400 WORDS
7052  022504  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
7053  022506     000                    .BYTE   0               ;SECTOR 0
7054  022507     000                    .BYTE   0               ;TRACK 0
7055  022510  000312                    312                     ;CYLINDER 312
7056
7057  022512  104417                    TLOADRK                 ;LOAD RK REGS
7058  022514  104430                    TWAT96                  ;WAIT FOR INTERRUPT
7059  022516  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7060
7061  022520  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7062  022522  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7063
7064  022524  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7065  022530  000131                    WRTCHK                  ;WRTCHK
7066  022532  177400                    -400                    ;-400 WORDS
7067  022534  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
7068  022536     000                    .BYTE   0               ;SECTOR 0
7069  022537     000                    .BYTE   0               ;TRACK 0
7070  022540  000312                    312                     ;CYLINDER 312
7071
7072  022542  104417                    TLOADRK                 ;LOAD RK REGS
7073  022544  104424                    TWAT32                  ;WAIT FOR INTERRUPT
7074  022546  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
```

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7075
7076  022550  104427                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7077  022552  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7078
7079  022554  104415                        SCOP1                   ;LOCAL LOOP ON WRITE CHECK
7080  022556  012737  022564  001110        MOV     #1$,$LPERR      ;SET LOCAL LOOP
7081  022564  010037  072634        1$:     MOV     R0,OBUFF+220    ;CAUSE ERROR BIT IN BUFFER
7082  022570  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
7083  022572  104003                        ERROR   3               ;BAD INIT ERROR
7084  022574  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
7085  022600  000131                        WRTCHK                  ;WRTCHK
7086  022602  177400                        -400                    ;-400 WORDS
7087  022604  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
7088  022606     000                        .BYTE   0               ;SECTOR 0
7089  022607     000                        .BYTE   0               ;TRACK 0
7090  022610  000312                        312                     ;CYLINDER 312
7091
7092  022612  104417                        TLOADRK                 ;LOAD RK REGS
7093  022614  104424                        TWAT32                  ;WAIT FOR INTERRUPT
7094  022616  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7095
7096  022620  104422                        TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
7097  022622  000000                        0
7098  022624  000004                        WCKERR                  ;WRITE CHECK ERROR
7099  022626  000000                        0
7100  022630  104004                        ERROR   4; OR 5,6,7     ;REPORT ALL DISCREPANCIES
7101
7102  022632  104415                        SCOP1                   ;LOCAL LOOP ON ERROR TO 1$
7103
7104                          ;       NOTE:   THE WORD COUNT AND BUS ADDRESS CAN BE EITHER OF THREE
7105                          ;       VALUES AND BE CORRECT. THE DIFFERENCE IS CAUSED BY WHEN THE
7106                          ;       WCE OCCURRED. IF IT OCCURRED ON THE FIRST WORD OF A DOUBLE
7107                          ;       NPR CYCLE, WC AND BA WILL BE TWO PAST WHERE THE ERROR ACTUALLY
7108                          ;       OCCURRED. IF WCE OCCURRED ON A SINGLE NPR CYCLE OR THE LAST
7109                          ;       NPR CYCLE OF A DOUBLE CYCLE, WC AND BA CONTENTS ARE ONE PAST
7110                          ;       THE ACTUAL WORD WHERE THE ERROR WAS. IN SOME CASES, WC AND BA
7111                          ;       CAN BE THREE PAST WHERE THE ERROR WAS AND STILL BE ACCEPTABLE.
7112
7113
7114  022634  023727  001544  072636        CMP     T.BA,#OBUFF+222 ;CHECK BA HALT AT PROPER PLACE
7115  022642  001416                        BEQ     2$              ;YES-SKIP
7116  022644  101040                        BHI     6$              ;IF TO HI - SKIP
7117  022646  012737  054123  001450        MOV     #EM11,EM10N     ;"INCORRECT BA"
7118  022654  012737  072636  001202        MOV     #OBUFF+222,$REG10  ;GOOD VALUE
7119  022662  013737  001544  001204        MOV     T.BA,$REG11     ;BAD VALUE
7120  022670  012737  050613  061072        MOV     #OPER41,DF010A  ;"WRITE CHECK ABORTED WITH WCE"
7121  022676  104010                        ERROR   10
7122
7123  022700  023727  001542  177511  2$:   CMP     T.WC,#-267      ;CHECK WORD COUNT AT CORRECT VALUE
7124  022706  001461                        BEQ     3$              ;YES-SKIP
7125  022710  101037                        BHI     7$              ;IF HIGHER SKIP
7126  022712  012737  054076  001450        MOV     #EM10,EM10N     ;"INCORRECT WC"
7127  022720  012737  050613  061072        MOV     #OPER41,DF010A  ;"WRITE CHECK ABORTED WITH WCE"
7128  022726  012737  177511  001202        MOV     #-267,$REG10    ;GOOD VALUE
7129  022734  013737  001542  001204        MOV     T.WC,$REG11     ;ERROR VALUE
7130  022742  104010                        ERROR   10
```

```
7131  022744  000442                          BR      3$              ;EXIT
7132
7133  022746  023727  001544  072642  6$:     CMP     T.BA,#OBUFF+226 ;TEST IF BA AT HI SIDE
7134  022754  101415                          BLOS    7$              ;YES - SKIP
7135  022756  012737  054123  001450          MOV     #EM11,EM10N     ;SET MESSAGE
7136  022764  012737  072642  001202          MOV     #OBUFF+226,$REG10 ;GOOD VALUE
7137  022772  013737  001544  001204          MOV     T.BA,$REG11     ;ERROR VALUE
7138  023000  012737  050613  061072          MOV     #OPER41,DF010A  ;"WRITE CHECK ABORTED WITH WCE"
7139  023006  104010                          ERROR   10
7140
7141  023010  023727  001542  177513  7$:     CMP     T.WC,#-265      ;TEST IF WORD COUNT AT HI SIDE
7142  023016  101415                          BLOS    3$              ;YES - SKIP
7143  023020  012737  054076  001450          MOV     #EM10,EM10N     ;SET MESSAGE
7144  023026  012737  050613  061072          MOV     #OPER41,DF010A  ;"WC ABORTED WITH WCE"
7145  023034  012737  177513  001202          MOV     #-265,$REG10    ;GOOD VALUE
7146  023042  013737  001542  001204          MOV     T.WC,$REG11     ;ERROR VALUE
7147  023050  104010                          ERROR   10
7148
7149  023052  104415                  3$:     SCOP1                   ;LOCAL LOOP ON ERROR TO 1$
7150
7151  023054  032700  100000                  BIT     #BIT15,R0       ;BIT 15 SET?
7152  023060  001002                          BNE     4$              ;YES-EXIT
7153  023062  006300                          ASL     R0              ;SHIFT ERROR BIT
7154  023064  000637                          BR      1$              ;LOOP
7155
7156  023066                          4$:
7157                                  ;;*****************************************************************
7158                                  ;*TEST 70       WRITE CHECK ERROR (PART 2)
7159                                  ;*
7160                                  ;*      WRITE CYLINDER 312, TRACK 0, SECTOR 0 WITH 17777
7161                                  ;*      IN ALL WORDS.  WRITE CHECK CYLINDER 312, TRACK 0,
7162                                  ;*      SECTOR 0 WITH THE SAME DATA EXCEPT WORD 120 HAS
7163                                  ;*      ONE OF THE FOLLWOING CONFIGURATIONS:
7164                                  ;*
7165                                  ;*      177776  177757  177377  167777
7166                                  ;*      177775  177737  176777  157777
7167                                  ;*      177773  177677  175777  137777
7168                                  ;*      177767  177577  173777  077777
7169                                  ;*
7170                                  ;*      MAKE SURE WRITE CHECK ERROR SET FOR EACH
7171                                  ;*      OF THE CONFIGURATIONS AND THAT THE BUS ADDRESS
7172                                  ;*      AND WORD COUNT IS CORRECT.
7173                                  ;*
7174                                  ;;*****************************************************************
7175  023066  000004                  TST70:  SCOPE
7176  023070  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
7177  023076  012700  177776                  MOV     #177776,R0      ;LOAD R0 FOR CAUSING WRITE CHECK ERROR
7178
7179  023102  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
7180  023104  104003                          ERROR   3               ;BAD INIT ERROR
7181  023106  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
7182  023112  000007                          7                       ;ALL 1'S
7183  023114  000400                          400                     ;400 WORDS
7184
7185  023116  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7186  023122  000123                          WRDATA                  ;WRDATA
```

```
7187  023124  177400                    -400                    ;-400 WORDS
7188  023126  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
7189  023130     000                    .BYTE   0               ;SECTOR 0
7190  023131     000                    .BYTE   0               ;TRACK 0
7191  023132  000312                    312                     ;CYLINDER 312
7192
7193  023134  104417                    TLOADRK                 ;LOAD RK REGS
7194  023136  104430                    TWAT96                  ;WAIT FOR INTERRUPT
7195  023140  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7196
7197  023142  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7198  023144  104004                    ERROR   4  ;OP 5, 6, 7, 10 ;REPORT ALL ERRORS
7199
7200  023146  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7201  023152  000131                    WRTCHK                  ;WRTCHK
7202  023154  177400                    -400                    ;-400 WORDS
7203  023156  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
7204  023160     000                    .BYTE   0               ;SECTOR 0
7205  023161     000                    .BYTE   0               ;TRACK 0
7206  023162  000312                    312                     ;CYLINDER 312
7207
7208  023164  104417                    TLOADRK                 ;LOAD RK REGS
7209  023166  104424                    TWAT32                  ;WAIT FOR INTERRUPT
7210  023170  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7211
7212  023172  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7213  023174  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7214
7215  023176  104415                    SCOP1           ;LOCAL LOOP TO START OF TEST
7216  023200  012737  023206  001110    MOV     #1$,$LPERR      ;SET LOCAL LOOP
7217
7218  023206  010037  072634    1$:     MOV     R0,OBUFF+220    ;PUT WORD IN OBUFF TO CAUSE WCE
7219  023212  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
7220  023214  104003                    ERROR   3               ;BAD INIT ERROR
7221
7222  023216  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7223  023222  000131                    WRTCHK                  ;WRTCHK
7224  023224  177400                    -400                    ;-400 WORDS
7225  023226  072414                    OBUFF                   ;OBUFF IS BUFF ADDRESS
7226  023230     000                    .BYTE   0               ;SECTOR 0
7227  023231     000                    .BYTE   0               ;TRACK 0
7228  023232  000312                    312                     ;CYLINDER 312
7229
7230  023234  104417                    TLOADRK                 ;LOAD RK REGS
7231  023236  104424                    TWAT32                  ;WAIT FOR INTERRUPT
7232  023240  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7233
7234  023242  104422                    TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
7235  023244  000000                    0
7236  023246  000004                    WCKERR                  ;WRITE CHECK ERROR
7237  023250  000000                    0
7238  023252  104004                    ERROR   4; OR 5,6,7     ;REPORT ALL DISCREPANCIES
7239
7240  023254  104415                    SCOP1                   ;LOCAL LOOP TO 1$
7241
7242                            ;       NOTE:   THE WORD COUNT AND BUS ADDRESS CAN BE EITHER OF THREE
```

```
                                ;       VALUES AND BE CORRECT. THE DIFFERENCE IS CAUSED BY WHEN THE
                                ;       WCE OCCURRED. IF IT OCCURRED ON THE FIRST WORD OF A DOUBLE
                                ;       NPR CYCLE, WC AND BA WILL BE TWO PAST WHERE THE ERROR ACTUALLY
                                ;       OCCURRED. IF WCE OCCURRED ON A SINGLE NPR CYCLE OR THE LAST
                                ;       NPR CYCLE OF A DOUBLE CYCLE, WC AND BA CONTENTS ARE ONE PAST
                                ;       THE ACTUAL WORD WHERE THE ERROR WAS. IN SOME CASES, WC AND BA
                                ;       CAN BE THREE PAST WHERE THE ERROR WAS AND STILL BE ACCEPTABLE.

023256  023727  001544  072636          CMP     T.BA,#OBUFF+222 ;CHECK BA HALT AT PROPER PLACE
023264  001416                          BEQ     2$              ;YES-SKIP
023266  101040                          BHI     6$              ;IF TO HI - SKIP
023270  012737  054123  001450          MOV     #EM11,EM10N     ;"INCORRECT BA"
023276  012737  072636  001202          MOV     #OBUFF+222,$REG10  ;GOOD VALUE
023304  013737  001544  001204          MOV     T.BA,$REG11     ;BAD VALUE
```

```
7258  023312  012737  050613  061072          MOV     #OPER41,DF010A  ;"WRITE CHECK ABORTED WITH WCE"
7259  023320  104010                          ERROR   10
7260
7261  023322  023727  001542  177511  2$:     CMP     T.WC,#-267      ;CHECK WORD COUNT AT CORRECT VALUE
7262  023330  001461                          BEQ     3$              ;YES-SKIP
7263  023332  101037                          BHI     7$              ;IF HIGHER - SKIP
7264  023334  012737  054076  001450          MOV     #EM10,EM10N     ;"INCORRECT WC"
7265  023342  012737  050613  061072          MOV     #OPER41,DF010A  ;"WRITE CHECK ABORTED WITH WCE"
7266  023350  012737  177511  001202          MOV     #-267,$REG10    ;GOOD VALUE
7267  023356  013737  001542  001204          MOV     T.WC,$REG11     ;ERROR VALUE
7268  023364  104010                          ERROR   10
7269  023366  000442                          BR      3$              ;EXIT
7270
7271  023370  023727  001544  072642  6$:     CMP     T.BA,#OBUFF+226 ;TEST IF BA AT HI SIDE
7272  023376  101415                          BLOS    7$              ;YES - SKIP
7273  023400  012737  054123  001450          MOV     #EM11,EM10N     ;SET MESSAGE
7274  023406  012737  072642  001202          MOV     #OBUFF+226,$REG10 ;GOOD VALUE
7275  023414  013737  001544  001204          MOV     T.BA,$REG11     ;ERROR VALUE
7276  023422  012737  050613  061072          MOV     #OPER41,DF010A  ;"WRITE CHECK ABORTED WITH WCE"
7277  023430  104010                          ERROR   10
7278
7279  023432  023727  001542  177513  7$:     CMP     T.WC,#-265      ;TEST IF WORD COUNT AT HI SIDE
7280  023440  101415                          BLOS    3$              ;YES - SKIP
7281  023442  012737  054076  001450          MOV     #EM10,EM10N     ;SET MESSAGE
7282  023450  012737  050613  061072          MOV     #OPER41,DF010A  ;"WC ABORTED WITH WCE"
7283  023456  012737  177513  001202          MOV     #-265,$REG10    ;GOOD VALUE
7284  023464  013737  001542  001204          MOV     T.WC,$REG11     ;ERROR VALUE
7285  023472  104010                          ERROR   10
7286
7287  023474  104415                  5$:     SCOP1
7288
7289  023476  032700  100000                  BIT     #BIT15,R0       ;BIT 15 SET? (ALL PATTERNS TESTED)
7290  023502  001002                          BNE     4$              ;YES-EXIT
7291  023504  006300                          ASL     R0              ;SHIFT FOR NEXT TEST
7292  023506  000637                          BR      1$              ;LOOP
7293
7294  023510                          4$:
7295                                  ;;*****************************************************************
7296                                  ;*TEST 71       WRITE CHECK OF PARTIAL SECTOR
7297                                  ;*
7298                                  ;*      WRITE CYLINDER 312, TRACK 0, SECTOR WITH A KNOWN
7299                                  ;*      CONFIGURATIONS.  ISSUE A WRITE CHECK COMMAND OF
7300                                  ;*      110 WORDS MAKING SURE THE 111TH WORD IS
7301                                  ;*      DIFFERENT THAN DATA ON DISK.  MAKE SURE
7302                                  ;*      WRITE CHECK ERROR DOES NOT SET.
7303                                  ;*
7304                                  ;;*****************************************************************
7305  023510  000004                  TST71:  SCOPE
7306  023512  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
7307  023520  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
7308  023522  104003                          ERROR   3               ;BAD INIT ERROR
7309
7310  023524  004437  042260                  JSR     R4,GENDOM       ;GENERATE DATA
7311  023530  000007                          7                       ;ALL 1'S
7312  023532  000400                          400                     ;400 WORDS
7313
```

```
7314  023534  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7315  023540  000123                          WRDATA                  ;WRDATA
7316  023542  177400                          -400                    ;-400 WORDS
7317  023544  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
7318  023546     000                          .BYTE   0               ;SECTOR 0
7319  023547     000                          .BYTE   0               ;TRACK 0
7320  023550  000312                          312                     ;CYLINDER 312
7321
7322  023552  104417                          TLOADRK                 ;LOAD RK REGS
7323  023554  104430                          TWAT96                  ;WAIT FOR INTERRUPT
7324  023556  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7325
7326  023560  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7327  023562  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7328
7329  023564  005037  072636                  CLR     OBUFF+2
7330
7331  023570  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7332  023574  000131                          WRTCHK                  ;WRTCHK
7333  023576  177670                          -110                    ;-110 WORDS
7334  023600  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
7335  023602     000                          .BYTE   0               ;SECTOR 0
7336  023603     000                          .BYTE   0               ;TRACK 0
7337  023604  000312                          312                     ;CYLINDER 312
7338
7339  023606  104417                          TLOADRK                 ;LOAD RK REGS
7340  023610  104424                          TWAT32                  ;WAIT FOR INTERRUPT
7341  023612  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7342
7343  023614  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7344  023616  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7345
7346                          .SBTTL  **MAXIMUM DATA TRANSFER AND CONTROLLER TIME OUT
7347
7348                          ;;*****************************************************************
7349                          ;*TEST 72        MAXIMUM DATA TRANSFER (PART 1)
7350                          ;*
7351                          ;*      IN THE FIRST PASS OF THE PROGRAM, THE HEADERS OF
7352                          ;*      THE FIRST 4 CYLINDERS ARE WRITTEN. THIS IS DONE TO
7353                          ;*      INSURE THE FORMAT IS CORRECT.
7354                          ;*
7355                          ;*      ZERO OUT THE FIRST 256 SECTORS OF THE DISK WITH
7356                          ;*      ONE SECTOR WRITES.  ISSUE A SEEK TO CYLINDER 0, TRACK 0.
7357                          ;*      ISSUE A WRITE DATA OF MAXIMUM DATA TRANSFER 200000 WORDS
7358                          ;*      TO CYLINDER 0, TRACK 0, SECTOR 0.  MAKE SURE CONTROLLER
7359                          ;*      TIME OUT IS NOT SET.  CHECK CYLINDER ADDRESS,
7360                          ;*      DISK ADDRESS, BUS ADDRESS AND WORD COUNT.  READ
7361                          ;*      EACH SECTOR TO MAKE SURE IT WAS WRITTEN CORRECTLY.
7362                          ;*
7363                          ;*      NOTE:   THIS TEST IS EXECUTED ONLY IF NO BAD SECTORS ARE PRESENT
7364                          ;*              IN THE FIRST 256 SECTORS ON THE PACK.
7365                          ;*
7366                          ;*****************************************************************
7367  023620  000004          TST72:  SCOPE
7368  023622  012737  000002  001262          MOV     #2,$TIMES       ;;DO 2 ITERATIONS
7369  023630  032737  000400  001664          BIT     #FPFMT,OPTFLG   ;TEST IF FIRST PASS SWITCH SET
```

```
7370  023636  001043                        BNE     24$             ;YES - SKIP FORMAT
7371
7372  023640  105037  023663                CLRB    21$             ;CLEAR ADDRESS POINTERS
7373  023644  005037  023664                CLR     22$
7374
7375  023650  004437  035674        20$:    JSR     R4,LRLOAD       ;LOAD "L" REGISTERS
7376  023654  000127                        WRHEAD                  ;WRITE HEADER
7377  023656  177676                        -102                    ;102 WORDS
7378  023660  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
7379  023662     000                        .BYTE   0               ;SECTOR 0
7380  023663     000        21$:            .BYTE   0               ;TRACK ADDRESS (VARIABLE)
7381  023664  000000        22$:            0                       ;CYLINDER 0 (VARIABLE)
7382
7383  023666  004437  042260                JSR     R4,GENCOM       ;GO GENERATE HEADERS
7384  023672  001200                        1200                    ;WITH BAD SECTOR ERRORS
7385
7386  023674  104417                        TLOADRK                 ;LOAD RK REGS
7387  023676  104431                        TWAT112                 ;WAIT FOR INTERRUPT
7388  023700  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7389
7390  023702  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7391  023704  104004                        ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7392
7393  023706  123727  023663  000002        CMPB    21$,#2          ;TEST IF LAST TRACK
7394  023714  001403                        BEQ     23$             ;YES - SKIP
7395  023716  105237  023663                INCB    21$             ;ELSE BUMP TRACK
7396  023722  000752                        BR      20$             ;LOOP
7397
7398  023724  105037  023663        23$:    CLRB    21$             ;CLEAR TRACK POINTER
7399  023730  023727  023664  000003        CMP     22$,#3          ;TEST IF LAST CYLINDER WRITTEN
7400  023736  001403                        BEQ     24$             ;YES - SKIP
7401  023740  005237  023664                INC     22$             ;ELSE BUMP CYLINDER
7402  023744  000741                        BR      20$             ;LOOP
7403
7404  023746  013737  023760  001110  24$:    MOV     1$,$LPERR       ;SET LOCAL LOOP ON ERROR
7405  023754  012703  000400                MOV     #400,R3         ;SET COUNT FOR SECTOR CLEARING
7406  023760                          1$:
7407  023760  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
7408  023762  104003                        ERROR   3               ;BAD INIT ERROR
7409  023764  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
7410  023770  000123                        WRDATA                  ;WRDATA
7411  023772  177400                        -400                    ;-400 WORDS
7412  023774  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
7413  023776     000                        .BYTE   0               ;SECTOR 0
7414  023777     000                        .BYTE   0               ;TRACK 0
7415  024000  000000                        0                       ;CYLINDER 0
7416
7417  024002  104417                        TLOADRK                 ;LOAD RK REGS
7418  024004  104434                        TWAT159                 ;WAIT FOR INTERRUPT
7419  024006  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7420
7421  024010  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7422  024012  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7423
7424  024014  104415                        SCOP1                   ;LOCAL LOOP ON ERROR TO 1$
7425  024016  005303                        DEC     R3              ;DECREMENT COUNT
```

```
7426  024020  012762  072414  000004  2$:     MOV     #OBUFF,RKBA(R2) ;SET BA
7427  024026  012762  177400  000002          MOV     #-400,RKWC(R2)  ;AND WC AGAIN
7428  024034  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
7429  024040  013762  001626  000010          MOV     DRVNUM,RKCS2(R2)        ;SET DRIVE NUMBER
7430  024046  012737  000123  036124          MOV     #WRDATA,HOLD
7431  024054  053737  001720  036124          BIS     DTYPE,HOLD
7432  024062  013762  036124  000000          MOV     HOLD,RKCS1(R2) ;DO WRITE DATA
7433
7434  024070  104425                          TWAT48                  ;WAIT FOR INTERRUPT
7435  024072  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7436
7437  024074  032762  000200  000074          BIT     #BSE,RKER(R2)   ;BAD SECTOR ERROR?
7438  024102  001415                          BEQ     3$              ;NO-SKIP
7439  024104  032737  000200  001664          BIT     #BSERPT,OPTFLG  ;TEST IF BSE TO MANY HAS BEEN REPORTED
7440  024112  001007                          BNE     5$              ;YES - SKIP
7441  024114  052737  000200  001664          BIS     #BSERPT,OPTFLG  ;SET FLAG
7442  024122  012737  052547  001360          MOV     #OPR017,EM1N    ;SET MESSAGE
7443  024130  104001                          ERROR   1               ;"FIRST 256 SECTOR NOT BSE FREE"
7444  024132  000137  024466          5$:     JMP     14$             ;GO TO EXIT
7445                                  ;
7446  024136                          3$:     CHECK FOR ANY OTHER ERRORS
7447  024136  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7448  024140  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7449  024142  104415                          SCOP1                   ;LOCAL LOOP TO 1$ (RESTART SECTOR CLEAR)
7450
7451  024144  005303                          DEC     R3              ;DECREMENT COUNT
7452  024146  001324                          BNE     2$              ;LOOP IF NOT ZERO
7453
7454  024150  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7455  024154  000117                          SEEK                    ;SEEK
7456  024156  000000                          0                       ;0 WORDS
7457  024160  000000                          0                       ;0 IS BUFF ADDRESS
7458  024162     000                          .BYTE   0               ;SECTOR 0
7459  024163     000                          .BYTE   0               ;TRACK 0
7460  024164  000000                          0                       ;CYLINDER 0
7461
7462  024166  104417                          TLOADRK                 ;LOAD RK REGS
7463  024170  104423                          TWAT16                  ;WAIT FOR INTERRUPT
7464  024172  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7465  024174  005037  001662                  CLR     INTSET          ;CLEAR FIRST INTERRUPT
7466  024200  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7467  024202  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7468  024204  104427                          TWAT80                  ;WAIT FOR SECOND INTERRUPT
7469  024206  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7470  024210  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA
7471  024214  004006                          4006                    ;PATTERN 6, 1ST WORD REPEATED
7472  024216  000400                          400                     ;400 WORDS
7473
7474  024220                          4$:
7475  024220  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
7476  024222  104003                          ERROR   3               ;BAD INIT ERROR
7477  024224  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7478  024230  000123                          WRDATA                  ;WRDATA
7479  024232  000000                          0                       ;0 WORDS
7480  024234  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
7481  024236     000                          .BYTE   0               ;SECTOR 0
```

```
 7482  024237    000                        .BYTE   0               ;TRACK 0
 7483  024240  000000                       0                       ;CYLINDER 0
 7484
 7485  024242  052737  000020  001610       BIS     #BAI,L.CS2
 7486
 7487  024250  104417                       TLOADRK                 ;LOAD RK REGS
 7488  024252  104437                       TWAIT5S                 ;WAIT FOR SECOND INTERRUPT
 7489  024254  104002                       ERROR   2               ;ELSE REPORT TO SLOW/NOT COMPLETE ERROR
 7490
 7491  024256                       7$:
 7492  024256  104421                       TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 7493  024260  104004                       ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 7494
 7495  024262  104415                       SCOP1                   ;INTERNAL LOOP ON ERROR TO 4$
 7496  024264  012703  000400               MOV     #400,R3         ;SET COUNTER FOR READ-COMPARE LOOP
 7497  024270  005037  024332               CLR     10$             ;CLEAR SECTOR AND TRACK VALUES
 7498  024274  005037  024334               CLR     12$             ;CLEAR CYL VALUE
 7499  024300  013737  024314  001110       MOV     8$,$LPERR       ;SET LOCAL LOOP ON ERROR
 7500  024306  042737  000020  001610       BIC     #BAI,L.CS2      ;CLEAR BAI
 7501
 7502  024314                       8$:
 7503  024314  104416                       TSSINIT                 ;CLEAR SUBSYSTEM
 7504  024316  104003                       ERROR   3               ;BAD INIT ERROR
 7505  024320  004437  035674       9$:     JSR     R4,LRLOAD       ;LOAD RK REGS
 7506  024324  000121                       RDDATA                  ;READ DATA
 7507  024326  177400                       -400                    ;400 WORDS
 7508  024330  070414                       IBUFF                   ;INTO IBUFF
 7509  024332    000              10$:      .BYTE   0               ;SECTOR (VARIABLE)
 7510  024333    000              11$:      .BYTE   0               ;TRACK  (VARIABLE)
 7511  024334  000000             12$:      0                       ;CYL    (VARIABLE)
 7512
 7513  024336  104417                       TLOADRK                 ;LOAD RK REGS
 7514  024340  104425                       TWAIT48                 ;WAIT FOR INTERRUPT
 7515  024342  104002                       ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 7516
 7517  024344  104421                       TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 7518  024346  104004                       ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 7519
 7520  024350  104415                       SCOP1                   ;LOCAL LOOP ON ERROR TO 8$
 7521
 7522  024352  004437  042260               JSR     R4,GENCOM       ;COMPARE DATA
 7523  024356  100000                       100000
 7524  024360  000400                       400                     ;400 WORDS
 7525  024362  000413                       BR      13$             ;NO MISCOMPARE-EXIT LOOP
 7526  024364  104015                       ERROR   15              ;REPORT FIRST ERROR
 7527
 7528  024366  013700  001634               MOV     ERRLMT,R0       ;GET ERROR LIMIT
 7529  024372  005300             64$:      DEC     R0              ;DECREMENT COUNT
 7530  024374  001406                       BEQ     65$             ;IF ZERO - EXIT
 7531  024376  004437  04226C               JSR     R4,GENCOM       ;CONTINUE DATA COMPARE
 7532  024402  040000                       40000
 7533  024404  000402                       BR      65$             ;NO MORE ERRORS - EXIT
 7534  024406  104016                       ERROR   16              ;REPORT NEXT ERROR
 7535  024410  000770                       BR      64$             ;LOOP
 7536  024412                       65$:
 7537
```

```
7538  024412  104415                  13$:    SCOP1                   ;LOCAL LOOP TO 8$
7539
7540  024414  005303                          DEC     R3              ;DEC READ LOOP COUNT
7541  024416  001423                          BEQ     14$             ;IF ZERO-EXIT
7542
7543  024420  105237  024332                  INCB    10$             ;BUMP SECTOR
7544  024424  123727  024332  000026          CMPB    10$,#26         ;FINISHED WITH TRACK?
7545  024432  001332                          BNE     9$              ;NO-LOOP
7546  024434  105037  024332                  CLRB    10$             ;CLEAR SECTOR
7547  024440  105237  024333                  INCB    11$             ;BUMP TRACK
7548  024444  123727  024333  000003          CMPB    11$,#3          ;FINISHED WITH CYLINDER?
7549  024452  001322                          BNE     9$              ;NO-LOOP
7550  024454  105037  024333                  CLRB    11$             ;CLEAR TRACK
7551  024460  005237  024334                  INC     12$             ;BUMP CYL.
7552  024464  000715                          BR      9$              ;LOOP
7553
7554  024466                          14$:
7555                                  ;;*****************************************************************
7556                                  ;*TEST 73       MAXIMUM DATA TRANSFER (PART 2)
7557                                  ;*
7558                                  ;*      ZERO OUT FIRST 256 SECTORS OF THE DISK WITH
7559                                  ;*      200000 WORD WRITE.  SEEK TO CYLINDER 632.
7560                                  ;*      ISSUE A WRITE OF MAXIMUM DATA TRANSFER
7561                                  ;*      200000 WORD WRITE.  MAKE SURE CONTROLLER TIME
7562                                  ;*      OUT IS NOT SET.  CHECK CYLINDER ADDRESS
7563                                  ;*      DISK ADDRESS, BUS ADDRESS AND WORD COUNT.
7564                                  ;*      SEEK TO CYLINDER 632.  ISSUE A WRITE CHECK
7565                                  ;*      OF 200000 WORDS.  MAKE SURE NO ERROR SETS.
7566                                  ;*
7567                                  ;*      NOTE:   THIS TEST IS EXECUTED ONLY IF NO BAD SECTORS ARE PRESENT
7568                                  ;*              IN THE FIRST 256 SECTORS ON THE PACK.
7569                                  ;*              CYLINDER 1456 IS USED FOR RK07.
7570                                  ;*
7571                                  ;;*****************************************************************
7572  024466  000004                  TST73:  SCOPE
7573  024470  012737  000002  001262          MOV     #2,$TIMES       ;;DO 2 ITERATIONS
7574  024476  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
7575  024500  104003                          ERROR   3               ;BAD INIT ERROR
7576  024502  012700  000620                  MOV     #400.,R0        ;SET COUNT FOR INTERRUPT WAIT
7577  024506  005037  072414                  CLR     OBUFF
7578
7579  024512  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7580  024516  000123                          WRDATA                  ;WRDATA
7581  024520  000000                          0                       ;0 WORDS
7582  024522  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
7583  024524     000                          .BYTE   0               ;SECTOR 0
7584  024525     000                          .BYTE   0               ;TRACK 0
7585  024526  000000                          0                       ;CYLINDER 0
7586  024530  052737  000020  001610          BIS     #BAI,L.CS2      ;SET BAI
7587  024536  104417                          TLOADRK                 ;LOAD RK REGS
7588  024540  104434                  1$:     TWAT159                 ;WAIT FOR INTERRUPT
7589  024542  000401                          BR      2$              ;NO INTERRUPT-SKIP
7590  024544  000403                          BR      3$              ;INTERRUPT-SKIP
7591
7592  024546  005300                  2$:     DEC     R0              ;DEC WAIT COUNTER
7593  024550  001373                          BNE     1$              ;NO ZERO-LOOP
```

```
7594  024552  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7595
7596  024554  032762  000200  000014  3$:     BIT     #BSE,RKER(R2)   ;DID BSE SET
7597  024562  001415                    BEQ     4$              ;NO-SKIP
7598
7599  024564  032737  000200  001664          BIT     #BSERPT,OPTFLG  ;TEST IF TO MANY BAD SECTORS REPORTED
7600  024572  001007                    BNE     12$             ;YES - SKIP
7601  024574  052737  000200  001664          BIS     #BSERPT,OPTFLG  ;SET FLAG
7602  024602  012737  052547  001360          MOV     #OPR017,EM1N    ;SET MESSAGE
7603  024610  104001                    ERROR   1               ;"FIRST 256 SECTORS NOT BSE FREE"
7604  024612  000137  025160          12$:    JMP     11$             ;EXIT
7605
7606  024616                          4$:
7607  024616  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS //
7608  024620  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7609  024622  013737  036120  024652          MOV     LSTCYL,13$
7610  024630  013737  036120  025026          MOV     LSTCYL,14$
7611
7612  024636  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7613  024642  000117                    SEEK
7614  024644  000000                    0                       ;0 WORDS
7615  024646  000000                    0                       ;0 IS BUFF ADDR
7616  024650     000                    .BYTE   0               ;SEC 0
7617  024651     000                    .BYTE   0               ;TRK 0
7618  024652  000000          13$:    0                       ;CYL 632/1456
7619
7620  024654  104417                    TLOADRK                 ;LOAD RK REGS
7621  024656  104423                    TWAT16                  ;WAIT FOR INTERRUPT
7622  024660  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7623  024662  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
7624
7625  024666  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7626  024670  104004                    ERROR   4  ;CR 5, 6, 7  ;REPORT ALL ERRORS
7627
7628  024672  104427                    TWAT80                  ;WAIT FOR 2ND INTERRUPT
7629  024674  104002                    ERROR   2
7630
7631  024676  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7632  024700  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7633
7634  024702  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7635  024706  000105                    CLEAR                   ;CLEAR
7636  024710  000000                    0                       ;0 WORDS
7637  024712  000000                    0                       ;0 IS BUFF ADDRESS
7638  024714     000                    .BYTE   0               ;SECTOR 0
7639  024715     000                    .BYTE   0               ;TRACK 0
7640  024716  000000                    0                       ;CYLINDER 0
7641
7642  024720  104417                    TLOADRK                 ;LOAD RK REGS
7643  024722  104423                    TWAT16                  ;WAIT FOR INTERRUPT
7644  024724  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7645
7646  024726  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7647  024730  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7648
7649  024732  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
```

```
 7650  024736  000123                        WRDATA                  ;WRDATA
 7651  024740  000000                        0                       ;0 WORDS
 7652  024742  072414                        OBUFF                   ;OBUFF IS BUFF ADDRESS
 7653  024744     000                        .BYTE   0               ;SECTOR 0
 7654  024745     000                        .BYTE   0               ;TRACK 0
 7655  024746  000000                        0                       ;CYLINDER 0
 7656
 7657  024750  012737  135143  072414        MOV     #135143,OBUFF   ;SET WORD FOR OUTPUT
 7658  024756  012700  000621                MOV     #401.,R0        ;SET COUNT FOR INTERRUPT WAIT
 7659  024762  052737  000020  001610        BIS     #BAI,L.CS2      ;SET BUS ADDRESS INC INHIBIT
 7660
 7661  024770  104417                        TLOADRK                 ;LOAD RK REGS
 7662  024772  104434                5$:     TWAT159                 ;WAIT FOR INTERRUPT
 7663  024774  000401                        BR      6$              ;NO INTERRUPT-BRANCH
 7664  024776  000403                        BR      7$              ;INTERRUPT-BRANCH
 7665
 7666  025000  005300                6$:     DEC     R0              ;DEC WAIT COUNT
 7667  025002  001373                        BNE     5$              ;LOOP IF NOT ZERO
 7668  025004  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 7669
 7670  025006                        7$:
 7671  025006  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 7672  025010  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
 7673
 7674  025012  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
 7675  025016  000117                        SEEK
 7676  025020  000000                        0                       ;0 WORDS
 7677  025022  000000                        0                       ;0 IS BUFF ADDR
 7678  025024     000                        .BYTE   0               ;SEC 0
 7679  025025     000                        .BYTE   0               ;TRK 0
 7680  025026  000000                14$:     0                       ;CYL 632/1456
 7681  025030  104417                        TLOADRK                 ;LOAD RK REGS
 7682  025032  104423                        TWAT16                  ;WAIT FOR INTERRUPT
 7683  025034  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 7684  025036  005037  001662                CLR     INTSET          ;CLEAR INTERRUPT FLAG
 7685
 7686  025042  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 7687  025044  104004                        ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
 7688
 7689  025046  104427                        TWAT80                  ;WAIT FOR SECOND INIT
 7690  025050  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 7691  025052  104421                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
 7692  025054  104004                        ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
 7693
 7694  025056  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
 7695  025062  000105                        CLEAR                   ;CLEAR
 7696  025064  000000                        0                       ;0 WORDS
 7697  025066  000000                        0                       ;0 IS BUFF ADDRESS
 7698  025070     000                        .BYTE   0               ;SECTOR 0
 7699  025071     000                        .BYTE   0               ;TRACK 0
 7700  025072  000000                        0                       ;CYLINDER 0
 7701
 7702  025074  104417                        TLOADRK                 ;LOAD RK REGS
 7703  025076  104423                        TWAT16                  ;WAIT FOR INTERRUPT
 7704  025100  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
 7705
```

```
7706  025102  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7707  025104  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7708
7709  025106  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7710  025112  000131                          WRTCHK                  ;WRTCHK
7711  025114  000000                          0                       ;0 WORDS
7712  025116  072414                          OBJFF                   ;OBUFF IS BUFF ADDRESS
7713  025120     000                          .BYTE   0               ;SECTOR 0
7714  025121     000                          .BYTE   0               ;TRACK 0
7715  025122  000000                          0                       ;CYLINDER 0
7716  025124  052737  000020  001610         BIS     #BAI,L.CS2      ;SET BAI FLAG
7717  025132  012700  000621                  MOV     #401.,R0        ;SET WAIT COUNT
7718
7719  025136  104417                          TLOADRK                 ;LOAD RK REGS
7720  025140  104434                  8$:     TWAT159                 ;WAIT FOR INTERRUPT
7721  025142  000401                          BR      9$              ;NO INTERRUPT-SKIP
7722  025144  000403                          BR      10$             ;INTERRUPT-SKIP
7723
7724  025146  005300                  9$:     DEC     R0              ;DEC WAIT COUNT
7725  025150  001373                          BNE     8$              ;NOT ZERO-LOOP
7726  025152  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7727
7728  025154                          10$:
7729  025154  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7730  025156  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
7731
7732  025160                          11$:
7733                                  ;;*******************************************************************
7734                                  ;*TEST 74       CONTROLLER TIME OUT
7735                                  ;*
7736                                  ;*      SEEK TO CYLINDER 632.  ISSUE A RECALIBRATE AND DO NOT
7737                                  ;*      WAIT FOR SECOND INTERRUPT. NOW ISSUE A READ HEADER
7738                                  ;*      OF CYLINDER 0, TRACK 0.  MAKE SURE CONTROLLER TIME
7739                                  ;*      OUT SETS.
7740                                  ;*      CYLINDER 1456 IS USED FOR THE RK07.
7741                                  ;*
7742                                  ;;*******************************************************************
7743  025160  000004                  TST74:  SCOPE
7744  025162  012737  000005  001262          MOV     #5.,$TIMES      ;;DO 5. ITERATIONS
7745  025170  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
7746  025172  104003                          ERROR   3               ;BAD INIT ERROR
7747  025174  013737  036120  025216          MOV     LSTCYL,1$
7748
7749  025202  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7750  025206  000117                          SEEK
7751  025210  000000                          0                       ;0 WORDS
7752  025212  000000                          0                       ;0 IS BUFF ADDR
7753  025214     000                          .BYTE   0               ;SEC 0
7754  025215     000                          .BYTE   0               ;TRK 0
7755  025216  000000                  1$:     0                       ;CYL 632/1456
7756
7757  025220  104417                          TLOADRK                 ;LOAD RK REGS
7758  025222  104423                          TWAT16                  ;WAIT FOR INTERRUPT
7759  025224  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7760
7761  025226  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
```

```
7762  025230  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7763
7764  025232  005037  001662            CLR     INTSET          ;CLEAR INTERRUPT FLAG
7765  025236  104427                    TWAT80                  ;WAIT FOR SECOND INTERRUPT
7766  025240  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7767  025242  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7768  025244  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7769
7770  025246  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7771  025252  000105                    CLEAR                   ;CLEAR
7772  025254  000000                    0                       ;0 WORDS
7773  025256  000000                    0                       ;0 IS BUFF ADDRESS
7774  025260     000                    .BYTE   0               ;SECTOR 0
7775  025261     000                    .BYTE   0               ;TRACK 0
7776  025262  000000                    0                       ;CYLINDER 0
7777
7778  025264  104417                    TLOADRK                 ;LOAD RK REGS
7779  025266  104423                    TWAT16                  ;WAIT FOR INTERRUPT
7780  025270  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7781
7782  025272  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7783  025274  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
7784
7785  025276  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7786  025302  000113                    RECAL                   ;RECAL
7787  025304  000000                    0                       ;0 WORDS
7788  025306  000000                    0                       ;0 IS BUFF ADDRESS
7789  025310     000                    .BYTE   0               ;SECTOR 0
7790  025311     000                    .BYTE   0               ;TRACK 0
7791  025312  000000                    0                       ;CYLINDER 0
7792
7793  025314  104417                    TLOADRK                 ;LOAD RK REGS
7794  025316  104423                    TWAT16                  ;WAIT FOR INTERRUPT
7795  025320  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7796
7797  025322  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
7798  025326  000125                    RDHEAD                  ;RDHEAD
7799  025330  000000                    0                       ;0 WORDS
7800  025332  000000                    0                       ;0 IS BUFF ADDRESS
7801  025334     000                    .BYTE   0               ;SECTOR 0
7802  025335     000                    .BYTE   0               ;TRACK 0
7803  025336  000000                    0                       ;CYLINDER 0
7804
7805  025340  104417                    TLOADRK                 ;LOAD RK REGS
7806  025342  104436                    TWAT2S                  ;WAIT FOR INTERRUPT
7807  025344  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7808
7809  025346  104422                    TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
7810  025350  000000                    0
7811  025352  000000                    0
7812  025354  000002                    CTOERR                  ;CONTROLLER TIME OUT
7813  025356  104004                    ERROR   4; OR 5,6,7     ;REPORT ANY DISCREPANCIES
7814  025360  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
7815  025362  104003                    ERROR   3               ;BAD INIT ERROR
7816  025364  005037  001662            CLR     INTSET          ;CLEAR INT FLAG
7817  025370  012762  000100  000000    MOV     #IE,RKCS1(R2)   ;SET INT ENABLE
```

```
                                        TWAT8S                  ;WAIT FOR SECOND INT
                                        ERROR   2
                                .SBTTL  **ERRORS DURING DATA TRANSFER
                                ;;*****************************************************************
                                ;*TEST 75        LIMIT DETECT ON DATA TRANSFER
                                ;*
                                ;*      ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECALIBRATE.  ISSUE
                                ;*      A SEEK TO CYLINDER 2 WITH BAD PARITY.  ISSUE A DRIVE
                                ;*      CLEAR.  ISSUE A WRITE DATA OF 400 WORDS TO CYLINDER 1,
                                ;*      TRACK 0, HEAD 0.  SEEK INCOMPLETE BECAUSE OF OUTER
                                ;;*     LIMIT SHOULD BE THE ONLY ERROR SET.
                                ;;*****************************************************************
025402  000004                  TST75:  SCOPE
025404  012737  000003  001262          MOV     #3.,$TIMES      ;;DO 3. ITERATIONS

025412  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
025414  104003                          ERROR   3               ;BAD INIT ERROR

025416  004437  035674                  JSR     R4,LRLOAD       ;LOAD 'L' REGS
025422  000113                          RECAL                   ;RECAL
025424  000000                          0                       ;0 WORDS
025426  000000                          0                       ;0 IS BUFF ADDRESS
025430     000                          .BYTE   0               ;SECTOR 0
025431     000                          .BYTE   0               ;TRACK 0
025432  000000                          0                       ;CYLINDER 0

025434  104417                          TLOADRK                 ;LOAD RK REGS
025436  104423                          TWAT16                  ;WAIT FOR INTERRUPT
025440  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

025442  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
025446  104437                          TWAT8S                  ;WAIT FOR SECOND INTERRUPT
025450  104002                          ERROR   2

025452  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
025454  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS

025456  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
025462  000117                          SEEK                    ;SEEK
025464  000000                          0                       ;0 WORDS
025466  000000                          0                       ;0 IS BUFF ADDRESS
025470     000                          .BYTE   0               ;SECTOR 0
025471     000                          .BYTE   0               ;TRACK 0
025472  000002                          2                       ;CYLINDER 2
025474  012737  00002C  001616          MOV     #PAT,L.MR1      ;SET EVEN PARITY BIT
025502  104417                          TLOADRK                 ;LOAD RK REGS
025504  104423                          TWAT16                  ;WAIT FOR INTERRUPT
025506  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

025510  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
025512  104003                          ERROR   3               ;BAD INIT ERROR
```

```
7874
7875  025514  004437  035674              JSR     R4,LRLOAD       ;LOAD "L" REGS
7876  025520  000123                      WRDATA                  ;WRDATA
7877  025522  177400                      -400                    ;-400 WORDS
7878  025524  072414                      OBUFF                   ;OBUFF IS BUFF ADDRESS
7879  025526     000                      .BYTE   0               ;SECTOR 0
7880  025527     000                      .BYTE   0               ;TRACK 0
7881  025530  000001                      1                       ;CYLINDER 1
7882
7883  025532  104417                      TLOADRK                 ;LOAD RK REGS
7884  025534  104423                      TWAT16                  ;WAIT FOR INTERRUPT
7885  025536  104002                      ERROR   2               ;TO SLOW/NOT COMPLETE FRROR
7886
7887  025540  104422                      TCHKWE                  ;CHECK OPERATION WITH ERRCR
7888  025542  000002                      SKIERR                  ;SEEK INCOMPLETE
7889  025544  000000                      0
7890  025546  000000                      0
7891  025550  104004                      ERROR   4  ;OR 5,6,OR7  ;REPORT ALL DISCREPANCIES
7892
7893  025552  104416                      TSSINIT                 ;CLEAR SUBSYSTEM
7894  025554  104003                      ERROR   3               ;BAD INIT ERROR
7895
7896
7897  025556                      3$:
7898  025556  004437  035674              JSR     R4,LRLOAD       ;LOAD "L" REGS
7899  025562  000101                      SELDRV                  ;SELDRV
7900  025564  000000                      0                       ;0 WORDS
7901  025566  000000                      0                       ;0 IS BUFF ADDRESS
7902  025570     000                      .BYTE   0               ;SECTOR 0
7903  025571     000                      .BYTE   0               ;TRACK 0
7904  025572  000000                      0                       ;CYLINDER 0
7905
7906  025574  012737  000001  001616      MOV     #1,L.MR1        ;SET TO GET STATUS PAIR 1
7907  025602  104417                      TLOADRK                 ;LOAD RK REGS
7908  025604  104423                      TWAT16                  ;WAIT FOR INTERRUPT
7909  025606  104002                      ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7910
7911  025610  104421                      TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
7912  025612  104004                      ERROR   4 .;OR 5, 6, 7  ;REPORT ALL ERRORS
7913
7914  025614  032737  000040  001574      BIT     #S.HDHM,T.MR2   ;TEST IF HEADS HOME
7915  025622  001755                      BEQ     3$ .            ;NO - GET STATUS AGAIN
7916
7917  025624  104416                      TSSINIT                 ;CLEAR SUBSYSTEM
7918  025626  104003                      ERROR   3               ;BAD INIT ERROR
7919
7920  025630  012762  000100  000000      MOV     #IE,RKCS1(R2)   ;SET IE
7921
7922  025636  005037  001662              CLR     INTSET          ;CLEAR INT FLAG
7923  025642  104437                      TWAT8S                  ;WAIT FOR SECOND INTERRUPT
7924  025644  000401                      BR      1$
7925  025646  000404                      BR      2$
7926
7927  025650  012737  060404  001372  1$: MOV     #DH0*6,DH2N     ;"SUBSYSTEM CLEAR TO RESET LIMIT ERROR
7928                                                              ;ALLOWING HEADS TO RELOAD"
7929  025656  104002                      ERROR   2
```

```
7930
7931  025660                          2$:
7932
7933                                  ;;*****************************************************************
7934                                  ;*TEST 76       PROGRAMMING ERROR
7935                                  ;*      ISSUE A SUBSYSTEM CLEAR. ISSUE
7936                                  ;*      A READ DATA OF 400 WORDS ON CYLINDER 0,
7937                                  ;*      TRACK 0, SECTOR 0. DURING READ ISSUE A
7938                                  ;*      WRITE TO THE SPARE REGISTER. MAKE SURE
7939                                  ;*      PROGRAMMING ERROR SETS.
7940                                  ;*****************************************************************
7941  025660  000004                  $T76:  SCOPE
7942  025662  012737  000012  001262         MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
7943  025670  104416                         TSSINIT                 ;CLEAR SUBSYSTEM
7944  025672  104003                         ERROR   3               ;BAD INIT ERROR
7945
7946  025674  004437  035674                 JSR     R4,$RLOAD       ;LOAD "L" REGS
7947  025700  000121                         RDDATA                  ;RDDATA
7948  025702  177400                         -400                    ;-400 WORDS
7949  025704  070414                         IBUFF                   ;IBUFF IS BUFF ADDRESS
7950  025706     000                         .BYTE   0               ;SECTOR 0
7951  025707     000                         .BYTE   0               ;TRACK 0
7952  025710  000000                         0                       ;CYLINDER 0
7953
7954  025712  104417                         $LOADRK         ;LOAD RK REGS
7955
7956  025714  012762  000001  000022         MOV     #1,RKSPAR(R2)   ;WRITE SPARE REGISTER
7957
7958  025722  104423                         $WAIT16         ;WAIT FOR INTERRUPT
7959  025724  104002                         ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7960
7961  025726  104422                         TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
7962  025730  000000                         0
7963  025732  000000                         0
7964  025734  000020                         PGERR                   ;PROG ERROR
7965  025736  104004                         ERROR   4  ;OR 5,6,7    ;REPORT ALL DISCREPANCIES
7966
7967
7968                                  ;;*****************************************************************
7969                                  ;*TEST 77       ECC HARD
7970                                  ;*      ISSUE A SUBSYSTEM CLEAR. ISSUE
7971                                  ;*      A WRITE DATA WORDS CONSISTING OF 177777 TO
7972                                  ;*      CYLINDER 0, TRACK 0, SECTOR 0. NOW WRITE
7973                                  ;*      ALL ZEROS TO CYLINDER 0, TRACK 0, SECTOR 0.
7974                                  ;*      DURING WRITE ISSUE CONTROLLER CLEAR. MAKE
7975                                  ;*      SURE PROGRAMMING ERROR IS RESET. NOW
7976                                  ;*      ISSUE A READ DATA TO CYLINDER 0, TRACK 0,
7977                                  ;*      HEAD 0 AND AN ECC HARD ERROR SHOULD SET.
7978                                  ;*****************************************************************
7979  025740  000004                  $T77:  SCOPE
7980  025742  012737  000012  001262         MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
7981  025750  104416                         TSSINIT                 ;CLEAR SUBSYSTEM
7982  025752  104003                         ERROR   3               ;BAD INIT ERROR
7983
7984  025754  004437  042260                 JSR     R4,$ENCOM       ;GENERATE DATA OF ALL ONES
7985  025760  000001                         1
```

```
7986  025762  000400                          400
7987
7988  025764  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
7989  025770  000123                          WRDATA                  ;WRDATA
7990  025772  177400                          -400                    ;-400 WORDS
7991  025774  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
7992  025776     000                          .BYTE   0               ;SECTOR 0
7993  025777     000                          .BYTE   0               ;TRACK 0
7994  026000  000000                          0                       ;CYLINDER 0
7995
7996  026002  104417                          TLOADRK                 ;LOAD RK REGS
7997  026004  104430                          TWAT96                  ;WAIT FOR INTERRUPT
7998  026006  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
7999
8000  026010  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8001  026012  104004                          ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
8002
8003  026014  004437  042260                  JSR     R4,GENCOM       ;GENERATE DATA OF ZEROS
8004  026020  000002                          2
8005  026022  000400                          400
8006
8007  026024  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8008  026030  000123                          WRDATA                  ;WRDATA
8009  026032  177630                          -150                    ;-150 WORDS
8010  026034  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
8011  026036     000                          .BYTE   0               ;SECTOR 0
8012  026037     000                          .BYTE   0               ;TRACK 0
8013  026040  000000                          0                       ;CYLINDER 0
8014
8015  026042  104417                          TLOADRK                 ;START OPERATION
8016
8017  026044  005737  001662          1$:     TST     INTSET          ;CHECK IF INTERRUPT HAS OCCURRED
8018  026050  001026                          BNE     2$              ;YES - MUCH TO SOON. REPORT ERROR
8019  026052  005762  000002                  TST     RKWC(R2)        ;TEST IF NPR'S DONE
8020  026056  001372                          BNE     1$              ;NO - LOOP
8021
8022  026060  052762  100000  000000          BIS     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER (CROWBAR WRITE)
8023
8024  026066  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8025  026072  000121                          RDDATA                  ;RDDATA
8026  026074  177400                          -400                    ;-400 WORDS
8027  026076  070414                          IBUFF                   ;IBUFF IS BUFF ADDRESS
8028  026100     000                          .BYTE   0               ;SECTOR 0
8029  026101     000                          .BYTE   0               ;TRACK 0
8030  026102  000000                          0                       ;CYLINDER 0
8031
8032  026104  104417                          TLOADRK                 ;LOAD RK REGS
8033  026106  104425                          TWAT48                  ;WAIT FOR INTERRUPT
8034  026110  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8035
8036  026112  104422                          TCHKWE                  ;CHECK OPERATION WITH ERROR
8037  026114  000000                          0
8038  026116  000003                          DCKERR.ECHERR           ;DATA CHECK AND ECC HARD
8039  026120  000000                          0
8040  026122  104004                          ERROR   4 ;OR 5,6,7     ;REPORT ALL DISCREPANCIES
8041
```

```
8042  026124  000402                        BR      3$              ;SKIP TO EXIT
8043  026126                          2$:
8044  026126  104427                        TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8045  026130  104004                        ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
8046  026132                          3$:
8047
8048
8049                                  ;;*****************************************************************
8050                                  ;*TEST 100      DRIVE TIMING ERROR
8051                                  ;*      ISSUE A SUBSYSTEM CLEAR. SEEK TO CYLINDER 632.
8052                                  ;*      ISSUE A RECALIBRATE BUT DO NOT WAIT FOR SECOND INTERRUPT.
8053                                  ;*      PUT CONTROLLER IN DIAGNOSTIC MODE. ISSUE A READ HEADER
8054                                  ;*      OF CYLINDER 0, TRACK 0. CLOCK THROUGH SEEK
8055                                  ;*      AND DRIVE CLEAR MESSAGES. TURN OFF DIAGNOSTIC MODE.
8056                                  ;*      DRIVE TIMING ERROR SHOULD SET BECAUSE OF NO DATA
8057                                  ;*      TRANSISTIONS ON DATA LINE.
8058                                  ;;*****************************************************************
8059  026132  000004                  TST100: SCOPE
8060  026134  012737  000005  001262        MOV     #5.,$TIMES      ;;DO 5. ITERATIONS
8061
8062  026142  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
8063  026144  104003                        ERROR   3               ;BAD INIT ERROR
8064
8065  026146  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
8066  026152  000117                        SEEK                    ;SEEK
8067  026154  000000                        0                       ;0 WORDS
8068  026156  000000                        0                       ;0 IS BUFF ADDRESS
8069  026160     000                        .BYTE   0               ;SECTOR 0
8070  026161     000                        .BYTE   0               ;TRACK 0
8071  026162  000632                        632                     ;CYLINDER 632
8072
8073  026164  104417                        TLOADRK                 ;LOAD RK REGS
8074  026166  104423                        TWAIT6                  ;WAIT FOR INTERRUPT
8075  026170  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8076  026172  005037  001662                CLR     INTSET          ;CLEAR INT FLAG
8077  026176  104430                        TWAI96                  ;WAIT FOR SECOND INTERRUPT
8078  026200  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8079
8080  026202  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
8081  026206  000113                        RECAL                   ;RECAL
8082  026210  000000                        0                       ;0 WORDS
8083  026212  000000                        0                       ;0 IS BUFF ADDRESS
8084  026214     000                        .BYTE   0               ;SECTOR 0
8085  026215     000                        .BYTE   0               ;TRACK 0
8086  026216  000000                        0                       ;CYLINDER 0
8087
8088  026220  104417                        TLOADRK                 ;LOAD RK REGS
8089  026222  104423                        TWAIT6                  ;WAIT FOR INTERRUPT
8090  026224  104002                        ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8091
8092  026226  004437  035674                JSR     R4,LRLOAD       ;LOAD "L" REGS
8093  026232  000125                        RDHEAD                  ;RDHEAD
8094  026234  000000                        0                       ;0 WORDS
8095  026236  000000                        0                       ;0 IS BUFF ADDRESS
8096  026240     000                        .BYTE   0               ;SECTOR 0
8097  026241     000                        .BYTE   0               ;TRACK 0
```

```
8098  026242  000000                          0                       ;CYLINDER 0
8099  026244  012737  000040  001616          MOV     #DMD,L.MR1      ;SET DIAG MODE
8100  026252  104417                          TLOADRK                 ;LOAD RK REGS
8101
8102  026254  004437  036316                  JSR     R4,MCLOCK       ;CLOCK CONTROLLER THROUGH SEEK
8103  026260  001062                          1062                    ;AND CLEAR TO READ
8104
8105  026262  005062  000026                  CLR     RKMR1(R2)       ;RESET DIAG MODE, LET RD HDRS COMPLETE
8106
8107  026266  104424                          TWAIT32                 ;WAIT FOR INTERRUPT
8108  026270  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8109  026272  104422                          TCHKWE                  ;CHECK OPERATION WITH EXP ERROR
8110  026274  010000                          DTERR                   ;DRIVE TIMING ERROR
8111  026276  000000                          0
8112  026300  000000                          0
8113  026302  104004                          ERROR   4  ;OR 5,6,7    ;REPORT ALL DISCREPANCIES
8114
8115  026304                          1$:
8116  026304  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
8117  026306  104003                          ERROR   3               ;BAD INIT ERROR
8118  026310  012762  000100  000000          MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
8119  026316  005037  001662                  CLR     INTSET          ;CLEAR INT FLAG
8120
8121  026322  104437                          TWAIT8S                 ;WAIT FOR INTERRUPT FOR END OF RECAL
8122  026324  104002                          ERROR   2
8123
8124  026326  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8125  026332  000105                          CLEAR                   ;CLEAR
8126  026334  000000                          0                       ;0 WORDS
8127  026336  000000                          0                       ;0 IS BUFF ADDRESS
8128  026340     000                          .BYTE   0               ;SECTOR 0
8129  026341     000                          .BYTE   0               ;TRACK 0
8130  026342  000000                          0                       ;CYLINDER 0
8131
8132  026344  104417                          TLOADRK                 ;LOAD RK REGS
8133  026346  104423                          TWAIT16                 ;WAIT FOR INTERRUPT
8134  026350  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8135  026352  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8136  026354  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8137
8138                            .SBTTL  **ERROR FORCING IN DRIVE
8139
8140                            ;;*****************************************************************
8141                            ;*TEST 101      INITIALIZE CLEARING SACK
8142                            ;*
8143                            ;*      ISSUE A SUBSYSTEM CLEAR.  SELECT AN AVAILABLE
8144                            ;*      DRIVE.  ISSUE A SUBSYSTEM CLEAR.  PUT CONTROLLER IN
8145                            ;*      DIAGNOSTIC MODE.  ISSUE A SELECT COMMAND WITH
8146                            ;*      MESSAGE ID = 3 AND DRIVE SELECTED = 0.  CLOCK THROUGH
8147                            ;*      PHASE ADDRESS 6.  TURN OFF DIAGNOSTIC MODE.  MAKE
8148                            ;*      SURE UNIT FIELD ERROR DOES NOT SET.
8149                            ;*
8150                            ;;*****************************************************************
8151  026356  000004            TST101: SCOPE
8152  026360  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
8153  026366  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
```

```
8154  026370  104003                          ERROR   3               ;BAD INIT ERROR
8155
8156  026372  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8157  026376  000101                          SELDRV                  ;SELDRV
8158  026400  000000                          0                       ;0 WORDS
8159  026402  000000                          0                       ;0 IS BUFF ADDRESS
8160  026404     000                          .BYTE   0               ;SECTOR 0
8161  026405     000                          .BYTE   0               ;TRACK 0
8162  026406  000000                          0                       ;CYLINDER 0
8163
8164  026410  104417                          TLOADRK                 ;LOAD RK REGS
8165  026412  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8166  026414  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8167
8168  026416  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8169  026420  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8170
8171  026422  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
8172  026424  104003                          ERROR   3               ;BAD INIT ERROR
8173
8174  026426  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8175  026432  000101                          SELDRV                  ;SELDRV
8176  026434  000000                          0                       ;0 WORDS
8177  026436  000000                          0                       ;0 IS BUFF ADDRESS
8178  026440     000                          .BYTE   0               ;SECTOR 0
8179  026441     000                          .BYTE   0               ;TRACK 0
8180  026442  000000                          0                       ;CYLINDER 0
8181  026444  012737  000043  001616          MOV     #3.DMD,L.MR1    ;SET DIAG MODE AND MESSAGE PAIR 3
8182  026452  005037  001610                  CLR     L.CS2           ;SELECT DRIVE 0
8183
8184  026456  104417                          TLOADRK                 ;LOAD RK REGS
8185
8186  026460  004437  036316                  JSR     R4,MCLOCK       ;CLOCK THROUGH PHASE ADDRESS 6
8187  026464  001027                          1027
8188
8189  026466  042762  000040  000026          BIC     #DMD,RKMR1(R2)  ;CLEAR MAINTENANCE MODE
8190
8191  026474  104424                          TWAT32                  ;WAIT FOR INTERRUPT
8192  026476  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE
8193
8194  026500  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8195  026502  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8196                                ;;*****************************************************************
8197                                ;*TEST 102      DRIVE OFF TRACK
8198                                ;*
8199                                ;*      ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECALIBRATE.  ISSUE
8200                                ;*      OFFSET OF +1200 MICRO-INCHES.  PUT CONTROLLER IN DIAGNOSTIC
8201                                ;*      MODE.  ISSUE A WRITE DATA OF 1 WORD TO CYLINDER 0,
8202                                ;*      TRACK 0, SECTOR 0.  CLOCK THROUGH SEEK AND DRIVE CLEAR
8203                                ;*      MESSAGES.  TURN OFF DIAGNOSTIC MODE.  DRIVE OFF TRACK
8204                                ;*      SHOULD SET IN DRIVE.  REPEAT FOR ALL AVAILIABLE DRIVES.
8205                                ;*
8206                                ;*****************************************************************
8207  026504  000004                TST102: SCOPE
8208  026506  012737  000005  001262          MOV     #5.,$TIMES      ;;DO 5. ITERATIONS
8209  026514  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
```

```
8210  026516  104003                    ERROR   3               ;BAD INIT ERROR
8211
8212  026520  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
8213  026524  000113                    RECAL                   ;RECAL
8214  026526  000000                    0                       ;0 WORDS
8215  026530  000000                    0                       ;0 IS BUFF ADDRESS
8216  026532     000                    .BYTE   0               ;SECTOR 0
8217  026533     000                    .BYTE   0               ;TRACK 0
8218  026534  000000                    0                       ;CYLINDER 0
8219
8220  026536  104417                    TLOADRK                 ;LOAD RK REGS
8221  026540  104423                    TWAT16                  ;WAIT FOR INTERRUPT
8222  026542  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8223  026544  005037  001662            CLR     INTSET          ;CLEAR INTERRUPT FLAG
8224
8225  026550  104437                    TWAT8S                  ;WAIT FOR INTERRUPT #2
8226  026552  104002                    ERROR   2
8227
8228  026554  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
8229  026560  000105                    CLEAR                   ;CLEAR
8230  026562  000000                    0                       ;0 WORDS
8231  026564  000000                    0                       ;0 IS BUFF ADDRESS
8232  026566     000                    .BYTE   0               ;SECTOR 0
8233  026567     000                    .BYTE   0               ;TRACK 0
8234  026570  000000                    0                       ;CYLINDER 0
8235
8236  026572  104417                    TLOADRK                 ;LOAD RK REGS
8237  026574  104423                    TWAT16                  ;WAIT FOR INTERRUPT
8238  026576  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8239
8240  026600  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8241  026602  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8242
8243  026604  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
8244  026610  000115                    OFFSET                  ;OFFSET
8245  026612  000000                    0                       ;0 WORDS
8246  026614  000000                    0                       ;0 IS BUFF ADDRESS
8247  026616     000                    .BYTE   0               ;SECTOR 0
8248  026617     000                    .BYTE   0               ;TRACK 0
8249  026620  000000                    0                       ;CYLINDER 0
8250  026622  112737  000060  001612    MOVB    #60,L.ASOF      ;SET OFFSET AT +1200
8251
8252  026630  104417                    TLOADRK                 ;LOAD RK REGS
8253  026632  104423                    TWAT16                  ;WAIT FOR INTERRUPT
8254  026634  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8255
8256  026636  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8257  026640  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8258
8259  026642  005037  001662            CLR     INTSET          ;CLEAR INT FLAG
8260
8261  026646  104424                    TWAT32                  ;WAIT FOR INT #2
8262  026650  104002                    ERROR   2
8263
8264  026652  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8265  026654  104004                    ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
```

```
8266
8267  026656  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
8268  026662  000105                  CLEAR                   ;CLEAR
8269  026664  000000                  0                       ;0 WORDS
8270  026666  000000                  0                       ;0 IS BUFF ADDRESS
8271  026670     000                  .BYTE   0               ;SECTOR 0
8272  026671     000                  .BYTE   0               ;TRACK 0
8273  026672  000000                  0                       ;CYLINDER 0
8274
8275  026674  104417                  TLOADRK                 ;LOAD RK REGS
8276  026676  104423                  TWAT16                  ;WAIT FOR INTERRUPT
8277  026700  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8278
8279  026702  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8280  026704  104004                  ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8281
8282  026706  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
8283  026712  000023                  23                      ;WRITE DATA W/O INTERRUPT ENABLE
8284  026714  177777                  -1                      ;-1 WORDS
8285  026716  072414                  OBUFF                   ;OBUFF IS BUFF ADDRESS
8286  026720     000                  .BYTE   0               ;SECTOR 0
8287  026721     000                  .BYTE   0               ;TRACK 0
8288  026722  000000                  0                       ;CYLINDER 0
8289  026724  012737  000040  001616  MOV     #DMD,L.MR       ;SET DIAGNOSTIC MODE
8290
8291  026732  104417                  TLOADRK
8292
8293  026734  004437  036316          JSR     R4,MCLOCK       ;CLOCK THROUGH SEEK & DRIVE CLEAR
8294  026740  001064                  1064
8295
8296  026742  005062  000026          CLR     RKMR1(R2)       ;CLEAR DIAGNOSTIC MODE
8297  026746  104426                  TWAT64                  ;WAIT FOR INTERRUPT
8298  026750  012762  100000  000000  MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
8299  026756  104423                  TWAT16                  ;STALL FOR 16 MS
8300  026760  000240                  NOP
8301  026762  000240                  NOP
8302
8303  026764  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
8304  026770  000101                  SELDRV                  ;SELDRV
8305  026772  000000                  0                       ;0 WORDS
8306  026774  000000                  0                       ;0 IS BUFF ADDRESS
8307  026776     000                  .BYTE   0               ;SECTOR 0
8308  026777     000                  .BYTE   0               ;TRACK 0
8309  027000  000000                  0                       ;CYLINDER 0
8310  027002  005037  001616          CLR     L.MR1           ;RESET DIAG MODE
8311
8312  027006  104417                  TLOADRK                 ;LOAD RK REGS
8313  027010  104423                  TWAT16                  ;WAIT FOR INTERRUPT
8314  027012  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8315
8316  027014  104422                  TCHKWE                  ;CHECK OPERATION WITH ERROR EXPECTED
8317  027016  000400                  DROTERR                 ;DRIVE OFF TRACK
8318  027020  000000                  0
8319  027022  000000                  0
8320  027024  104004                  ERROR   4; OR 5,6,7     ;REPORT ANY DISCREPANCIES
8321                          ;;*****************************************************************
```

```
                                ;*TEST 103      FILE UNSAFE
                                ;*
                                ;*      ISSUE A SUBSYSTEM CLEAR.  ISSUE A RECLAIBRATE.  ISSUE
                                ;*      A READ HEAD OF CYLINDER 0, TRACK 0 IN 24 SECTOR
                                ;*      FORMAT.  DO A SELECT COMMAND IN 26 SECTOR FORMAT.
                                ;*      PUT CONTROLLER IN DIAGNOSTIC MODE.  ISSUE A WRITE
                                ;*      HEADER TO CYLINDER 0, TRACK 0, ONE WORD IN 26 SECTOR
                                ;*      FORMAT.  CLOCK THROUGH SEEK AND DRIVE CLEAR MESSAGES.
                                ;*      SIMULATE INDEX PULSE.  TURN OFF DIAGNOSTIC MODE.  FILE
                                ;*      UNSAFE SHOULD SET BECAUSE OF ATTEMPTING TO WRITE
                                ;*      THROUGH SECTOR PULSE.  REPEAT FOR ALL AVAILIABLE DRIVES.
                                ;*
                                ;;*****************************************************************
027026  000004                  TST103: SCOPE
027030  012737  000005  001262          MOV     #5.,$TIMES      ;;DO 5. ITERATIONS
027036  012737  177777  001676          MOV     #-1,REFMT       ;SET REFORMAT SWITCH
027044  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
027046  104003                          ERROR   3               ;BAD INIT ERROR

027050  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
027054  000113                          RFCAL                   ;RECAL
027056  000000                          0                       ;0 WORDS
027060  000000                          0                       ;0 IS BUFF ADDRESS
027062     000                          .BYTE   0               ;SECTOR 0
027063     000                          .BYTE   0               ;TRACK 0
027064  000012                          12                      ;CYLINDER 12

027066  104417                          TLOADRK                 ;LOAD RK REGS
027070  104423                          TWAT16                  ;WAIT FOR INTERRUPT
027072  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

027074  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
027076  104004                          ERROR   4  ;CR 5, 6, 7  ;REPORT ALL ERRORS

027100  005037  001662                  CLR     INTSET          ;CLEAR INT FLAG
027104  104437                          TWAT8S                  ;WAIT FOR SECOND INT
027106  104002                          ERROR   2

027110  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
027112  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS

027114  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
027120  000105                          CLEAR                   ;CLEAR
027122  000000                          0                       ;0 WORDS
027124  000000                          0                       ;0 IS BUFF ADDRESS
027126     000                          .BYTE   0               ;SECTOR 0
027127     000                          .BYTE   0               ;TRACK 0
027130  000012                          12                      ;CYLINDER 12

027132  104417                          TLOADRK                 ;LOAD RK REGS
027134  104423                          TWAT16                  ;WAIT FOR INTERRUPT
027136  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR

027140  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
027142  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
```

```
8378  027144  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
8379  027150  010125                  RDHEAD.CFMT                     ;RDHEAD!CFMT
8380  027152  000000                  0                       ;0 WORDS
8381  027154  000000                  0                       ;0 IS BUFF ADDRESS
8382  027156     000                  .BYTE   0               ;SECTOR 0
8383  027157     000                  .BYTE   0               ;TRACK 0
8384  027160  000012                  12                      ;CYLINDER 12
8385
8386  027162  104417                  TLOADRK                 ;LOAD RK REGS
8387  027164  104424                  TWAT32                  ;WAIT FOR INTERRUPT
8388  027166  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8389
8390  027170  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8391  027172  104004                  ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8392
8393  027174  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
8394  027200  000101                  SELDRV                  ;SELDRV
8395  027202  000000                  0                       ;0 WORDS
8396  027204  000000                  0                       ;0 IS BUFF ADDRESS
8397  027206     000                  .BYTE   0               ;SECTOR 0
8398  027207     000                  .BYTE   0               ;TRACK 0
8399  027210  000012                  12                      ;CYLINDER 12
8400
8401  027212  104417                  TLOADRK                 ;LOAD RK REGS
8402  027214  104423                  TWAT16                  ;WAIT FOR INTERRUPT
8403  027216  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8404
8405  027220  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
8406  027224  000127                  WRHEAD                  ;WRHEAD
8407  027226  177777                  -1                      ;-1 WORDS
8408  027230  072414                  OBUFF                   ;OBUFF IS BUFF ADDRESS
8409  027232     000                  .BYTE   0               ;SECTOR 0
8410  027233     000                  .BYTE   0               ;TRACK 0
8411  027234  000012                  12                      ;CYLINDER 12
8412  027236  012737  000040  001616  MOV     #DMD,L.MR1      ;SET DIAGNOSTIC-MODE
8413
8414  027244  104417                  TLOADRK                 ;LOAD RK REGS
8415  027246  004437  036316          JSR     R4,MCLOCK       ;CLOCK THROUGH SEEK AND DRIVE CLEAR
8416  027252  001064                  1064
8417
8418  027254  052762  000200  000026  BIS     #MIND,RKMR1(R2) ;SET INDEX
8419
8420  027262  004437  036316          JSR     R4,MCLOCK       ;CLOCK INDEX
8421  027266  001001                  1001
8422
8423  027270  042762  000200  000026  BIC     #MIND,RKMR1(R2) ;CLEAR INDEX
8424
8425  027276  004437  036316          JSR     R4,MCLOCK       ;CLOCK CLEAR
8426  027302  001001                  1001
8427
8428  027304  005062  000026          CLR     RKMR1(R2)       ;CLEAR DIAGNOSTIC MODE
8429
8430  027310  104426                  TWAT64                  ;WAIT FOR INTERRUPT
8431  027312  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8432
8433  027314  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
```

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8434  027316  104004                    ERROR   4  ;OR 5, 6, 7, 10 ;REPORT ALL ERRORS
8435
8436  027320  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
8437  027324  000101                    SELDRV                  ;SELDRV
8438  027326  000000                    0                       ;0 WORDS
8439  027330  000000                    0                       ;0 IS BUFF ADDRESS
8440  027332     000                    .BYTE   0               ;SECTOR 0
8441  027333     000                    .BYTE   0               ;TRACK 0
8442  027334  000012                    12                      ;CYLINDER 12
8443
8444  027336  005037  001616            CLR     L.MR1           ;CLEAR DIAG MODE
8445
8446  027342  104417                    TLOADRK                 ;LOAD RK REGS
8447  027344  104423                    TWAT16                  ;WAIT FOR INTERRUPT
8448  027346  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8449
8450  027350  104422                    TCHKWE                  ;CHECK OPERATION WITH EXPECTED ERROR
8451  027352  040400                    UNSERR.DROTERR          ;UNSAFE AND DRIVE OFF TRACK
8452  027354  000000                    0
8453  027356  000000                    0
8454  027360  104004                    ERROR   4; OR 5,6,7     ;REPORT ANY DISCREPANCIES
8455
8456  027362  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
8457  027364  104003                    ERROR   3               ;BAD INIT ERROR
8458
8459  027366  004437  035674            JSR     R4,LRLOAD       ;LOAD "L" REGS
8460  027372  000101                    SELDRV                  ;SELDRV
8461  027374  000000                    0                       ;0 WORDS
8462  027376  000000                    0                       ;0 IS BUFF ADDRESS
8463  027400     000                    .BYTE   0               ;SECTOR 0
8464  027401     000                    .BYTE   0               ;TRACK 0
8465  027402  000012                    12                      ;CYLINDER 12
8466
8467  027404  012737  000001  001616    MOV     #1,L.MR1        ;SET MESSAGE SELECT ONE
8468
8469  027412                        1$:
8470  027412  104417                    TLOADRK                 ;LOAD RK REGS
8471  027414  104423                    TWAT16                  ;WAIT FOR INTERRUPT
8472  027416  104002                    ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8473
8474  027420  104421                    TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8475  027422  104004                    ERROR   4 ;OR 5, 6, 7   ;REPORT ALL ERRORS
8476
8477  027424  032737  000040  001574    BIT     #S.HDHM,T.MR2   ;TEST IF HEADS HOME
8478  027432  001767                    BEQ     1$
8479
8480  027434  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
8481  02 436  104003                    ERROR   3               ;BAD INIT ERROR
8482
8483  027440  005037  001662            CLR     INTSET          ;CLEAR INT FLAG
8484  027444  104434                    TWAT159                 ;WAIT FOR APPROX 160 MS
8485  027446  000240                    NOP                     ;DON'T CARE ERROR RETURN
8486
8487  027450  104416                    TSSINIT                 ;CLEAR SUBSYSTEM
8488  027452  104003                    ERROR   3               ;BAD INIT ERROR
8489
```

```
8490  027454  012762  000100  000000          MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
8491
8492  027462  104437                          TWAT8S                  ;WAIT FOR SECOND INTERRUPT FROM HDS LOADED
8493  027464  104002                          ERROR   2
8494
8495  027466  005037  001616                  CLR     L.MR1           ;CLEAR MR1
8496
8497  027472  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8498  027476  000105                          CLEAR                   ;CLEAR
8499  027500  000000                          0                       ;0 WORDS
8500  027502  000000                          0                       ;0 IS BUFF ADDRESS
8501  027504     000                          .BYTE   0               ;SECTOR 0
8502  027505     000                          .BYTE   0               ;TRACK 0
8503  027506  000012                          12                      ;CYLINDER 12
8504
8505  027510  104417                          TLOADRK                 ;LOAD RK REGS
8506  027512  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8507  027514  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8508
8509  027516  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8510  027520  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8511
8512  027522  004437  042260                  JSR     R4,GENCOM       ;BUILD HEADERS
8513  027526  001200                          1200
8514
8515  027530  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8516  027534  000127                          WRHEAD                  ;WRHEAD
8517  027536  177676                          -102                    ;-102 WORDS
8518  027540  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
8519  027542     000                          .BYTE   0               ;SECTOR 0
8520  027543     000                          .BYTE   0               ;TRACK 0
8521  027544  000012                          12                      ;CYLINDER 12
8522
8523  027546  104417                          TLOADRK                 ;LOAD RK REGS
8524  027550  104426                          TWAT64                  ;WAIT FOR INTERRUPT
8525  027552  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8526
8527  027554  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8528  027556  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8529
8530                                  ;;*****************************************************************
8531                                  ;*TEST 104      DUMMY TEST FOR PREVIOUS TEST EXIT
8532                                  ;*      THIS TEST IS PRESENT TO MAKE $SW08TB TABLE HAVE AN ENTRY
8533                                  ;*      WHICH RELATES TO "NEWDRV". THIS IS NECESSARY IF AN ERROR OCCURS
8534                                  ;*      IN THE PRECEEDING TEST AND THAT ERROR ABORTS THE TEST.
8535                                  ;*      IF THIS TEST WERE NOT PRESENT, THE PROGRAM WOULD SKIP THE
8536                                  ;*      "NEWDRV" ROUTINE AND GO TO THE TEST FOLLOWING "NEWDRV".
8537                                  ;*
8538                                  ;*      IN ADDITION, THE DRIVE IS CLEARED AND THE HEADS ARE ALLOWED
8539                                  ;*      TO RELOAD. THIS MUST BE DONE TO PREVENT UNEXPECTED INTERRUPTS
8540                                  ;*      FROM THE DRIVE COMING READY AT A LATER TIME.
8541                                  ;;*****************************************************************
8542  027560  000004                  TST104: SCOPE
8543  027562  012737  000001  001262          MOV     #1,$TIMES       ;;DO 1 ITERATION
8544
8545  027570  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
```

```
8546  027572  104003                          ERROR   3               ;BAD INIT ERROR
8547
8548  027574  013762  001626  000010          MOV     DRVNUM,RKCS2(R2) ;LOAD DRIVE NUMBER
8549  027602  005037  036126                  CLR     HOLD1
8550  027606  012737  000001  036124          MOV     #1,HOLD
8551  027614  053737  001720  036124          BIS     DTYPE,HOLD
8552  027622  013762  036124  000000          MOV     HOLD,RKCS1(R2)  ;SELECT THE DRIVE
8553  027630  032762  000200  000012  1$:     BIT     #DRDY,RKDS(R2)  ;TEST IF DRIVE READY
8554  027636  001004                          BNE     2$              ;BR IF YES
8555  027640  005237  036126                  INC     HOLD1           ;ELSE TRY AGAIN
8556  027644  001371                          BNE     1$
8557  027646  104002                          ERROR   2               ;NO RDY
8558
8559  027650                          2$:
8560  027650  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
8561  027652  104003                          ERROR   3               ;BAD INIT ERROR
8562
8563  027654  004437  042260                  JSR     R4,GENCOM       ;GENERATE HEADERS FOR CYL 0
8564  027660  001200                          1200
8565                                          .
8566  027662  004437  035674                  JSR     R4,LRLOAD       ;LOAD "L" REGS
8567  027666  000127                          WRHEAD                  ;WRHEAD
8568  027670  177676                          -102                    ;-102 WORDS
8569  027672  072414                          OBUFF                   ;OBUFF IS BUFF ADDRESS
8570  027674     000                          .BYTE   0               ;SECTOR 0
8571  027675     000                          .BYTE   0               ;TRACK 0
8572  027676  000000                          0                       ;CYLINDER 0
8573
8574  027700  104417                          TLOADRK                 ;LOAD RK REGS
8575  027702  104426                          TWAT64                  ;WAIT FOR INTERRUPT
8576  027704  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8577
8578  027706  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8579  027710  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8580  027712  005037  001676                  CLR     REFMT           ;CLEAR REFORMAT SWITCH
8581                                  .SBTTL  **MULTI-DRIVE OPERATIONS
8582  027716  000004                  NEWDRV: SCOPE
8583  027720  012737  000001  001262          MOV     #1,$TIMES       ;DO ONLY ONCE
8584  027726  032737  000200  001630          BIT     #BIT7,DRVBIT    ;WERE WE TESTING DRIVE 7?
8585  027734  001026                          BNE     3$              ;YES-SKIP
8586
8587  027736  005237  001626          1$:     INC     DRVNUM          ;BUMP TO NEXT SEQUENTIAL ADDRESS
8588  027742  006337  001630                  ASL     DRVBIT          ;BUMP DRIVEBIT TO THAT POSITION
8589  027746  033737  001630  001354          BIT     DRVBIT,$DEVM    ;IS THIS DRIVE TO BE TESTED?
8590  027754  001005                          BNE     2$              ;YES-EXIT
8591  027756  032737  000400  001630          BIT     #BIT8,DRVBIT    ;ALL DRIVES TESTED?
8592  027764  001012                          BNE     3$              ;YES-EXIT
8593  027766  000763                          BR      1$              ;ELSE CHECK NEXT DRIVE AVAILABLE
8594
8595  027770  112737  000004  001102  2$:     MOVB    #4,$TSTNM       ;SET TEST NUMBER FOR REPORTS
8596  027776  013701  001626                  MOV     DRVNUM,R1
8597  030002  004737  036150                  JSR     PC,GTYP1        ;GET DRV TYP FOR NEXT DRV TO TST
8598  030006  000137  004720                  JMP     TSTLUP          ;GO TO TEST LOOP TO CHECK THIS DRIVE
8599  030012  005037  001630          3$:     CLR     DRVBIT          ;CLEAR DRIVE BIT
8600  030016  005037  001626                  CLR     DRVNUM          ;CLEAR DRIVE NUMBER
8601
```

```
                                ;*****************************************************************
                                ;*TEST 105      RESET ATTENTIONS WITH UNIBUS INIT
                                ;*
                                ;*      DO A RECALIBRATE ON ALL AVAILIABLE DRIVES.
                                ;*      ISSUE A RESET.  MAKE SURE ALL ATTENTION RESET.
                                ;*
                                ;*****************************************************************
030022  000004                  TST105: SCOPE
030024  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
030032  005000                          CLR     R0              ;CLEAR DRIVE POSITION COUNTER
030034  012701  000001                  MOV     #1,R1           ;PRESET BIT FOR POSITION 0 IN TESTING FOR AVAIL
030040  013703  001354                  MOV     $DEVM,R3        ;GET DEVICE MAP
030044  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
030046  104003                          ERROR   3               ;BAD INIT ERROR
030050  030103                  1$:     BIT     R1,R3           ;TEST IF THIS DRIVE AVAILABLE
030052  001006                          BNE     2$              ;YES-SKIP TO SEEK
030054  006301                  3$:     ASL     R1              ;SHIFT DRIVE SELECT BIT
030056  005200                          INC     R0              ;BUMP DRIVE POSITION COUNTER
030060  032701  000400                  BIT     #BIT8,R1        ;ALL DRIVE POSITIONS CHECKED
030064  001771                          BEQ     1$              ;NO-LOOP
030066  000443                          BR      4$              ;SKIP TO RESET
                                
030070  010037  001610          2$:     MOV     R0,L.CS2        ;LOAD DRIVE NUMBER
030074  004737  036134                  JSR     PC,GTYP0
030100  012737  000113  001600          MOV     #RECAL,L.CS1    ;LOAD RECALIBRATE
                                
030106  104417                          TLOADRK                 ;LOAD RK REGS
030110  104423                          TWAT16                  ;WAIT FOR INTERRUPT
030112  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
                                
030114  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
030120  012705  000764                  MOV     #500.,R5        ;SET COUNT FOR 8 SECONDS
030124  012762  000012  000C00          MOV     #12,RKCS1(R2)   ;RESET INTERRUPT ENABLE
030132  016237  000016  001556  12$:     MOV     RKASOF(R2),T.ASOF ;GET ATTENTION REGISTER
030140  113704  001557                  MOVB    T.ASOF+1,R4     ;ADJUST FOR CHECK OF ATTENTION
030144  042704  177400                  BIC     #177400,R4      ;CLEAR UNUSED BITS
030150  030104                          BIT     R1,R4           ;CHECK IF ATT SET FROM DRIVE RECAL'ED
030152  001006                          BNE     10$             ;YES - SKIP
                                
030154  104423                          TWAT16                  ;WAIT FOR 16 MS
030156  000240                          NOP                     ;DON'T CARE RETURNS
030160  000240                          NOP
030162  005305                          DEC     R5              ;TATOL WAIT TIME IS 8 SECONDS
030164  001362                          BNE     12$             ;CHECK ATTENTION EACH 16 MS
030166  104002                          ERROR   2               ;REPORT IF NO ATTENTION IN 8 SEC
                                
030170                          10$:
030170  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
030172  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
                                
030174  000727                          BR      3$              ;LOOP FOR NEXT DRIVE
030176  000005                  4$:     RESET                   ;UNIBUS RESET
030200  004737  045220                  JSR     PC,$TKINT       ;RESET KEYBOARD INTERRUPT ENABLE
                                
030204  012701  000031                  MOV     #25.,R1         ;DO A SHORT DELAY
030210  005301                  5$:     DEC     R1
```

```
8658  030212  001376                          BNE     5$
8659  030214  004737  034522                  JSR     PC,OPTST        ;SET UP OPTIONS
8660
8661  030220  104420                          TGETRK                  ;GET RK611 REGS
8662
8663  030222  105737  001557                  TSTB    T.ASOF+1        ;ALL ATTENTION RESET?
8664  030226  001407                          BEQ     6$              ;YES-SKIP
8665
8666  030230  012737  056630  001470          MOV     #EMDA,EM12N     ;"DRIVE ATT NOT RESET RESULT OF
8667  030236  012737  056754  061112          MOV     #EMUR,DF01+A    ;UNIBUS RESET"
8668  030244  104012                          ERROR   12
8669
8670  030246                          6$:
8671                                  ;*****************************************************************
8672                                  ;*TEST 106      RESET ATTENTIONS WITH SUBSYSTEM CLEAR
8673                                  ;*
8674                                  ;*      DO A RECALIBRATE ON ALL AVAILABLE DRIVES.
8675                                  ;*      ISSUE A SUBSYSTEM CLEAR.  MAKE SURE ALL ATTENTIONS
8676                                  ;*      RESET.
8677                                  ;*
8678                                  ;*****************************************************************
8679  030246  000004                  TST106: SCOPE
8680  030250  012737  000012  001262          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
8681  030256  005000                          CLR     R0              ;CLEAR DRIVE POSITION COUNTER
8682  030260  012701  000001                  MOV     #1,R1           ;PRESET TO TEST POSITION 0
8683  030264  013703  001354                  MOV     $DEVM,R3        ;CUT DEVICE MAP
8684  030270  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
8685  030272  104003                          ERROR   3               ;BAD INIT ERROR
8686  030274  030103                  1$:     BIT     R1,R3           ;THIS DRIVE AVAILABLE?
8687  030276  001006                          BNE     2$              ;YES-SKIP TO SEEK
8688  030300  006301                  3$:     ASL     R1              ;SHIFT TO NEXT DRIVE POSITION
8689  030302  005200                          INC     R0              ;DUMP POSITION COUNTER
8690  030304  032701  000400                  BIT     #BIT8,R1        ;ALL POSITIONS CHECKED
8691  030310  001771                          BEQ     1$              ;NO-LOOP
8692  030312  000443                          BR      4$              ;YES-SKIP TO CLEAR
8693
8694  030314  010037  001610          2$:     MOV     R0,L.CS2        ;LOAD DRIVE NUMBER
8695  030320  004737  036134                  JSR     PC,GTYP0
8696  030324  012737  000013  001600          MOV     #RECAL,L.CS1    ;LOAD RECALIBRATE
8697  030332  104417                          TLOADRK                 ;LOAD RK REGS
8698  030334  104423                          TWAIT6                  ;WAIT FOR INTERRUPT
8699  030336  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8700
8701  030340  005037  001662                  CLR     INTSET          ;CLEAR INT FLAG
8702  030344  012705  000764                  MOV     #500.,R5        ;SET COUNT FOR 8 SECONDS
8703  030350  012762  000012  000000          MOV     #12,RKCS1(R2)   ;RESET INTERRUPT ENABLE
8704  030356  016237  000016  001556  12$:     MOV     RKASOF(R2),T.ASOF ;GET ATTENTION REGISTER
8705  030364  113704  001557                  MOVB    T.ASOF+1,R4     ;ADJUST FOR CHECK OF ATTENTION
```

```
8706  030370  042704  177400          BIC     #177400,R4      ;CLEAR UNUSED BITS
8707  030374  030104                  BIT     R1,R4           ;CHECK IF ATT SET FROM DRIVE RECAL'ED
8708  030376  001006                  BNE     10$             ;YES - SKIP
8709
8710  030400  104423                  TWAT16                  ;WAIT FOR 16 MS
8711  030402  000240                  NOP                     ;DON'T CARE RETURNS
8712  030404  000240                  NOP
8713  030406  005305                  DEC     R5              ;TATOL WAIT TIME IS 8 SECONDS
8714  030410  001362                  BNE     12$             ;CHECK ATTENTION EACH 16 MS
8715  030412  104002                  ERROR   2               ;REPORT IF NO ATTENTION IN 8 SEC
8716
8717  030414                  10$:
8718  030414  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8719  030416  104004                  ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8720
8721  030420  000727                  BR      3$              ;LOOP FOR NEXT DRIVE
8722
8723  030422  052762  000040  000010 4$:     BIS     #SCLR,RKCS2(R2) ;DO SUBSYSTEM CLEAR
8724  030430  012701  000031          MOV     #25.,R1         ;DO A SHORT DELAY
8725  030434  005301                  5$:     DEC     R1
8726  030436  001376                  BNE     5$
8727
8728  030440  104420                  TGETRK                  ;GET RK611 REGS
8729
8730  030442  105737  001557          TSTB    T.ASOF+1        ;TEST ALL ATTENTION RESET
8731  030446  001407                  BEQ     6$              ;YES-SKIP
8732
8733  030450  012737  056630  001470  MOV     #EMDA,EM12N     ;"DRIVE ATT NOT RESET AS RESULT OF
8734  030456  012737  057044  061112  MOV     #EMSCLR,DF011A  ;SUBSYSTEM CLEAR"
8735  030464  104012                  ERROR   12
8736
8737  030466                  6$:
8738                          ;*****************************************************************
8739                          ;*TEST 107      SVAL AND ATTENTION FROM OTHER DRIVE
8740                          ;*
8741                          ;*      DO A RECALIBRATE ON ONE AVAILABLE DRIVE.  DO A SELECT
8742                          ;*      ON ANOTHER AVAILABLE DRIVE.  MAKE SURE STATUS VALID
8743                          ;*      IS SET.  WAIT FOR SECOND INTERRUPT FROM RECALIBRATE
8744                          ;*      MAKE SURE STATUS VALID REMAINS SET AND DRIVE STATUS
8745                          ;*      CHANGE REMAINS RESET.
8746                          ;*
8747                          ;*      REPEAT FOR ALL COMBINATIONS OF TWO AVAILABLE DRIVES.
8748                          ;*
8749                          ;*      NOTE:   THIS TEST WILL ONLY BE DONE IF AT LEAST
8750                          ;*              TWO DRIVES ARE AVAILABLE.
8751                          ;*
8752                          ;*****************************************************************
8753  030466  000004          TST107: SCOPE
8754  030470  012737  000012  001262      MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
8755  030476  013746  001354          MOV     $DEVM,-(SP)     ;PUT DEVICE MAP ON STACK
8756  030502  004437  036242          JSR     R4,BITCNT       ;COUNT NUMBER OF BITS(# OF DRIVES)
8757  030506  022627  000001          CMP     (SP)+,#1        ;COMPARE TO 1
8758  030512  101007                  BHI     2$              ;SKIP IF MORE THAN 1
8759  030514  005737  001304          TST     $PASS           ;CHECK IF PASS 0
8760  030520  001002                  BNE     1$              ;NO-SKIP
8761
```

```
8762  030522  104401  052664                    TYPE    ,OPR018          ;"OVERLAPPED OPERATION BYPASSED"
8763  030526  000137  031772          1$:       JMP     $EOP             ;GET OUT.
8764
8765  030532  012737  177777  001224  2$:       MOV     #-1,$TMP1        ;SET LOOP CONTROL FLAG
8766  030540  013705  001354                    MOV     $DEVM,R5         ;GET DEVICE MAP
8767  030544  005000                            CLR     R0               ;CLEAR FOR DRIVE #A
8768  030546  005001                            CLR     R1               ;CLEAR FOR DRIVE #B
8769  030550  012703  000001                    MOV     #1,R3            ;SET DRIVE POSITION A
8770  030554  012704  000001                    MOV     #1,R4            ;SET DRIVE POSITION B
8771  030560  012737  030570  001110            MOV     #3$,$LPERR       ;SET LOCAL LOOP ON ERROR
8772  030566  000503                            BR      11$              ;GO SET UP POINTERS
8773
8774  030570                          3$:
8775  030570  104416                            TSSINIT                  ;CLEAR SUBSYSTEM
8776  030572  104003                            ERROR   3                ;BAD INIT ERROR
8777
8778  030574  010037  001610                    MOV     R0,L.CS2         ;LOAD DRIVE A
8779  030600  010037  001626                    MOV     R0,DRVNUM        ;LOAD FOR REPORT
8780  030604  004737  036134                    JSR     PC,GTYP0
8781  030610  012737  000113  001600            MOV     #RECAL,L.CS1     ;LOAD RECAL
8782
8783  030616  104417                            TLOADRK                  ;LOAD RK REGS
8784  030620  104423                            TWAIT6                   ;WAIT FOR INTERRUPT
8785  030622  104002                            ERROR   2                ;TO SLOW/NOT COMPLETE ERROR
8786  030624  104421                            TCHKOP                   ;CHECK OPERATION FOR ANY ERRORS
8787  030626  104004                            ERROR   4  ;OR 5, 6, 7   ;REPORT ALL ERRORS
8788
8789  030630  005037  001662                    CLR     INTSET           ;CLEAR INT FLAG
8790
8791  030634  010137  001610                    MOV     R1,L.CS2         ;LOAD DRIVE B
8792  030640  010137  001626                    MOV     R1,DRVNUM        ;LOAD FOR REPORT
8793  030644  004737  036150                    JSR     PC,GTYP1
8794  030650  012737  000101  001600            MOV     #SELDRV,L.CS1    ;LOAD DRIVE SELECT
8795
8796  030656  104417                            TLOADRK                  ;LOAD RK REGS
8797  030660  104423                            TWAIT6                   ;WAIT FOR INTERRUPT
8798  030662  104002                            ERROR   2                ;TO SLOW/NOT COMPLETE ERROR
8799
8800  030664  104421                            TCHKOP                   ;CHECK OPERATION FOR ANY ERRORS
8801  030666  104004                            ERROR   4  ;OR 5, 6, 7   ;REPORT ALL ERRORS
8802
8803  030670  032737  100000  001552            BIT     #SVAL,T.DS       ;CHECK IF STATUS VALID SET
8804  030676  001007                            BNE     4$               ;YES - SKIP
8805  030700  012737  056444  001460            MOV     #EMSVAL,EM11N    ;"STATUS VALID NOT SET RESULT OF
8806  030706  012737  050250  061112            MOV     #OPER00,DF011A   ;DRIVE SELECT"
8807  030714  104011                            ERROR   11
8808
8809  030716  005037  001662          4$:       CLR     INTSET           ;CLEAR INT FLAG
8810  030722  104436                            TWAT2S                   ;WAIT FOR SEEK COMPLETE INTERRUPT
8811  030724  000401                            BR      44$              ;NONE RECEIVED - SKIP
8812  030726  000406                            BR      55$              ; RECEIVED - SKIP
8813
8814  030730  010037  001626          44$:      MOV     R0,DRVNUM        ;SET DRIVE FOR REPORT
8815  030734  012737  060501  001372            MOV     #DH07,DH2N       ;"COMMAND - SELECT AFTER RECAL"
8816  030742  104002                            ERROR   2
8817
```

```
8818  030744  104420                  55$:    TGETRK                  ;GET RK REGS
8819  030746  032737  100000  001552          BIT     #SVAL,*.DS      ;TEST IF SVAL STILL SET
8820  030754  001007                          BNE     5$              ;YES - SKIP
8821
8822  030756  012737  056444  001510          MOV     #EMSVAL,EM14N   ;"STATUS VALID RESET RESULT OF
8823  030764  012737  060524  061112          MOV     #DH018,DF011A   ;RECAL COMPLETE ATTENTION AFTER SEL"
8824  030772  104014                          ERROR   14
8825
8826  030774  104415                  5$:     SCOP1                   ;LOCAL LOOP TO 3$
8827
8828                                  ;       THE FOLLOWING CODE CAUSES THE TEST TO BE RUN ON EVERY COMBINATION
8829                                  ;       OF DRIVES AVAILABLE.  THE FIRST PASS OF THE PROGRAM WILL USE THE
8830                                  ;       LOWEST NUMBER DRIVE AS A AND THE NEXT HIGHER NUMBER DRIVE AS
8831                                  ;       B.  THE SECOND PASS SWAPS DRIVE A & B.  THE THIRD PASS USES
8832                                  ;       THE LOWEST NUMBER DRIVE AS B AND THE 3RD HIGHEST NUMBER DRIVE
8833                                  ;       AS A.  THE FORTH PASS SWAPS A & B AGAIN.  THIS CONTINUES
8834                                  ;       UNTIL ALL DRIVES HAVE BEEN TESTED WITH THE LOWEST NUMBER
8835                                  ;       DRIVE.
8836                                  ;
8837                                  ;       THE SECOND HIGHEST NUMBER DRIVE IS THEN USED AS A AND THE
8838                                  ;       THIRD HIGHEST AS B.  THEY ARE SWAPPED ON THE NEXT PASS.
8839                                  ;
8840                                  ;       THIS TECHNIQUE IS CONTINUED UNTIL ALL COMBINATIONS ARE
8841                                  ;       CHECKED.
8842
8843  030776  005237  001224          11$:    INC     $TMP1           ;INCREMENT PASS CONTROL
8844  031002  001024                          BNE     16$             ;SKIP IF NOT ZERO
8845                                                                  ;(IT WILL BE ZERO ON THE 1ST PASS)
8846
8847  031004  030305                  2$:     BIT     R3,R5           ;TEST IF BIT POSITION FOR A AT AVAIL DRIVE
8848  031006  001006                          BNE     13$             ;YES-SKIP
8849
8850  031010  005200                  22$:    INC     R0              ;BUMP R0 (DRIVE A)
8851  031012  006303                          ASL     R3              ;SHIFT DRIVE SELECT BIT ONE POSITION
8852  031014  032703  000400                 BIT     #BIT8,R3        ;IF BIT 8 IS SET, ALL DRIVES HAVE
8853  031020  001771                          BEQ     12$             ;BEEN CHECKED; IF NOT CHECK NEXT POSITION
8854  031022  000464                          BR      50$             ;DONE-EXIT
8855
8856  031024  010001                  13$:    MOV     R0,R1           ;SET DRIVE B TO THE SAME AS A
8857  031026  010304                          MOV     R3,R4
8858  031030  005201                  14$:    INC     R1              ;BUMP R1 (DRIVE B)
8859  031032  006304                          ASL     R4              ;SHIFT SELECTOR BIT ONE POSITION
8860  031034  030405                          BIT     R4,R5           ;IS THIS DRIVE AVAIL?
8861  031036  001004                          BNE     15$             ;YES-SKIP
8862  031040  032704  000400                 BIT     #BIT8,R4        ;WERE ALL POSITIONS CHECKED?
8863  031044  001771                          BEQ     14$             ;NO-LOOP
8864  031046  000452                          BR      50$             ;DONE-EXIT
8865
8866  031050  000137  030570          15$:    JMP     3$              ;GO DO THE TEST ON THE DRIVE A & B
8867                                                                  ;CONTAINED IN R0 & R1
8868  031054  032737  000001  001224  16$:    BIT     #BIT0,$TMP1     ;IS PASS FLAGS ODD?
8869  031062  001410                          BEQ     17$             ;NO-SKIP
8870
8871  031064  010046                          MOV     R0,-(SP)        ;
8872  031066  010346                          MOV     R3,-(SP)        ;SWAP R0 & R1, R3 & R4
8873  031070  010403                          MOV     R4,R3           ;TO EXCHANGE DRIVE A & B
```

```
8874  031072  010100                        MOV     R1,R0
8875  031074  012604                        MOV     (SP)+,R4
8876  031076  012601                        MOV     (SP)+,R1
8877  031100  000137  030570                JMP     3$                      ;REPEAT TEST ON THIS COMBO.
8878
8879  031104  032737  000002  001224  17$:  BIT     #BIT1,$TMP1             ;TEST IF PASS FLAGS AT HALF MODULE 4?
8880  031112  001410                        BEQ     19$                     ;NO-SKIP TO BUMP DRIVE B
8881  031114  005200                  18$:  INC     R0                      ;BUMP DRIVE A
8882  031116  006303                        ASL     R3                      ;SHIFT DRIVE SELECT BIT
8883  031120  030305                        BIT     R3,R5                   ;AVAILABLE?
8884  031122  001014                        BNE     20$                     ;YES-SKIP
8885  031124  032703  000400                BIT     #BIT8,R3                ;ALL CHECKED?
8886  031130  001771                        BEQ     18$                     ;NO-SKIP
8887  031132  000412                        BR      21$                     ;GO TO NEXT PASS
8888
8889  031134  005201                  19$:  INC     R1                      ;BUMP DRIVE B
8890  031136  006304                        ASL     R4                      ;SHIFT DRIVE SELECT BIT
8891  031140  030405                        BIT     R4,R5                   ;AVAILABLE?
8892  031142  001004                        BNE     20$                     ;YES-SKIP
8893  031144  032704  000400                BIT     #BIT8,R4                ;ALL CHECKED?
8894  031150  001771                        BEQ     19$                     ;NO-LOOP
8895  031152  000404                        BR      23$                     ;YES-SKIP TO NEXT PASS
8896
8897  031154  000137  030570          20$:  JMP     3$                      ;GO TEST THIS COMBO
8898
8899  031160  010100                  21$:  MOV     R1,R0                   ;SET DRIVE 0 TO LOW POSITION THIS PASS
8900  031162  010403                        MOV     R4,R3                   ;SET SELECT BITS TO AGREE
8901  031164  005037  001224          23$:  CLR     $TMP1                   ;CLEAR PASS FLAGS
8902  031170  000137  031010                JMP     22$                     ;GO SET UP A & B
8903  031174                          50$:
8904                                        ;;*********************************************************************
8905                                        ;*TEST 10      OVERLAPPED OPERATIONS
8906                                        ;*
8907                                        ;*      DO A RECALIBRATE ON BOTH DRIVE A AND DRIVE B.  ISSUE  A
8908                                        ;*      SEEK ON DRIVE A TO CYLINDER 1.  IMMEDIATELY ISSUE A WRITE
8909                                        ;*      DATA TO CYLINDER 100, TRACK 0, HEAD 0 ON DRIVE B.
8910                                        ;*      AT THE END OF THE DATA TRANSFER NO ERRORS SHOULD
8911                                        ;*      BE SET AND DRIVE A HAS ATTENTION SET.
8912                                        ;*
8913                                        ;*      REPEAT FOR ALL COMBINATIONS OF TWO DRIVES.
8914                                        ;*
8915                                        ;*      NOTE:   IF ONLY ONE DRIVE IS AVAILABLE THE
8916                                        ;*              TEST WILL NOT BE DONE.
8917                                        ;*
8918                                        ;;*********************************************************************
8919  031174  000004                  TST110: SCOPE
8920  031176  012737  000005  001262          MOV     #5.,$TIMES              ;;DO 5. ITERATIONS
8921
8922  031204  012737  177777  001224  2$:    MOV     #-1,$TMP1               ;SET LOOP CONTROL FLAG
8923  031212  013705  001354                  MOV     $DEVM,R5                ;GET DEVICE MAP
8924  031216  005000                          CLR     R0                      ;CLEAR FOR DRIVE #A
8925  031220  005001                          CLR     R1                      ;CLEAR FOR DRIVE #B
8926  031222  012703  000001                  MOV     #1,R3                   ;SET DRIVE POSITION A
8927  031226  012704  000001                  MOV     #1,R4                   ;SET DRIVE POSITION B
8928  031232  012737  031242  001110          MOV     #3$,$LPERR              ;SET LOCAL LOOP ON ERROR
8929  031240  000555                          BR      11$                     ;GO SET UP POINTERS
```

```
8930  031242                          3$:
8931  031242  104416                          TSSINIT                 ;CLEAR SUBSYSTEM
8932  031244  104003                          ERROR   3               ;BAD INIT ERROR
8933
8934  031246  010037  001626                  MOV     R0,DRVNUM       ;STORE DRIVE FOR REPORT
8935  031252  010037  001610                  MOV     R0,L.CS2        ;SETUP DRIVE A TO RECAL
8936  031256  004737  036134                  JSR     PC,GTYP0
8937  031262  012737  000113  001600          MOV     #RECAL,L.CS1
8938
8939  031270  104417                          TLOADRK                 ;LOAD RK REGS
8940  031272  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8941  031274  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8942  031276  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
8943
8944  031302  104437                          TWAT8S                  ;WAIT FOR SECOND INTERRUPT
8945  031304  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8946
8947  031306  012737  000105  001600          MOV     #CLEAR,L.CS1    ;SET UP TO CLEAR DRIVE
8948  031314  104417                          TLOADRK                 ;LOAD RK REGS
8949  031316  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8950  031320  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8951  031322                          4$:
8952  031322  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8953  031324  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8954  031326  032737  040000  001540          BIT     #DI.T.CS1       ;TEST IF DI STILL SET
8955  031334  001372                          BNE     4$              ;YES - LOOP
8956  031336  010137  001626                  MOV     R1,DRVNUM       ;STORE DRIVE FOR REPORT
8957  031342  010137  001610                  MOV     R1,L.CS2        ;SETUP DRIVE B TO RECAL
8958  031346  004737  036150                  JSR     PC,GTYP1
8959  031352  012737  000113  001600          MOV     #RECAL,L.CS1
8960
8961  031360  104417                          TLOADRK                 ;LOAD RK REGS
8962  031362  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8963  031364  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8964  031366  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT FLAG
8965  031372  104437                          TWAT8S                  ;WAIT FOR SECOND INTERRUPT
8966  031374  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8967  031376  012737  000105  001600          MOV     #CLEAR,L.CS1    ;SET UP DRIVE CLEAR
8968  031404  104417                          TLOADRK                 ;LOAD RK REGS
8969  031406  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8970  031410  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8971  031412                          5$:
8972  031412  104421                          TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
8973  031414  104004                          ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
8974  031416  032737  040000  001540          BIT     #DI.T.CS1       ;TEST IF DI STILL SET
8975  031424  001372                          BNE     5$              ;YES - LOOP
8976
8977  031426  010037  001626                  MOV     R0,DRVNUM       ;STORE DRIVE FOR REPORT
8978  031432  010037  001610                  MOV     R0,L.CS2        ;SETUP DRIVE A TO SEEK
8979  031436  004737  036134                  JSR     PC,GTYP0
8980  031442  012737  000001  001614          MOV     #1,L.DCYL       ;TO CYL 1
8981  031450  012737  000117  001600          MOV     #SEEK,L.CS1
8982
8983  031456  104417                          TLOADRK                 ;LOAD RK REGS
8984  031460  104423                          TWAT16                  ;WAIT FOR INTERRUPT
8985  031462  104002                          ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
```

```
8986
8987  031464  010137  001626              MOV     R1,DRVNUM       ;STORE DRIVE FOR REPORT
8988  031470  010137  001610              MOV     R1,L.CS2        ;SETUP DRIVE B TO WRITE DATA
8989  031474  004737  036150              JSR     PC,GTYP1
8990  031500  012737  000100  001614      MOV     #100,L.DCYL     ;AT CYL 100
8991  031506  012737  177400  001602      MOV     #-400,L.WC      ;400 WORDS
8992  031514  012737  072414  001604      MOV     #OBUFF,L.BA
8993  031522  012737  000123  001600      MOV     #WRDATA,L.CS1
8994
8995  031530  104417                      TLOADRK                 ;LOAD RK REGS-DO WRITE
8996
8997  031532  104427                      TWAT80                  ;WAIT FOR INTERRUPT
8998  031534  104002                      ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
8999
9000  031536  104421                      TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
9001  031540  104004                      ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
9002
9003  031542  010037  001626              MOV     R0,DRVNUM       ;STORE DRIVE FOR REPORT
9004  031546  130337  001557              BITB    R3,T.ASOF+1     ;CHECK IF DRIVE ATTENTION IS DRIVE A
9005  031552  001007                      BNE     10$             ;YES-SKIP
9006  031554  012737  056630  001460      MOV     #EMDA,EM11N     ;"DRIVE ATTENTION NOT SET RESULT OF
9007  031562  012737  050362  061112      MOV     #EMSK,DF011A    ;SEEK"
9008  031570  104011                      ERROR   11
9009
9010  031572  104415              10$:    SCOP1                   ;LOCAL LOOP TO 3$
9011
9012                          ;           THE FOLLOWING CODE CAUSES THE TEST TO BE RUN ON EVERY COMBINATION
9013                          ;           OF DRIVES AVAILABLE.  THE FIRST PASS OF THE PROGRAM WILL USE THE
9014                          ;           LOWEST NUMBER DRIVE AS A AND THE NEXT HIGHER NUMBER DRIVE AS
9015                          ;           B.  THE SECOND PASS SWAPS DRIVE A & B.  THE THIRD PASS USES
9016                          ;           THE LOWEST NUMBER DRIVE AS B AND THE 3RD HIGHEST NUMBER DRIVE
9017                          ;           AS A.  THE FORTH PASS SWAPS A & B AGAIN.  THIS CONTINUES
9018                          ;           UNTIL ALL DRIVES HAVE BEEN TESTED WITH THE LOWEST NUMBER
9019                          ;           DRIVE.
9020                          ;
9021                          ;           THE SECOND HIGHEST NUMBER DRIVE IS THEN USED AS A AND THE
9022                          ;           THIRD HIGHEST AS B.  THEY ARE SWAPPED ON THE NEXT PASS.
9023                          ;
9024                          ;           THIS TECHNIQUE IS CONTINUED UNTIL ALL COMBINATIONS ARE
9025                          ;           CHECKED.
9026
9027  031574  005237  001224      11$:    INC     $TMP1           ;INCREMENT PASS CONTROL
9028  031600  001024                      BNE     16$             ;SKIP IF NOT ZERO
9029                                                              ;(IT WILL BE ZERO ON THE 1ST PASS)
9030
9031  031602  030305              12$:    BIT     R3,R5           ;TEST IF BIT POSITION FOR A AT AVAIL DRIVE
9032  031604  001006                      BNE     13$             ;YES-SKIP
9033
9034  031606  005200              22$:    INC     R0              ;BUMP R0 (DRIVE A)
9035  031610  006303                      ASL     R3              ;SHIFT DRIVE SELECT BIT ONE POSITION
9036  031612  032703  000400              BIT     #BIT8,R3        ;IF BIT 8 IS SET, ALL DRIVES HAVE
9037  031616  001771                      BEQ     12$             ;BEEN CHECKED; IF NOT CHECK NEXT POSITION
9038  031620  000464                      BR      50$             ;DONE-EXIT
9039
9040  031622  010001              13$:    MOV     R0,R1           ;SET DRIVE B TO THE SAME AS A
9041  031624  010304                      MOV     R3,R4
```

```
 9042  031626  005201                 14$:    INC     R1              ;BUMP R1 (DRIVE B)
 9043  031630  006304                         ASL     R4              ;SHIFT SELECTOR BIT ONE POSITION
 9044  031632  030405                         BIT     R4,R5           ;IS THIS DRIVE AVAIL?
 9045  031634  001004                         BNE     15$             ;YES-SKIP
 9046  031636  032704  000400               BIT     #BIT8,R4        ;WERE ALL POSITIONS CHECKED?
 9047  031642  001771                         BEQ     14$             ;NO-LOOP
 9048  031644  000452                         BR      50$             ;DONE-EXIT
 9049
 9050  031646  000137  031242         15$:    JMP     3$              ;GO DO THE TEST ON THE DRIVE A & B
 9051                                                                 ;CONTAINED IN R0 & R1
 9052  031652  032737  000001  001224 16$:    BIT     #BIT0,$TMP1     ;IS PASS FLAGS ODD?
 9053  031660  001410                         BEQ     17$             ;NO-SKIP
 9054
 9055  031662  010046                         MOV     R0,-(SP)        ;
 9056  031664  010346                         MOV     R3,-(SP)        ;SWAP R0 & R1, R3 & R4
 9057  031666  010403                         MOV     R4,R3           ;TO EXCHANGE DRIVE A & B
 9058  031670  010100                         MOV     R1,R0
 9059  031672  012604                         MOV     (SP)+,R4
 9060  031674  012601                         MOV     (SP)+,R1
 9061  031676  000137  031242                 JMP     3$              ;REPEAT TEST ON THIS COMBO.
 9062
 9063  031702  032737  000002  001224 17$:    BIT     #BIT1,$TMP1     ;TEST IF PASS FLAGS AT HALF MODULE 4?
 9064  031710  001410                         BEQ     19$             ;NO-SKIP TO BUMP DRIVE B
 9065  031712  005200                 18$:    INC     R0              ;BUMP DRIVE A
 9066  031714  006303                         ASL     R3              ;SHIFT DRIVE SELECT BIT
 9067  031716  030305                         BIT     R3,R5           ;AVAILABLE?
 9068  031720  001014                         BNE     20$             ;YES-SKIP
 9069  031722  032703  000400               BIT     #BIT8,R3        ;ALL CHECKED?
 9070  031726  001771                         BEQ     18$             ;NO-SKIP
 9071  031730  000412                         BR      21$             ;GO TO NEXT PASS
 9072
 9073  031732  005201                 19$:    INC     R1              ;BUMP DRIVE B
 9074  031734  006304                         ASL     R4              ;SHIFT DRIVE SELECT BIT
 9075  031736  030405                         BIT     R4,R5           ;AVAILABLE?
 9076  031740  001004                         BNE     20$             ;YES-SKIP
 9077  031742  032704  000400               BIT     #BIT8,R4        ;ALL CHECKED?
 9078  031746  001771                         BEQ     19$             ;NO-LOOP
 9079  031750  000404                         BR      23$             ;YES-SKIP TO NEXT PASS
 9080
 9081  031752  000137  031242         20$:    JMP     3$              ;GO TEST THIS COMBO
 9082
 9083  031756  010100                 21$:    MOV     R1,R0           ;SET DRIVE 0 TO LOW POSITION THIS PASS
 9084  031760  010403                         MOV     R4,R3           ;SET SELECT BITS TO AGREE
 9085  031762  005037  001224         23$:    CLR     $TMP1           ;CLEAR PASS FLAGS
 9086  031766  000137  031606                 JMP     22$             ;GO SET UP A & B
 9087  031772                         50$:
 9088                                 ;ADD WAITING LOOP FOR APT OPERATION ON JAN-9-78 REV 007
 9089                                 .SBTTL  END OF PASS ROUTINE
 9090
 9091                                 ;;*****************************************************************
 9092                                 ;*INCREMENT THE PASS NUMBER ($PASS)
 9093                                 ;*TYPE "END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY"
 9094                                 ;*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
 9095                                 ;*IF THERES A MONITOR GO TO IT
 9096                                 ;*IF THERE ISN'T JUMP TO TSTART
 9097
```

```
 9098  031772                                  $EOP:
 9099  031772  000004                                SCOPE
 9100  031774  005037  001102                        CLR     $TSTNM          ;;ZERO THE TEST NUMBER
 9101  032000  005037  001262                        CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
 9102  032004  005237  001304                        INC     $PASS           ;;INCREMENT THE PASS NUMBER
 9103  032010  042737  100000  001304                BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
 9104  032016  005327                                DEC     (PC)+           ;;LOOP?
 9105  032020  000001                          $EOPCT: .WORD   1
 9106  032022  003063                                BGT     $DOAGN          ;;YES
 9107  032024  012737                                MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
 9108  032026  000001                          $ENDCT: .WORD   1
 9109  032030  032020                                $EOPCT
 9110  032032  104401  032040                        TYPE    ,65$            ;;TYPE ASCIZ STRING
 9111  032036  000407                                BR      64$             ;;GET OVER THE ASCIZ
 9112                                          ;;65$:  .ASCIZ  <12><15>/END PASS #/
 9113  032056                                  64$:
 9114  032056  013746  001304                        MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
 9115                                                                          ;;TYPE PASS NUMBER
 9116  032062  104405                                TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 9117  032064  104401  032072                        TYPE    ,67$            ;;TYPE ASCIZ STRING
 9118  032070  000421                                BR      66$             ;;GET OVER THE ASCIZ
 9119                                          ;;67$:  .ASCIZ  /  TOTAL ERRORS SINCE LAST REPORT /
 9120  032134                                  66$:
 9121  032134  013746  001112                        MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
 9122                                                                          ;;TOTAL NUMBER OF ERRORS
 9123  032140  104405                                TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 9124  032142  104401  001273                        TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
 9125  032146  005037  001112                        CLR     $ERTTL          ;;CLEAR ERROR TOTAL
 9126  032152  013700  000042              $GET42:   MOV     @#42,R0         ;;GET MONITOR ADDRESS
 9127  032156  001405                                BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
 9128  032160  000005                                RESET                   ;;CLEAR THE WORLD
 9129  032162  004710                        $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
 9130  032164  000240                                NOP                     ;;SAVE ROOM
 9131  032166  000240                                NOP                     ;;FOR
 9132  032170  000240                                NOP                     ;;ACT11
 9133  032172                                  $DOAGN:
 9134  032172  000137                                JMP     @(PC)+          ;;RETURN
 9135  032174  032202                        $RTNAD: .WORD   TSTAPT
 9136  032176     377     377     000        $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
 9137          032202                                .EVEN
 9138  032202  122737  000001  001316        TSTAPT: CMPB    #APTENV,$ENV    ;RUNNING UNDER APT MODE ?
 9139  032210  001007                                BNE     2$              ;BRANCH IF NOT
 9140  032212  023727  001304  000002                CMP     $PASS,#2        ;TWO PASS DONE ?
 9141  032220  103403                                BLO     2$              ;BRANCH IF NOT
 9142  032222  005237  001102              1$:       INC     $TSTNM          ;INCREMENT TEST NUMBER
 9143  032226  000775                                BR      1$              ;WAITING LOOP FOR APT DJMP THE NEXT PROG
 9144  032230  000137  003150              2$:       JMP     NEWPAS          ;REPEAT THE SAME TEST IF NOT UNDER APT
 9145                                          .SBTTL  ROUTINE TO SIZE MEMORY
 9146
 9147                                          ;;*****************************************************************
 9148                                          ;*CALL:
 9149                                          ;*      JSR     PC,$SIZE
 9150                                          ;*      RETURN
 9151                                          ;*$LSTAD WILL CONTAIN:
 9152                                          ;*      WITH KT11 OPTION        -- LAST VIRTUAL ADDRESS OF THE LAST BANK
 9153                                          ;*      WITHOUT KT11 OPTION     -- LAST ABSOLUTE ADDRESS OF AVAILABLE MEMORY
```

```
                                        ;*$LSTBK WILL CONTAIN THE LAST BANK AS A SAF
                                        ;*$KT11 IS THE MEMORY MANAGEMENT KEY
                                        ;*BIT07 = 0 DON'T USE MEMORY MANAGEMENT
                                        ;*      MUST BE SETUP BEFORE THE CALL
                                        ;*BIT15 = 0 DON'T HAVE MEMORY MANAGEMENT OPTION
                                        ;*      DETERMINED BY ROUTINE
;
032234  010046                  $SIZE:  MOV     R0,-(SP)        ;;SAVE R0 ON THE STACK
032236  010146                          MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
032240  010246                          MOV     R2,-(SP)        ;;SAVE R2 ON THE STACK
032242  010346                          MOV     R3,-(SP)        ;;SAVE R3 ON THE STACK
032244  013746  000114                  MOV     @#114,-(SP)     ;;SAVE MEMORY ERROR VECTOR PS & PC
032250  013746  000116                  MOV     @#116,-(SP)
032254  012737  000116  000114          MOV     #116,@#114      ;;IGNORE PARITY ERRORS WHILE SIZING
032262  012737  000002  000116          MOV     #RTI,@#116
032270  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE PRESENT ERROR VECTOR PS & PC
032274  013746  000006                  MOV     @#ERRVEC+2,-(SP)
032300  010600                          MOV     SP,R0           ;;SAVE THE STACK POINTER
                                ;;SET THE ERRVEC PS TO THE PRESENT PS
032302  104400                          TRAP                    ;;PUSH OLD PSW AND PC ON STACK
032304  012637  000006                  MOV     (SP)+,@#ERRVEC+2        ;;SAVE THE PSW IN @#ERRVEC+2
032310  012701  003776                  MOV     #3776,R1        ;;SETUP ADDRESS
032314  105727                          TSTB    (PC)+           ;;USE MEMORY MANAGEMENT?
032316  000200                  $KT11:  .WORD   200             ;;SET TO USE MEMORY MANAGEMENT
032320  100062                          BPL     $CORE           ;;BR IF NO
032322  012737  032460  000004          MOV     #$KTNEX,@#ERRVEC ;;SET FOR TIMEOUT
032330  005737  177572                  TST     @#SR0           ;;KT11 ARE YOU THERE?
032334  052737  100000  032316          BIS     #100000,$KT11   ;;YES--SET KT11 KEY
032342  005046                          CLR     -(SP)           ;;INITIALIZE FOR "PAR" LOADING
032344  012702  172340                  MOV     #KIPAR0,R2      ;;ADDRESS OF FIRST "PAR"
032350  012703  000010                  MOV     #^D8,R3         ;;LOAD EIGHT "PAR.'S" AND EIGHT "PDR.'S"
032354  012762  077406  177740  1$:     MOV     #77406,-40(R2)  ;;PDR = 4K, UP, READ/WRITE
032362  011622                          MOV     (SP),(R2)+      ;;LOAD "PAR"
032364  062716  000200                  ADD     #200,(SP)       ;;UPDATE FOR NEXT "PAR"
032370  077307                          SOB     R3,1$           ;;LOOP UNTIL ALL EIGHT ARE LOADED
032372  012742  177600                  MOV     #177600,-(R2)   ;;SETUP KIPAR7 FOR I/O
032376  005042                          CLR     -(R2)           ;;SETUP KIPAR6 FOR TESTING
032400  012737  032416  000004          MOV     #2$,@#ERRVEC    ;;CATCH TIMEOUT IF NO SR3
032406  012737  000020  172516          MOV     #20,@#SR3       ;;ENABLE 22 BIT MODE
032414  000401                          BR      3$              ;;THIS PDP-11 HAS A SR3 REGISTER
032416  022626                  2$:     CMP     (SP)+,(SP)+     ;;CLEAN OFF THE STACK--NO SR3
032420  005237  177572          3$:     INC     @#SR0           ;;TURN ON MEMORY MANAGEMENT
032424  012737  032450  000004          MOV     #$KTOUT,@#ERRVEC ;;SET FOR TIME OUT
032432  005737  143776          4$:     TST     @#143776        ;;TRAP ON NON-EX-MEM
032436  062712  000040                  ADD     #40,(R2)        ;;MAKE A 1K STEP
032442  023712  172356                  CMP     @#KIPAR7,(R2)   ;;LAST ONE?
032446  101371                          BHI     4$              ;;NO--TRY IT
032450  011202                  $KTOUT: MOV     (R2),R2         ;;GET LAST BANK+1
032452  005037  177572                  CLR     @#SR0           ;;TURN OFF MEMORY MANAGEMENT
032456  000421                          BR      $SIZEX
032460  042737  100000  032316  $KTNEX: BIC     #100000,$KT11   ;;KT11 NON-EXISTENT
032466  012737  032516  000004  $CORE:  MOV     #$CROUT,@#ERRVEC ;;SET FOR TIMEOUT
032474  005002                          CLR     R2              ;;SET UP BANK
032476  062701  004000          1$:     ADD     #4000,R1        ;;INCREMENT BY 1K
032502  062702  000040                  ADD     #40,R2          ;;1K STEP
032506  005711                          TST     (R1)            ;;TRAP ON TIME OUT
```

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9210  032510  022701  177776          CMP     #177776,R1          ;;LAST ONE
9211  032514  001370                  BNE     1$                  ;;NO--TRY AGAIN
9212  032516  162701  004000  $CROUT: SUB     #4000,R1
9213  032522  162702  000040  $SIZEX: SUB     #40,R2              ;;DROP BACK
9214  032526  010006                  MOV     R0,SP               ;;RESTORE THE STACK
9215  032530  012637  000006          MOV     (SP)+,@#ERRVEC+2    ;;RESTORE ERROR VECTOR
9216  032534  012637  000004          MOV     (SP)+,@#ERRVEC
9217  032540  012637  000116          MOV     (SP)+,@#116         ;;RESTORE MEMORY ERROR VECTOR
9218  032544  012637  000114          MOV     (SP)+,@#114
9219  032550  010137  032572          MOV     R1,$LSTAD           ;;LAST ADDRESS
9220  032554  010237  032574          MOV     R2,$LSTBK           ;;LAST BANK
9221  032560  012603                  MOV     (SP)+,R3            ;;RESTORE R3
9222  032562  012602                  MOV     (SP)+,R2            ;;RESTORE R2
9223  032564  012601                  MOV     (SP)+,R1            ;;RESTORE R1
9224  032566  012600                  MOV     (SP)+,R0            ;;RESTORE R0
9225  032570  000207                  RTS     PC
9226  032572  000000  $LSTAD: .WORD   0                           ;;CONTAINS THE LAST ADDRESS
9227  032574  000000  $LSTBK: .WORD   0                           ;;CONTAINS THE LAST BANK
9228                  .SBTTL  SCOPE HANDLER ROUTINE
9229
9230                  ;;**************************************************************
9231                  ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
9232                  ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
9233                  ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
9234                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
9235                  ;*SW14=1         LOOP ON TEST
9236                  ;*SW11=1         INHIBIT ITERATIONS
9237                  ;*SW09=1         LOOP ON ERROR
9238                  ;*SW08=1         LOOP ON TEST IN SWR<7:0>
9239                  ;*CALL
9240                  ;*      SCOPE           ;;SCOPE=IOT
9241
9242  032576  $SCOPE:
9243  032576  104407          CKSWR                       ;;TEST  FOR CHANGE IN SOFT-SWR
9244                  ;;GO TO ERROR ROUTINE IF RETURN PC LESS THAN 1002
9245                  ;;OTHERWISE CONTINUE
9246  032600  021627  001002          CMP     (SP),#1002  ;;UNEXPECTED TRAP OR INTERRRUPT
9247  032604  101002                  BHI     1$          ;;ARE TRAPPED HERE VIA IOT
9248  032606  000137  033614          JMP     $ERROR      ;;GO PROCESS UNEXPECTED TRAP
9249  032612  032777  040000  146320  1$:     BIT     #BIT14,@SWR ;;LOOP ON PRESENT TEST?
9250  032620  001131                  BNE     $OVER       ;;YES IF SW14=1
9251                  ;#####START OF CODE FOR THE XOR TESTER#####
9252  032622  000416  $XTSTR: BR      6$                  ;;IF RUNNING ON THE "XOR" TESTER CHANGE
9253                                                      ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
9254  032624  013746  000004          MOV     @#ERRVEC,-(SP) ;;SAVE THE CONTENTS OF THE ERROR VECTOR
9255  032630  012737  032650  000004  MOV     #5$,@#ERRVEC ;;SET FOR TIMEOUT
9256  032636  005737  177060          TST     @#177060    ;;TIME OUT ON XOR?
9257  032642  012637  000004          MOV     (SP)+,@#ERRVEC ;;RESTORE THE ERROR VECTOR
9258  032646  000500                  BR      $SVLAD      ;;GO TO THE NEXT TEST
9259  032650  022626          .5$:    CMP     (SP)+,(SP)+ ;;CLEAR THE STACK AFTER A TIME OUT
9260  032652  012637  000004          MOV     (SP)+,@#ERRVEC ;;RESTORE THE ERROR VECTOR
9261  032656  000440                  BR      7$          ;;LOOP ON THE PRESENT TEST
9262  032660  6$.;#####END OF CODE FOR THE XOR TESTER#####
9263  032660  032777  000400  146252  BIT     #BIT08,@SWR ;;LOOP ON SPEC. TEST?
9264  032666  001421                  BEQ     2$          ;;BR IF NO
9265  032670  005046                  CLR     -(SP)       ;;CLEAR A TEMP. LOCATION
```

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9266  032672  117716  146242            MOVB    @SWR,(SP)       ;;PICKUP THE DESIRED TEST NUMBER
9267  032676  001414                    BEQ     8$              ;;BRANCH IF BAD TEST NUMBER IN SWR
9268  032700  022716  000110            CMP     #1*0,(SP)       ;;CHECK THE NUMBER IN THE SWR
9269  032704  002411                    BLT     8$              ;;BRANCH IF TEST NUMBER IS OUT OF RANGE
9270  032706  011637  001102            MOV     (SP),$TSTNM     ;;UPDATE THE TEST NUMBER
9271  032712  005316                    DEC     (SP)            ;;BACKUP BY ONE
9272  032714  006316                    ASL     (SP)            ;;SCALE THE TEST NUMBER AS AN INDEX
9273  032716  062716  033122            ADD     #$SW08TBL,(SP)  ;;FORM THE ADDRESS OF TEST POINTER
9274  032722  013637  001106            MOV     @(SP)+,$LPADR   ;;SET LOOP ADDRESS TO DESIRED TEST
9275  032726  000466                    BR      $OVER           ;;GO LOOP ON THE TEST
9276  032730  005726            8$:     TST     (SP)+           ;;CLEAN THE BAD TEST NUMBER OFF OF THE STACK
9277  032732  105737  001103    2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
9278  032736  001421                    BEQ     3$              ;;BR IF NO
9279  032740  123737  001115  001103    CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
9280  032746  101015                    BHI     3$              ;;BR IF NO
9281  032750  032777  001000  146162    BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
9282  032756  001404                    BEQ     4$              ;;BR IF NO
9283  032760  013737  001110  001106  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
9284  032766  000446                    BR      $OVER
9285  032770  105037  001103    4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
9286  032774  005037  001262            CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
9287  033000  000415                    BR      1$              ;;ESCAPE TO THE NEXT TEST
9288  033002  032777  004000  146130  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
9289  033010  001011                    BNE     1$              ;;BR IF YES
9290  033012  005737  001304            TST     $PASS           ;;IF FIRST PASS OF PROGRAM
9291  033016  001406                    BEQ     1$              ;;      INHIBIT ITERATIONS
9292  033020  005237  001104            INC     $ICNT           ;;INCREMENT ITERATION COUNT
9293  033024  023737  001262  001104    CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
9294  033032  002024                    BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
9295  033034  012737  000001  001104   $:      MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
9296  033042  013737  033120  001262            MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
9297  033050  105237  001102          $SVLAD:  INCB    $TSTNM          ;;COUNT TEST NUMBERS
9298  033054  113737  001102  001202            MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
9299  033062  011637  001106                    MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
9300  033066  011637  001100                    MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
9301  033072  005037  001264                    CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
9302  033076  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
9303  033104  013777  001102  146030, $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
9304  033112  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
9305  033116  000002                          RTI                     ;;FIXES PS
9306  033120  003720                $MXCNT:  2000.                   ;;MAX. NUMBER OF ITERATIONS
9307  033122                         $SW08TBL:
9308  033122  003164                          .WORD   TST1+2          ;;STARTING ADDRESS OF TEST 1
9309  033124  003302                          .WORD   TST2+2          ;;STARTING ADDRESS OF TEST 2
9310  033126  003370                          .WORD   TST3+2          ;;STARTING ADDRESS OF TEST 3
9311  033130  004620                          .WORD   TST4+2          ;;STARTING ADDRESS OF TEST 4
9312  033132  004726                          .WORD   TST5+2          ;;STARTING ADDRESS OF TEST 5
9313  033134  005104                          .WORD   TST6+2          ;;STARTING ADDRESS OF TEST 6
9314  033136  005232                          .WORD   TST7+2          ;;STARTING ADDRESS OF TEST 7
9315  033140  005336                          .WORD   TST10+2         ;;STARTING ADDRESS OF TEST 10
9316  033142  006262                          .WORD   TST11+2         ;;STARTING ADDRESS OF TEST 11
9317  033144  006400                          .WORD   TST12+2         ;;STARTING ADDRESS OF TEST 12
9318  033146  006516                          .WORD   TST13+2         ;;STARTING ADDRESS OF TEST 13
9319  033150  006760                          .WORD   TST14+2         ;;STARTING ADDRESS OF TEST 14
9320  033152  007112                          .WORD   TST15+2         ;;STARTING ADDRESS OF TEST 15
9321  033154  007322                          .WORD   TST16+2         ;;STARTING ADDRESS OF TEST 16
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9322  033156  007512                .WORD   TST17+2         ;;STARTING ADDRESS OF TEST 17
9323  033160  007646                .WORD   TST20+2         ;;STARTING ADDRESS OF TEST 20
9324  033162  010514                .WORD   TST21+2         ;;STARTING ADDRESS OF TEST 21
9325  033164  010712                .WORD   TST22+2         ;;STARTING ADDRESS OF TEST 22
9326  033166  011324                .WORD   TST23+2         ;;STARTING ADDRESS OF TEST 23
9327  033170  011542                .WORD   TST24+2         ;;STARTING ADDRESS OF TEST 24
9328  033172  011666                .WORD   TST25+2         ;;STARTING ADDRESS OF TEST 25
9329  033174  012020                .WORD   TST26+2         ;;STARTING ADDRESS OF TEST 26
9330  033176  012176                .WORD   TST27+2         ;;STARTING ADDRESS OF TEST 27
9331  033200  012330                .WORD   TST30+2         ;;STARTING ADDRESS OF TEST 30
9332  033202  012624                .WORD   TST31+2         ;;STARTING ADDRESS OF TEST 31
9333  033204  013020                .WORD   TST32+2         ;;STARTING ADDRESS OF TEST 32
9334  033206  013254                .WORD   TST33+2         ;;STARTING ADDRESS OF TEST 33
9335  033210  013442                .WORD   TST34+2         ;;STARTING ADDRESS OF TEST 34
9336  033212  013674                .WORD   TST35+2         ;;STARTING ADDRESS OF TEST 35
9337  033214  014062                .WORD   TST36+2         ;;STARTING ADDRESS OF TEST 36
9338  033216  014304                .WORD   TST37+2         ;;STARTING ADDRESS OF TEST 37
9339  033220  014472                .WORD   TST40+2         ;;STARTING ADDRESS OF TEST 40
9340  033222  014664                .WORD   TST41+2         ;;STARTING ADDRESS OF TEST 41
9341  033224  015060                .WORD   TST42+2         ;;STARTING ADDRESS OF TEST 42
9342  033226  015264                .WORD   TST43+2         ;;STARTING ADDRESS OF TEST 43
9343  033230  015470                .WORD   TST44+2         ;;STARTING ADDRESS OF TEST 44
9344  033232  016330                .WORD   TST45+2         ;;STARTING ADDRESS OF TEST 45
9345  033234  016534                .WORD   TST46+2         ;;STARTING ADDRESS OF TEST 46
9346  033236  016740                .WORD   TST47+2         ;;STARTING ADDRESS OF TEST 47
9347  033240  017156                .WORD   TST50+2         ;;STARTING ADDRESS OF TEST 50
9348  033242  017362                .WORD   TST51+2         ;;STARTING ADDRESS OF TEST 51
9349  033244  017566                .WORD   TST52+2         ;;STARTING ADDRESS OF TEST 52
9350  033246  017712                .WORD   TST53+2         ;;STARTING ADDRESS OF TEST 53
9351  033250  020036                .WORD   TST54+2         ;;STARTING ADDRESS OF TEST 54
9352  033252  020162                .WORD   TST55+2         ;;STARTING ADDRESS OF TEST 55
9353  033254  020306                .WORD   TST56+2         ;;STARTING ADDRESS OF TEST 56
9354  033256  020432                .WORD   TST57+2         ;;STARTING ADDRESS OF TEST 57
9355  033260  020504                .WORD   TST60+2         ;;STARTING ADDRESS OF TEST 60
9356  033262  020564                .WORD   TST61+2         ;;STARTING ADDRESS OF TEST 61
9357  033264  021050                .WORD   TST62+2         ;;STARTING ADDRESS OF TEST 62
9358  033266  021232                .WORD   TST63+2         ;;STARTING ADDRESS OF TEST 63
9359  033270  021420                .WORD   TST64+2         ;;STARTING ADDRESS OF TEST 64
9360  033272  022124                .WORD   TST65+2         ;;STARTING ADDRESS OF TEST 65
9361  033274  022342                .WORD   TST66+2         ;;STARTING ADDRESS OF TEST 66
9362  033276  022446                .WORD   TST67+2         ;;STARTING ADDRESS OF TEST 67
9363  033300  023070                .WORD   TST70+2         ;;STARTING ADDRESS OF TEST 70
9364  033302  023512                .WORD   TST71+2         ;;STARTING ADDRESS OF TEST 71
9365  033304  023622                .WORD   TST72+2         ;;STARTING ADDRESS OF TEST 72
9366  033306  024470                .WORD   TST73+2         ;;STARTING ADDRESS OF TEST 73
9367  033310  025162                .WORD   TST74+2         ;;STARTING ADDRESS OF TEST 74
9368  033312  025404                .WORD   TST75+2         ;;STARTING ADDRESS OF TEST 75
9369  033314  025662                .WORD   TST76+2         ;;STARTING ADDRESS OF TEST 76
9370  033316  025742                .WORD   TST77+2         ;;STARTING ADDRESS OF TEST 77
9371  033320  026134                .WORD   TST100+2              ;;STARTING ADDRESS OF TEST 100
9372  033322  026360                .WORD   TST101+2              ;;STARTING ADDRESS OF TEST 101
9373  033324  026506                .WORD   TST102+2              ;;STARTING ADDRESS OF TEST 102
9374  033326  027030                .WORD   TST103+2              ;;STARTING ADDRESS OF TEST 103
9375  033330  027562                .WORD   TST104+2              ;;STARTING ADDRESS OF TEST 104
9376  033332  030024                .WORD   TST105+2              ;;STARTING ADDRESS OF TEST 105
9377  033334  030250                .WORD   TST106+2              ;;STARTING ADDRESS OF TEST 106
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                        .WORD   TST107+2                ;;STARTING ADDRESS OF TEST 107
                        .WORD   TST110+2                ;;STARTING ADDRESS OF TEST 110
                        .WORD   $EOP+2          ;ADDRESS OF END OF PASS
                        .WORD   ABTFAIL+2       ;ADDRESS OF ABORT FAILURE HANDLER

                .SBTTL  APT COMMUNICATIONS ROUTINE

                ;;**************************************************************
033346 112737 000001 033612 $ATY1:  MOVB    #1,$FFLG            ;;TO REPORT FATAL ERROR
033354 112737 000001 033610 $ATY3:  MOVB    #1,$MFLG            ;;TO TYPE A MESSAGE
033362 000403               BR      $ATYC
033364 112737 000001 033612 $ATY4:  MOVB    #1,$FFLG            ;;TO ONLY REPORT FATAL ERROR
033372              $ATYC:
033372 010046               MOV     R0,-(SP)            ;;PUSH R0 ON STACK
033374 010146               MOV     R1,-(SP)            ;;PUSH R1 ON STACK
033376 105737 033610        TSTB    $MFLG               ;;SHOULD TYPE A MESSAGE?
033402 001450               BEQ     5$                  ;;IF NOT:  BR
033404 122737 000001 001316 CMPB    #APTENV,$ENV        ;;OPERATING UNDER APT?
033412 001031               BNE     3$                  ;;IF NOT:  BR
033414 132737 000100 001317 BITB    #APTSPOOL,$ENVM     ;;SHOULD SPOOL MESSAGES?
033422 001425               BEQ     3$                  ;;IF NOT:  BR
033424 017600 000004        MOV     @4(SP),R0           ;;GET MESSAGE ADDR.
033430 062766 000002 000004 ADD     #2,4(SP)                    ;;BUMP RETURN ADDR.
033436 005737 001276        1$:     TST     $MSGTYPE            ;;SEE IF DONE W/ LAST XMISSION?
033442 001375               BNE     1$                  ;;IF NOT:  WAIT
033444 010037 001312        MOV     R0,$MSGAD           ;;PUT ADDR IN MAILBOX
033450 105720               2$:     TSTB    (R0)+               ;;FIND END OF MESSAGE
033452 001376               BNE     2$
033454 163700 001312        SUB     $MSGAD,R0           ;;SUB START OF MESSAGE
033460 006200               ASR     R0                  ;;GET MESSAGE LNGTH IN WORDS
033462 010037 001314        MOV     R0,$MSGLGT          ;;PUT LENGTH IN MAILBOX
033466 012737 000004 001276 MOV     #4,$MSGTYPE         ;;TELL APT TO TAKE MSG.
033474 000413               BR      5$
033476 017637 000004 033922 3$:     MOV     @4(SP),4$           ;;PUT MSG ADDR IN JSR LINKAGE
033504 062766 000002 000004 ADD     #2,4(SP)                    ;;BUMP RETURN ADDRESS
033512 013746 177776        MOV     177776,-(SP)        ;;PUSH 177776 ON STACK
033516 004737 044202        JSR     PC,$TYPE            ;;CALL TYPE MACRO
033522 000000               4$:     .WORD   0
033524              5$:
033524 105737 033612        10$:    TSTB    $FFLG               ;;SHOULD REPORT FATAL ERROR?
033530 001416               BEQ     12$                 ;;IF NOT:  BR
033532 005737 001316        TST     $ENV                ;;RUNNING UNDER APT?
033536 001413               BEQ     12$                 ;;IF NOT:  BR
033540 005737 001276        11$:    TST     $MSGTYPE            ;;FINISHED LAST MESSAGE?
033544 001375               BNE     11$                 ;;IF NOT:  WAIT
033546 017637 000004 001300 MOV     @4(SP),$FATAL       ;;GET ERROR #
033554 062766 000002 000004 ADD     #2,4(SP)                    ;;BUMP RETURN ADDR.
033562 005237 001276        INC     $MSGTYPE            ;;TELL APT TO TAKE ERROR
033566 105037 033612        12$:    CLRB    $FFLG               ;;CLEAR FATAL FLAG
033572 105037 033611        CLRB    $LFLG               ;;CLEAR LOG FLAG
033576 105037 033610        CLRB    $MFLG               ;;CLEAR MESSAGE FLAG
033602 012601               MOV     (SP)+,R1            ;;POP STACK INTO R1
033604 012600               MOV     (SP)+,R0            ;;POP STACK INTO R0
033606 000207               RTS     PC                  ;;RETURN
033610    000               $MFLG:  .BYTE   0           ;;MESSG. FLAG
033611    000               $LFLG:  .BYTE   0           ;;LOG FLAG
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                                $FFLG:  .BYTE   0               ;;FATAL FLAG
                                        .EVEN
                                APTSIZE=200
                                APTENV=001
                                APTSPOOL=100
                                APTCSUP=040
                                .SBTTL  ERROR HANDLER ROUTINE

                                ;;**************************************************************************
                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                ;*AND GO TO TYPERR ON ERROR
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW15=1         HALT ON ERROR
                                ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                ;*SW10=1         BELL ON ERROR
                                ;*SW09=1         LOOP ON ERROR
                                ;*CALL
                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER

033614                          $ERROR:
033614  104407                         CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
033616  105237  001103         7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
033622  001775                         BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
033624  013777  001102  145310         MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
033632  032777  002000  145300         BIT     #BIT10,@SWR     ;;BELL ON ERROR?
033640  001402                         BEQ     1$              ;;NO - SKIP
033642  104401  001266                 TYPE    ,$BELL          ;;RING BELL
033646  005237  001112         1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
033652  011637  001116                 MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
033656  162737  000002  001116         SUB     #2,$ERRPC
033664  117737  145226  001114         MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
033672  032777  020000  145240         BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
033700  001055                         BNE     20$             ;;SKIP TYPEOUTS
033702  021627  001002                 CMP     (SP),#1002      ;;IF RETURN PC LESS THAN 1002
033706  101046                         BHI     12$             ;;ERROR IS ILLEGAL TRAP
                                ;;PROCESS UNEXPECTED TRAP OR INTERRUPT
033710  016637  000004  001116         MOV     4(SP),$ERRPC    ;;GET PC AT TIME OF FALSE TRAP
033716  162737  000002  001116         SUB     #2,$ERRPC       ;;ADJUST PC
033724  104401  033770                 TYPE    ,10$            ;;TYPE HEADER
033730  013746  001116                 MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
033734  104402                         TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
033736  104401  033776                 TYPE    ,11$
033742  162716  000004                 SUB     #4,(SP)         ;;GET FALSE TRAP VECTOR ADDR
033746  011637  001116                 MOV     (SP),$ERRPC
033752  013746  001116                 MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
033756  104402                         TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
033760  104401  001273                 TYPE    ,$CRLF
033764  022626                         CMP     (SP)+,(SP)+     ;;POP FALSE TRAP VECTOR PC&ADDR
033766  000422                         BR      20$
033770  050200  036503  000040  10$:   .ASCIZ  <200>'PC= '
033776  020040  047125  054105  11$:   .ASCIZ  '  UNEXPECTED TRAP TO '
034004  042520  052103  042105
034012  052040  040522  020120
034020  047524  000040

                                        .EVEN
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9490  034024                          12$:
9491  034024  004737  034136                  JSR     PC,TYPERR       ;;GO TO USER ERROR ROUTINE
9492  034030  104401  001273                  TYPE    ,$CRLF
9493  034034                          20$:
9494  034034  122737  000001  001316          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
9495  034042  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
9496  034044  113737  001114  034056          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
9497  034052  004737  033364                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR  0 APT
9498  034056     000                  21$:    .BYTE   0
9499  034057     000                          .BYTE   0
9500  034060  000777                  22$:    BR      22$             ;;APT ERROR LOOP
9501  034062  005777  145052          2$:     TST     @SWR            ;;HALT ON ERROR
9502  034066  100002                          BPL     3$              ;;SKIP IF CONTINUE
9503  034070  000000                          HALT                    ;;HALT ON ERROR.
9504  034072  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
9505  034074  032777  001000  145036  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
9506  034102  001402                          BEQ     4$              ;;BR IF NO
9507  034104  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
9508  034110  005737  001264          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
9509  034114  001402                          BEQ     5$              ;;BR IF NONE
9510  034116  013716  001264                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
9511  034122                          5$:
9512  034122  022737  032162  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
9513  034130  001001                          BNE     6$              ;;BRANCH IF NO
9514  034132  000000                          HALT                    ;;YES
9515  034134                          6$:
9516  034134  000002                          RTI                     ;;RETURN
9517                                  ;;*****************************************************************
9518                                  .SBTTL  TYPE ERROR ROUTINE
9519                                  ;*ENTRY JSR PC,TYPERR
9520                                  ;*RETURN RTS PC
9521                                  ;*
9522                                  ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
9523                                  ;*ERROR IS TO BE REPORTED. IT THEN USES THE "ERROR TABLE" ($ERRTB)
9524                                  ;*ENTRY TO DEFINE WHAT INFORMATION IS TO BE REPORTED CONCERNING
9525                                  ;*THE ERROR.
9526                                  ;;*****************************************************************
9527  034136  004413                  TYPERR: SAVREG
9528  034140  113737  001102  001302          MOVB    $TSTNM,$TESTN   ;GET TEST NUMBER FOR REPORT
9529  034146  042737  177400  001302          BIC     #177400,$TESTN  ;CLEAR UNUSED BITS
9530  034154  113700  001114                  MOVB    $ITEMB,R0       ;ENTER ERROR NUMBER
9531  034160  042700  177400                  BIC     #177400,R0      ;CLEAR UNUSED BITS
9532  034164  005300                          DEC     R0              ;FORM INDEX FOR ERROR TABLE
9533  034166  006300                          ASL     R0
9534  034170  006300                          ASL     R0
9535  034172  006300                          ASL     R0
9536  034174  062700  001360          1$:     ADD     #$ERRTB,R0      ;FORM ADDRESS OF ERROR ENTRY
9537  034200  012037  034214                  MOV     (R0)+,2$        ;GET EM POINTER
9538  034204  001404                          BEQ     3$              ;BRANCH IF THERE ISN'T ONE
9539  034206  104401  001273                  TYPE    ,$CRLF          ;TYPE CARRIAGE RETURN LINE FEED
9540  034212  104401                          TYPE                    ;TYPE ERROR MESSAGE (EM)
9541  034214  000000                  2$:     .WORD   0               ;EM POINTER GOES HERE
9542  034216  012037  034232          3$:     MOV     (R0)+,4$        ;GET DH POINTER
9543  034222  001404                          BEQ     5$              ;BRANCH IF THERE ISN'T ONE
9544  034224  104401  001273                  TYPE    ,$CRLF          ;TYPE CR-LF
9545  034230  104401                          TYPE                    ;TYPE DATA HEADER
```

```
 9546  034232  000000                 4$:     .WORD   0               ;DH POINTER GOES HERE
 9547  034234  012000                 5$:     MOV     (R0)+,R1        ;GET DT POINTER
 9548  034236  001445                         BEQ     20$             ;BRANCH IF THERE ARE NONE
 9549  034240  005004                         CLR     R4              ;SET INDENT SWITCH
 9550  034242  012000                         MOV     (R0)+,R0        ;GET DF POINTER
 9551  034244  012002                         MOV     (R0)+,R2        ;STORE NUMBER OF DH'S
 9552  034246  104401  001273                 TYPE    ,$CRLF
 9553  034252  112003                 10$:    MOVB    (R0)+,R3        ;GET & STORE NUMBER OF DATA WORDS
 9554  034254  105720                         TSTB    (R0)+           ;BUMP PAST FORMAT WORD
 9555  034256  005703                         TST     R3              ;TEST IF ANY DATA FOR THIS HEADER
 9556  034260  001416                         BEQ     14$             ;NO - SKIP DATA PRINT
 9557  034262  005704                         TST     R4              ;CHECK FOR INDENT
 9558  034264  001004                         BNE     12$             ;YES, GO INDENT
 9559  034266  013146                 11$:    MOV     @(R1)+,-(SP)    ;PUT FIRST DATA WORD ON STACK
 9560  034270  104402                         TYPOC                   ;TYPE IT
 9561  034272  005303                         DEC     R3              ;MORE DATA WORDS
 9562  034274  001403                         BEQ     13$             ;NO-BRANCH
 9563  034276  104401  051053         12$:    TYPE    ,SPACE2         ;TYPE SEPARATORS
 9564  034302  000771                         BR      11$             ;LOOP
 9565  034304  104401  001273         13$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
 9566  034310  005710                         TST     (R0)            ;CHECK IF NEXT HEADER AVAILABLE
 9567  034312  001401                         BEQ     14$             ;NO, DO NOT CHANGE INDENT
 9568  034314  005104                         COM     R4              ;CHANGE INDENT
 9569  034316  005302                 14$:    DEC     R2              ;MORE DH'S?
 9570  034320  003414                         BLE     20$             ;NO-BRANCH
 9571  034322  012037  034342         15$:    MOV     (R0)+,18$       ;GET NEXT DH POINTER
 9572  034326  001751                         BEQ     10$             ;IF 0 GET DATA
 9573  034330  005704                         TST     R4              ;INDENT?
 9574  034332  001402                         BEQ     17$             ;NO, BRANCH
 9575  034334  104401  051053                 TYPE    ,SPACE2         ;TYPE INDENT
 9576  034340  104401                 17$:    TYPE                    ;TYPE DH
 9577  034342  000000                 18$:    .WORD   0               ;DH POINTER GOES HERE
 9578  034344  104401  001273                 TYPE    ,$CRLF
 9579  034350  000740                         BR      10$             ;GET DATA
 9580  034352  104414                 20$:    RESREG
 9581  034354  005237  001632                 INC     ERRCNT          ;INCREMENT THE ERROR COUNT
 9582  034360  032777  010000  144552         BIT     #SW12,@SWR      ;CHECK IF SWITCH 12 SET
 9583  034366  001421                         BEQ     25$             ;NO, RETURN
 9584  034370  022737  000024  001632         CMP     #20.,ERRCNT     ;CHECK IF ERROR THRESHOLD EXCEEDED
 9585  034376  103015                         BHIS    25$             ;NO, RETURN
 9586  034400  104401  053317                 TYPE    ,ABORT          ;TYPE "PROGRAM ABORTED BECAUSE
 9587                                                                 ;ERROR THRESHOLD EXCEEDED"
 9588  034404  005737  000042                 TST     42              ;CHECK IF CHAIN MODE
 9589  034410  001407                         BEQ     22$             ;NO, HALT PROCESSOR
 9590  034412  012706  001100                 MOV     #STACK,SP       ;INITIALIZE STACK
 9591  034416  012737  000001  032020         MOV     #1,$EOPCT       ;FORCE END OF PROGRAM
 9592  034424  000137  031772                 JMP     $EOP
 9593  034430  000000                 22$:    HALT
 9594  034432  000207                 25$:    RTS     PC
 9595                                 .SBTTL  NON-EXISTANT MEMORY AND INTERRUPT CHECK HANDLER
 9596                                 ;*      THIS ROUTINE SETS THE INTERRUPT FLAG AND DOES AN RTI.
 9597                                 ;*      THIS IS THE INDICATION TO THE ROUTINE CHECKING
 9598                                 ;*      NON-EXIXTANT MEMORY THAT AN INTERRUPT DID OCCUR.
 9599
 9600  034434  005237  001662         NEXINT: INC     INTSET          ;BUMP THE INTERRUPT COUNTER
 9601  034440  000002                         RTI
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                                        .SBTTL  RK611 INTERRUPT HANDLER
                                        ;*      MOST INTERRUPTS FROM THE RK611 ARE HANDLED BY THIS ROUTINE.  ACTUAL
                                        ;*      PROCESSING AS A RESULT OF THE INTERRUPT IS LEFT TO THE MAIN
                                        ;*      PROGRAM.  THE HANDLER JUST SETS A FLAG TO INDICATE THE
                                        ;*      INTERRUPT OCCURRED.

034442  000240                  INTHLR: NOP
034444  005237  001662                  INC     INTSET          ;BUMP THE INTERRUPT FLAG
034450  000002                          RTI                     ;RETURN.

                                        .SBTTL  MEMORY PARITY ERROR TRAP HANDLER
                                        ;*      MEMORY PARITY TRAPS WILL BE REPORTED BY THIS ROUTINE. THE REPORT
                                        ;*      WILL INCLUDE THE PC AT TIME OF FAILURE AND ABORT THE PROGRAM.

034452  032777  020000  144460  PERHLR: BIT     #BIT13,@SWR     ;TEST IF INHIBIT REPORT
034460  001003                          BNE     1$              ;YES - SKIP
034462  104401  053546                  TYPE    ,EM3            ;TYPE PARITY ERROR MESSAGE
034466  104402                          TYPOC                   ;AND PC VALUE
034470  012737  000001  032020  1$:     MOV     #1,$EOPCT       ;FORCE END OF PROGRAM
034476  012706  001100                  MOV     #STACK,SP       ;CLEAN OFF STACK
034502  000137  031772                  JMP     $EOP

                                        .SBTTL  LINE CLOCK INTERRUPT HANDLER
                                        ;*      THE LINE CLOCK INTERRUPT HANDLER WILL INCREMENT THE LCLKTK
                                        ;*      (LINE CLOCK TICK COUNTER) EACH TIME AN INTERRUPT OCCURS.

034506  005237  001674          LCKHLR: INC     LCLKTK          ;INCREMENT CLOCK TICK COUNTER
034512  042777  000200  145170          BIC     #BIT7,@KWLADD   ;CLEAR MONITOR BIT
034520  000002                          RTI

                                        ;;*****************************************************************
                                        .SBTTL  OPTION PRESENT TEST AND SETUP
                                        ;*      THIS ROUTINE CHECKS IF THE MEMORY PARITY OPTION AND THE
                                        ;*      LINE CLOCK ARE ON THE SYSTEM. FLAGS ARE SET IF PRESENT; CLEARED
                                        ;*      OTHERWISE, AND THE APPROPRIATE INTERRUPT VECTORS ARE SET UP.
034522  104413                  OPTTST: SAVREG
034524  013746  000004                  MOV     ERRVEC,-(SP)    ;STORE OLD NEM CONTENTS
034530  013746  000006                  MOV     ERRVEC+2,-(SP)
034534  012737  034754  000004          MOV     #20$,ERRVEC     ;DET INTERRUPT FOR NEM
034542  012737  000340  000006          MOV     #PR7,ERRVEC+2   ;SET PRIORITY
034550  005037  001670                  CLR     MEMPAR          ;CLEAR PARITY WORD FLAGS
034554  042737  000100  001664          BIC     #PARPRE,OPTFLG  ;CLEAR PARITY PRESENT FLAG
034562  005737  170200                  TST     170200          ;TEST IF EITHER 11/70 OR 11/44
034566  000240                          NOP
034570  000240                          NOP
034572  005737  177770                  TST     177770          ;NOW SEE IF IT'S 11/70
034576  000240                          NOP
034600  000240                          NOP
034602  012737  177750  001672          MOV     #177750,CSRPTR  ;SET POINTER FOR 11/70
034610  052737  002000  001664          BIS     #CP1170,OPTFLG  ;SET 11/70 FLAG
034616  052737  000100  001664          BIS     #PARPRE,OPTFLG  ;SET PARITY PRESENT FLAG
034624  000507                          BR      35$             ;GO TO VECTOR SETUP

034626  013703  001714          3$:     MOV     MEMBAS,R3       ;SET UP POINTER TO FIRST PARITY CSR
034632  012704  000001                  MOV     #1,R4           ;INIT MASK
```

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 9658  034636  012713  000001          6$:     MOV     #1,(R3)         ;SET PARITY DETECT IN THAT CSR
 9659  034642  005713                          TST     (R3)
 9660  034644  052713  000002                  BIS     #BIT1,(R3)      ;IS THIS ECC MEMORY?
 9661  034650  032713  000002                  BIT     #BIT1,(R3)      ;
 9662  034654  001061                          BNE     47$             ;YES - EXIT
 9663  034656  050437  001670                  BIS     R4,MEMPAR       ;SET PARITY PRESENT BIT
 9664                                  ;       BIT     #PARPRE,OPTFLG  ;WAS PARITY PRESENT SET BEFORE
 9665                                  ;       BNE     10$             ;YES - SKIP
 9666  034662  013700  001716                  MOV     MMVECA,R0       ;SET UP FOR PARITY TRAPS
 9667  034666  012720  034766                  MOV     #40$,(R0)+      ;  TO 40$
 9668  034672  012710  000340                  MOV     #PR7,(R0)
 9669  034676  012700  072640                  MOV     #OBUFF+224,R0   ;SET POINTER TO BUFFER WHERE BAD PARITY
 9670                                                                  ;  IS USED IN THE TESTS
 9671  034702  012713  000004                  MOV     #BIT2,(R3)      ;SET TO WRITE WRONG PARITY
 9672  034706  012710  177777                  MOV     #-1,(R0)        ;WRITE WORD BAD
 9673  034712  012713  000001                  MOV     #1,(R3)         ;SET TO DETECT PARITY ERROR
 9674  034716  005710                          TST     (R0)            ;READ BAD WORD
 9675  034720  042737  000100  001664          BIC     #PARPRE,OPTFLG  ;REV 005
 9676  034726  012713  000002                  MOV     #2,(R3)         ;TRUN OFF CZR ERROR ENABLE
 9677  034732  012710  000000                  MOV     #0,(R0)         ;CLEAR BAD PARITY
 9678                                  ;       BIC     #7,(R3)         ;REV 006
 9679                                  ;       MOV     #0,(R0)         ;REV 006
 9680  034736  000442                          BR      35$             ;REV 005
 9681  034740  062703  000002          10$:    ADD     #2,R3           ;BUMP TO NEXT CSR
 9682  034744  000241                          CLC
 9683  034746  006104                          ROL     R4              ;SHIFT MASK
 9684  034750  001332                          BNE     6$              ;TEST IF ALL DONE
 9685  034752  000434                          BR      35$             ;YES - SKIP
 9686
 9687  034754  022626          20$:    CMP     (SP)+,(SP)+     ;CLEAR STACK
 9688  034756  012737  035040  000004          MOV     #30$,ERRVEC     ;SET NEW NEM TRAP ADDRESS
 9689  034764  000720                          BR      3$              ;GO TO CSR CHECKS
 9690
 9691  034766  022626          40$:    CMP     (SP)+,(SP)+     ;CLEAR STACK
 9692  034770  010337  001672                  MOV     R3,CSRPTR       ;SET CSR POINTER FOR CSR TO BE USED
 9693  034774  052737  000100  001664          BIS     #PARPRE,OPTFLG  ;SET PARITY PRESENT FLAG
 9694  035002  012713  000000                  MOV     #0,(R3)         ;TURN OFF CSR ERROR ENABLE
 9695  035006  012710  000000                  MOV     #0,(R0)         ;WRITE GOOD PARITY
 9696  035012  012713  000001                  MOV     #1,(R3)         ;SET TO DETECT PARITY ERRORS
 9697  035016  000412                          BR      35$             ;EXIT
 9698
 9699  035020  012713  000000          47$:    MOV     #0,(R3)         ;CLEAR CSR
 9700  035024  042737  000100  001664          BIC     #PARPRE,OPTFLG  ;FORGET THEM ALL
 9701  035032  005037  001670                  CLR     MEMPAR          ;FORGET THEM ALL
 9702  035036  000402                          BR      35$             ;EXIT
 9703  035040  022626          30$:    CMP     (SP)+,(SP)+     ;CLEAR STACK
 9704  035042  000736                          BR      10$             ;GO CHECK NEXT CSR
 9705  035044  013700  001716          35$:    MOV     MMVECA,R0       ;SET UP POINTER TO PARITY VECTOR
 9706  035050  005737  001670                  TST     MEMPAR          ;TEST IF ANY PARITY PRESENT
 9707  035054  001004                          BNE     37$             ;YES - SKIP
 9708  035056  032737  002000  001664          BIT     #CP1170,OPTFLG  ;TEST IF 11/70
 9709  035064  001405                          BEQ     39$             ;NO - SKIP
 9710  035066  012720  034452          37$:    MOV     #PERHLR,(R0)+   ;SET UP PARITY VECTOR
 9711  035072  012710  000340                  MOV     #PR7,(R0)       ;SET PRIORITY
 9712  035076  000403                          BR      38$
 9713  035100  012720  000116          39$:    MOV     #116,(R0)+      ;ELSE RESTORE TRAP CATCHER
```

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9714  035104  005010                          CLR     (R0)
9715  035106  012737  034434  000004  38$:    MOV     #NEXINT,ERRVEC  ;SET UP NEM VECTOR FOR LINE CLOCK TEST
9716  035114  005037  001662                  CLR     INTSET          ;CLEAR INTERRUPT COUNTER
9717  035120  013700  001712                  MOV     KWLVEC,R0       ;SET POINTER TO VECTOR
9718  035124  012720  034506                  MOV     #LCKHLR,(R0)+   ;INSERT ADDRESS OF INTERRUPT HDLR
9719  035130  012710  000340                  MOV     #PR7,(R0)       ;INSERT PRIORITY
9720  035134  012777  000100  144546          MOV     #BIT6,@KWLADD   ;LOAD KW11-L FOR INTERRUPT ENABLE
9721  035142  000240                          NOP
9722  035144  000240                          NOP
9723  035146  000240                          NOP
9724  035150  005737  001662                  TST     INTSET          ;TEST IN NEM ON KW11-P REFERENCE
9725  035154  001003                          BNE     4$              ;THIS BRANCH WILL BYPASS SET UP OF
9726                                                                  ;CLOCK OPTION
9727  035156  052737  100000  001664          BIS     #LCLKPR,OPTFLG  ;SET CLOCK PRESENT FLAG
9728  035164  012701  000006          4$:     MOV     #6,R1           ;RESTORE OLD VECTOR
9729  035170  005037  001662                  CLR     INTSET          ;CLEAR INT FLAG
9730  035174  012637  000006                  MOV     (SP)+,ERRVEC+2
9731  035200  012637  000004                  MOV     (SP)+,ERRVEC
9732  035204  012746  000000                  MOV     #PR0,-(SP)      ;RESTORE PRIORITY TO 0
9733  035210  012746  035216                  MOV     #12$,-(SP)
9734  035214  000002                          RTI
9735  035216                          12$:
9736  035216  104414                          RESREG
9737  035220  000207                          RTS     PC
9738
9739                                  ;;*****************************************************************
9740                                  .SBTTL  LOOP ON INTERNAL ERROR
9741                                  ;*      THIS ROUTINE IS USED TO PROVIDE TIGHT SCOPE LOOPS. THE CALLER
9742                                  ;*      IS EXPECTED TO SET $LPERR TO THE START OF THE SCOPE LOOP
9743                                  ;*      TO BE EXECUTED ON ERROR.
9744
9745  035222  032777  001000  143710  SCOP1$: BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
9746  035230  001405                          BEQ     5$              ;NO, CONTINUE
9747  035232  105737  001103                  TSTB    $ERFLG          ;CHECK IF ERROR OCCURRED
9748  035236  001402                          BEQ     5$
9749  035240  013716  001110                  MOV     $LPERR,(SP)     ;LOAD ERROR RETURN
9750  035244  000002                  5$:     RTI                     ;RETURN
9751                                  .SBTTL  LINE CLOCK CALIBRATE
9752                                  ;*      WAITS FOR A LINE CLOCK INTERRUPT TO CALIBRATE THE INTERRUPTS
9753                                  ;*      TO A  MEANINGFUL TIME VALUE. IN ADDITION IT PRESETS
9754                                  ;*      THE TIMCNT IF THERE IS NO LINE CLOCK. TIMCNT IS USED IN THE
9755                                  ;*      LINE CLOCK SIMULATOR.
9756
9757  035246  005037  001674          CLKCAL: CLR     LCLKTK          ;CLEAR TICK COUNTER
9758  035252  032737  100000  001664          BIT     #LCLKPR,OPTFLG  ;TEST IF CLOCK PRESENT
9759  035260  001004                          BNE     1$              ;YES - SKIP
9760  035262  012737  000020  001654          MOV     #16.,TIMCNT     ;ELSE PRESET TIMCNT
9761  035270  000410                          BR      2$              ;AND EXIT
9762  035272  005737  001662          1$:     TST     INTSET          ;TEST IF INTERRUPT HAS OCCURRED
9763  035276  001005                          BNE     2$              ;YES- ABORT CALIBRATION
9764  035300  005737  001674                  TST     LCLKTK          ;WAIT FOR CLOCK TICK
9765  035304  001772                          BEQ     1$              ;NOT YET - LOOP
9766  035306  005037  001674                  CLR     LCLKTK          ;CLEAR TICK COUNT
9767  035312  000207                  2$:     RTS     PC      ;RETURN
9768
9769                                  .SBTTL  LINE CLOCK SIMULATION ROUTINE
```

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                        ;*      THIS ROUTINE IS USED TO SIMULATE THE LINE CLOCK. TO
                        ;*      DO THIS THE VALUE STORED IN MILCNT IS USED AS THE
                        ;*      BASE AND REPRESENTS THE NUMBER OF TIMES A DECREMENT
                        ;*      AND BRANCH LOOP CAN BE DONE IN 1 MILLISECOND. THE
                        ;*      TIMCNT VALUE IS DECREMENTED AND IF IT REACHED 0 THE
                        ;*      LINE CLOCK TICK COUNTER IS BUMPED. THEN THE TIMCNT
                        ;*      IS RESET TO 16 (REPRESENTS 16 MILLISECONDS PER LINE CLOCK
                        ;*      TICK).
                        ;*
                        ;*      THUS THE ROUTINE RETURNS TO THE CALLER AFTER 1 MILLISECOND
                        ;*      AND BUMPS THE LINE CLOCK TICK COUNTER FOR EACH 16 CALLS.
                        ;*

035314  010046         MYTIME: MOV     R0,-(SP)        ;SAVE R0
035316  013700 001652           MOV     MILCNT,R0       ;SET COUNT
035322  005737 001662   1$:     TST     INTSET          ;TEST IF INTERRUPT SET
035326  001012                   BNE     2$              ;YES - SKIP
035330  005300                   DEC     R0              ;DECREMENT COUNT TO ZERO
035332  001373                   BNE     1$
035334  005337 001654           DEC     TIMCNT          ;DECREMENT TIMCNT
035340  001005                   BNE     2$              ;IF NOT ZERO - EXIT
035342  005237 001674           INC     LCLKTK          ;ELSE BUMP TICK COUNTER
035346  012737 000020 001654    MOV     #16.,TIMCNT     ;RESET TIME COUNT
035354  012600           2$:     MOV     (SP)+,R0        ;RESTORE R0
035356  000207                   RTS     PC              ;RETURN

                        .SBTTL  WAIT FOR INTERRUPT ROUTINE
                        ;*      THE ROUTINE IS ENTERED BY ONE OF FOURTEEN TRAP CALLS. THE CALL
                        ;*      SPECIFIES HOW MANY TICKS OF THE LINE CLOCK ARE TO ELAPSE
                        ;*      WHILE WAITING FOR INTERRUPT. IF INTERRUPT DOES NOT OCCUR
                        ;*      IN THAT PERIOD OF TIME, AN ERROR MESSAGE IS PREPARED
                        ;*      (BUT NOT PRINTED IN THE ROUTINE)AND THEN RETURNS TO THE
                        ;*      LOCATION FOLLOWING THE CALL. IF INTERRUPT OCCURS THE
                        ;*      RETURN IS BUMPED BY 2. NORMALLY AN ERROR CALL WILL
                        ;*      BE IN THE LOCATION AFTER THE CALL TO INTERRUPT WAIT.

035360  104413          IWAT8S: SAVREG          ;ENTRY FOR 8 SECOND WAIT
035362  012700 000764           MOV     #500.,R0
035366  000463                   BR      WATSRT
035370  104413          IWAT1M: SAVREG          ;ENTRY FOR 1 MIN WAIT
035372  012700 007246           MOV     #3750.,R0
035376  000457                   BR      WATSRT
035400  104413          IWAT2S: SAVREG  ;ENTRY FOR 2 SECOND WAIT
035402  012700 000200           MOV     #128.,R0
035406  000453                   BR      WATSRT
035410  104413          IWAT1S: SAVREG                  ;ENTRY FOR 1 SECOND WAIT
035412  012700 000077           MOV     #63.,R0
035416  000447                   BR      WATSRT
035420  104413          IWAT159:        SAVREG          ;ENTRY FOR 160 MS WAIT
035422  012700 000012           MOV     #10.,R0
035426  000443                   BR      WATSRT
035430  104413          IWAT144:        SAVREG          ;ENTRY FOR 144 MS WAIT
035432  012700 000011           MOV     #9.,R0
035436  000437                   BR      WATSRT
035440  104413          IWAT128:        SAVREG          ;ENTRY FOR 128 MS WAIT
035442  012700 000010           MOV     #8.,R0
```

```
 9826  035446  000433                          BR      WATSRT
 9827  035450  104413                  IWAT112:        SAVREG          ;ENTRY FOR 112 MS WAIT
 9828  035452  012700  000007                  MOV     #7,R0
 9829  035456  000427                          BR      WATSRT
 9830  035460  104413                  IWAT96: SAVREG                  ;ENTRY FOR 96 MS WAIT
 9831  035462  012700  000006                  MOV     #6,R0
 9832  035466  000423                          BR      WATSRT
 9833  035470  104413                  IWAT80: SAVREG                  ;ENTRY FOR 80 MS WAIT
 9834  035472  012700  000005                  MOV     #5,R0
 9835  035476  000417                          BR      WATSRT
 9836  035500  104413                  IWAT64: SAVREG                  ;ENTRY FOR 64 MS WAIT
 9837  035502  012700  000004                  MOV     #4,R0
 9838  035506  000413                          BR      WATSRT
 9839  035510  104413                  IWAT48: SAVREG                  ;ENTRY FOR 48 MS WAIT
 9840  035512  012700  000003                  MOV     #3,R0
 9841  035516  000407                          BR      WATSRT
 9842  035520  104413                  IWAT32: SAVREG                  ;ENTRY FOR 32 MS WAIT
 9843  035522  012700  000002                  MOV     #2,R0
 9844  035526  000403                          BR      WATSRT
 9845  035530  104413                  IWAT'6: SAVREG                  ;ENTRY FOR 16 MS WAIT
 9846  035532  012700  000001                  MOV     #1,R0
 9847  035536  012746  000000          WATSRT: MOV     #PR0,-(SP)      ;LOAD PRIORITY 0 ON STACK
 9848  035542  012746  035550                  MOV     #5$,-(SP)       ;LOAD ADDRESS
 9849  035546  000002                          RTI
 9850
 9851  035550  012737  000020  001654  5$:     MOV     #16.,TIMCNT     ;PRESET TIME COUNTER
 9852  035556  004737  035246                  JSR     PC,CLKCAL       ;GO CALIBRATE THE CLOCK
 9853  035562  005737  001662          1$:     TST     INTSET          ;TEST IF INTERRUPT OCCURRED
 9854  035566  001036                          BNE     3$              ;YES - EXIT
 9855  035570  032737  100000  001664          BIT     #LCLKPR,OPTFLG  ;TEST IF KW11-L AVAILABLE
 9856  035576  001002                          BNE     2$              ;YES - SKIP
 9857  035600  004737  035314                  JSR     PC,MYTIME       ;ELSE CALL SIMULATOR
 9858  035604  023700  001674          2$:     CMP     LCLKTK,R0       ;TEST IF ENOUGH TICKS COUNTED
 9859  035610  103764                          BLO     1$              ;NO - LOOP
 9860  035612  104420                          'GETRK                  ;ELSE GET '611 REGS
 9861  035614  013701  001540                  MOV     T.CS1,R1        ;PUT CS1 IN R1- STRIP ALL BUT
 9862  035620  042701  177741                  BIC     #177741,R1      ;COMMAND CODE; INDEX INTO TABLE
 9863  035624  016137  050210  001372          MOV     CMNDLB(R1),DH2N ;AND SELECT HEADER TO IDENTIFY OPERATION
 9864  035632  012737  053616  001370          MOV     #EM4,EM2N       ;MESSAGE (NO INTERRUPT OR INTERRUPT LATE)
 9865  035640  013700  001302                  MOV     $TESTN,R0       ;GET NUMBER OF PRESENT TEST
 9866  035644  006300                          ASL     R0              ;SHIFT FOR INDEX
 9867  035646  016037  033122  001264          MOV     $SW08TB(R0),$ESCAPE  ;LOAD ESCAPE TO ABORT TESTS
 9868  035654  162737  000002  001264          SUB     #2,$ESCAPE      ;BUT GO TO NEXT SCOPE CALL
 9869  035662  000402                          BR      4$
 9870  035664  062716  000002          3$:     ADD     #2,(SP)         ;BUMP RETURN AROUND ERROR
 9871  035670  104414                  4$:     RESREG                  ;RESTORE REGS
 9872  035672  000002                          RTI                     ;RETURN
 9873
 9874                                  .SBTTL  "L" REGISTER LOADING ROUTINE
 9875                                  ;*      THE PARAMETERS FOLLOWING THE CALL ARE TRANSFERRED INTO
 9876                                  ;*      THE "L" REGISTERS L.CS1-L.DCYL. L.MR1 IS NOT
 9877                                  ;*      LOADED IN THIS MANNER SINCE IT IS NOT COMMONLY LOADED
 9878                                  ;*      FOR AN OPERATION. L.CS2 IS LOADED FROM DRVNUM.
 9879                                  ;*
 9880                                  ;*      CALL:   JSR     R4,LRLOAD
 9881                                  ;*              COMMAND
```

```
                        ;*              WORD COUNT
                        ;*              BUS ADDRESS
                        ;*              .BYTE           SECTOR ADDRESS
                        ;*              .BYTE           TRACK ADDRESS
                        ;*              CYLINDER ADDRESS
                        ;
035674                  LRLOAD:
035674  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
035676  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK.
035700  012701  001600          MOV     #L.CS1,R1       ;GET ADDRESS OF L REGS
035704  012700  000004          MOV     #4,R0           ;PRESET COUNT
035710  012421          1$:     MOV     (R4)+,(R1)+     ;MOVE FIRST FOUR WORDS INTO "L" REGS
035712  005300                  DEC     R0              ;CS1, WC, BA, DA
035714  001375                  BNE     1$
035716  013721  001626          MOV     DRVNUM,(R1)+    ;LOAD DRIVE NUMBER
035722  005721                  TST     (R1)+           ;BUMP PAST ASOF
035724  012411                  MOV     (R4)+,(R1)      ;LOAD DCYL
035726  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
035730  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
035732  000204                  RTS     R4

                        .SBTTL  LOAD RK611 FOR OPERATION
                        ;*      THE REGISTER SETUP STORAGE IS TRANSFERRED TO THE RK611 REGISTER.
                        ;*      THIS IS A STRAIGHT TRANSFER WITH NO CHECKING OR MANIPULATION
                        ;*      OF THE REGISTER CONTENTS.  L.CS1 IS TRANSFERRED LAST AS IT
                        ;*      SHOULD BE IF THE GO BIT IS SET.
035734  005037  001662  LOADRK: CLR     INTSET          ;CLEAR INTERRUPT FLAG.
035740  010046                  MOV     R0,-(SP)        ;STORE REGISTER
035742  010146                  MOV     R1,-(SP)
035744  012700  001602          MOV     #L.WC,R0        ;GET ADDRESS OF SETUP STORAGE WC
035750  010201                  MOV     R2,R1           ;GET BASE ADDRESS
035752  062701  000002          ADD     #2,R1           ;PUT R1 PAST RKCS1
035756  012021                  MOV     (R0)+,(R1)+     ;LOAD WORD COUNT
035760  012021                  MOV     (R0)+,(R1)+     ;LOAD BUS ADDRESS
035762  012021                  MOV     (R0)+,(R1)+     ;LOAD DISK ADDRESS
035764  012011                  MOV     (R0)+,(R1)      ;LOAD CS2
035766  062701  000006          ADD     #6,R1           ;BUMP R1 TO ASOF
035772  012021                  MOV     (R0)+,(R1)+     ;LOAD OFFSET
035774  012021                  MOV     (R0)+,(R1)+     ;LOAD CYLINDER
035776  062701  000004          ADD     #4,R1           ;BUMP R1 TO MR1
036002  011011                  MOV     (R0),(R1)       ;LOAD MR1
036004  123727  001102  000007  CMPB    $TSTNM,#7       ;SEE IF TEST 7
036012  001403                  BEQ     1$              ;BR IF YES
036014  053737  001720  001600  BIS     DTYPE,L.CS1     ;ELSE SET CORRECT DRIVE TYPE
036022  013712  001600  1$:     MOV     L.CS1,(R2)      ;LOAD CS1
036026  012601                  MOV     (SP)+,R1        ;RESTORE REGISTER
036030  012600                  MOV     (SP)+,R0
036032  000002                  RTI                     ;RETURN

                        ;
                        ;THIS ROUTINE LOADS CONSTANTS EITHER FOR THR RK06 OR THE RK07
                        ;
036034  005737  001720  LDCON:  TST     DTYPE           ;SEE IF RK06
036040  001414                  BEQ     1$              ;BR IF YES
036042  012737  001456  036120  MOV     #1456,LSTCYL    ;ELSE LOAD RK07 CONSTANTS
036050  012737  001000  036122  MOV     #1000,TSTCYL    ;MAY NOT BE NEEDED
```

```
 9938  036056  005037  036130                 CLR     HOLD2
 9939  036062  012737  000040  036132         MOV     #DTYE,HOLD3
 9940  036070  000207                         RTS     PC
 9941
 9942  036072  012737  000632  036120  1$:    MOV     #632,LSTCYL     ;RK06 CONSTANTS
 9943  036100  005037  036122                 CLR     TSTCYL          ;MAY NOT BE NEEDED
 9944  036104  012737  002000  036130         MOV     #CDT,HOLD2
 9945  036112  005037  036132                 CLR     HOLD3
 9946  036116  000207                         RTS     PC
 9947
 9948  036120  000000                 LSTCYL: 0
 9949  036122  000000                 TSTCYL: 0                       ;FOR T20,57,60 MAY NOT BE NEEDED
 9950  036124  000000                 HOLD:   0                       ;FOR T73,105
 9951  036126  000000                 HOLD1:  0                       ;FOR T105
 9952  036130  000000                 HOLD2:  0                       ;FOR T7
 9953  036132  000000                 HOLD3:  0                       ;FOR T12
 9954
 9955                                 ;
 9956                                 ;THESE ROUTINES LOAD THE CORRECT DRIVE TYPE INTO DTYPE
 9957                                 ;
 9958  036134  006300                 GTYP0:  ASL     R0
 9959  036136  016037  001722  001720         MOV     TYPTBL(R0),DTYPE
 9960  036144  006200                         ASR     R0
 9961  036146  000207                         RTS     PC
 9962
 9963  036150  006301                 GTYP1:  ASL     R1
 9964  036152  016137  001722  001720         MOV     TYPTBL(R1),DTYPE
 9965  036160  006201                         ASR     R1
 9966  036162  000207                         RTS     PC
 9967
 9968
 9969                                 .SBTTL  STORE RK611 REGISTERS
 9970                                 ;*      ALL THE RK611 REGISTERS ARE STORED IN THE TEST TABLE T
 9971                                 ;*      WITH THE EXCEPTION OF THE DATA BUFFER WHICH IS NOT STORED IN
 9972                                 ;*      THIS ROUTINE.
 9973
 9974  036164  010046                 GETRK:  MOV     R0,-(SP)        ;STORE REGISTERS TO BE USED
 9975  036166  010146                         MOV     R1,-(SP)
 9976  036170  010346                         MOV     R3,-(SP)
 9977  036172  012700  001540                 MOV     #T.CS1,R0       ;SET POINTER TO TEST TABLE
 9978  036176  010201                         MOV     R2,R1           ;SET POINTER TO RK611 BASE
 9979  036200  012703  000012                 MOV     #10.,R3         ;SET COUNT FOR 1ST 10 REGS
 9980  036204  012120                 1$:     MOV     (R1)+,(R0)+     ;STORE RKCS1 THROUGH RKSPAR
 9981  036206  005303                         DEC     R3
 9982  036210  001375                         BNE     1$
 9983  036212  062701  000002                 ADD     #2,R1           ;BUMP POINTER PAST RKDB
 9984  036216  005720                         TST     (R0)+           ;BUMP POINTER PAST T.RKDB
 9985  036220  012703  000004                 MOV     #4,R3           ;SET COUNT FOR LAST 5 REGS
 9986  036224  012120                 2$:     MOV     (R1)+,(R0)+     ;STORE RKMR1 THROUTH RKMR3
 9987  036226  005303                         DEC     R3
 9988  036230  001375                         BNE     2$
 9989  036232  012603                         MOV     (SP)+,R3        ;RESTORE REGISTERS
 9990  036234  012601                         MOV     (SP)+,R1
 9991  036236  012600                         MOV     (SP)+,R0
 9992  036240  000002                         RTI                     ;RETURN
 9993                                 ;SBTTL  BIT COUNTER IN A WORD
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 9994                                   ;*      THE WORD WHOSE BITS MUST BE COUNTED IS PLACED ON THE STACK
 9995                                   ;*      BY THE CALLING ROUTINE.  THE NUMBER OF BITS FOUND IN THE WORD
 9996                                   ;*      ARE PASSED BACK ON THE STACK.
 9997
 9998  036242  016637  000002  001256  BITCNT: MOV     2(SP),$TMP16    ;GET WORD WHOSE BITS ARE TO BE COUNTED
 9999  036250  010346                         MOV     R3,-(SP)        ;STORE R3
10000  036252  005037  001260                 CLR     $TMP17          ;CLEAR $TMP16 FOR COUNTING
10001  036256  012703  000021                 MOV     #17.,R3         ;SET A SHIFT COUNTER
10002  036262  000241                         CLC                     ;CLEAR CARRY
10003  036264  006037  001256          1$:    ROR     $TMP16          ;ROTATE WORD.
10004  036270  103407                         BCS     3$              ;WAS BIT SHIFTED OUT A 1?
10005  036272  005303                  2$:    DEC     R3              ;NO - DEC COUNT
10006  036274  001373                         BNE     1$              ;LOOP IF NOT ZERO
10007  036276  012603                         MOV     (SP)+,R3        ;RESTORE R3
10008  036300  013766  001260  000002         MOV     $TMP17,2(SP)    ;PUT COUNT OF BITS ON STACK
10009  036306  000204                         RTS     R4              ;RETURN
10010  036310  005237  001260          3$:    INC     $TMP17          ;BUMP COUNT
10011  036314  000766                         BR      2$              ;LOOP.
10012
10013                                  .SBTTL  MAINTENANCE CLOCK ROUTINE
10014                                  ;*      THE PARAMETERS PASSED TO THIS ROUTINE ARE LOCATED IN THE
10015                                  ;*      ADDRESS OFTER THE CALL. THE FIRST BYTE CANTAINS THE NUMBER
10016                                  ;*      OF PHASES ADDRESSES THE CALLING ROUTINE WANTS THE CONTROLLER
10017                                  ;*      CLOCKED THROUGH AND THE SECOND BYTE CONTAINS THE NUMBER OF
10018                                  ;*      CLOCK TRANSITIONS(PARTIAL PHASES) TO BE DONE.
10019
10020  036316                          MCLOCK:
10021  036316  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10022  036320  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10023  036322  112400                         MOVB    (R4)+,R0        ;GET NUMBER OF CONTROLLER PHASE ADDRESSES
10024  036324  112401                         MOVB    (R4)+,R1        ;GET PARTIAL PHASE ADDRESS COUNT
10025
10026  036326  006300                         ASL     R0              ;MULTIPLY PHASE ADDRESS  COUNT BY 4
10027  036330  006300                         ASL     R0
10028  036332  060100                         ADD     R1,R0           ;ADD IN PARTIALS
10029  036334  052762  000400  000026  1$:    BIS     #MCLK,RKMR1(R2) ;SET CLOCK
10030  036342  042762  000400  000026         BIC     #MCLK,RKMR1(R2) ;CLEAR MCLK
10031  036350  005300                         DEC     R0              ;DECREMENT COUNT
10032  036352  001370                         BNE     1$              ;LOOP IF NOT ZERO
10033  036354  012601                         MOV     (SP)+,R1        ;;POP STACK INTO R1
10034  036356  012600                         MOV     (SP)+,R0        ;;POP STACK INTO R0
10035  036360  000204                         RTS     R4
10036                                  .SBTTL  READ AND SORT HEADERS
10037                                  ;*      THE HEADERS IN THE CYLINDER AND TRACK SPECIFIED BY
10038                                  ;*      THE FIELDS IN THE "L" REGISTERS ARE READ AND STORED IN
10039                                  ;*      ASSCENDING ORDER. CONTROLLER ERRORS ARE CHECKED IN THE
10040                                  ;*      READ HEADER OPERATION AND DATA LATE IS CHECKED AFTER
10041                                  ;*      EACH READ OF THE DATA BUFFER.
10042                                  ;*
10043                                  ;*      CALL:   JSR     R4,RDSTHD
10044                                  ;*              TCHKOP                  ;RETURN POINT IF CERR IN READ HDR
10045                                  ;*              ERROR   4  ;OR 5, 6, 7
10046                                  ;*              ERROR   13              ;RETURN IF DATA LATE IN DB UNLOAD
10047                                  ;*              ERROR   2               ;RETURN IF TO SLOW OR
10048                                  ;*                                      ;IF HDR 0 NOT FOUND
10049
```

```
10050  036362  104413                    RDSTHD: SAVREG
10051  036364  032737  100000  001664            BIT     #LCLKPR,OPTFLG  ;TEST IF CLOCK PRESENT
10052  036372  001402                            BEQ     20$             ;NO - SKIP
10053  036374  005077  143310                    CLR     @KWLADD ;RESET INTERRUPT
10054  036400  012700  000026            20$:    MOV     #26,R0          ;PRESET FOR 26 SECTOR FORMAT
10055  036404  032737  010000  001600            BIT     #CFMT,L.CS1     ;IS 24 SECTOR MODE SET?
10056  036412  001402                            BEQ     1$              ;NO - SKIP
10057  036414  012700  000024                    MOV     #24,R0          ;ELSE CHANGE TO 24 SECTOR MODE
10058  036420  012701  070414            1$:     MOV     #IBUFF,R1       ;SET POINTER TO INPUT BUFFER
10059  036424  010005                            MOV     R0,R5           ;SAVE NUMBER OF SECTORS
10060  036426  010104                            MOV     R1,R4           ;SAVE IBUFF ADDRESS
10061  036430  010203                            MOV     R2,R3           ;SET UP POINTER TO RKDB
10062  036432  062703  000024                    ADD     #RKDB,R3
10063  036436  013762  001626  000010            MOV     DRVNUM,RKCS2(R2) ;LOAD DRIVE NUM
10064  036444  013762  001614  000020            MOV     L.DCYL,RKDCYL(R2) ;LOAD CYLINDER NUM
10065  036452  013762  001606  000006            MOV     L.DA,RKDA(R2)   ;LOAD TRACK AND SECTOR
10066
10067  036460  012737  000020  001654  2$:       MOV     #16.,TIMCNT     ;SET TIME COUNTER
10068  036466  005037  001662                    CLR     INTSET          ;CLEAR INTERRUPT FLAG
10069  036472  005037  001674                    CLR     LCLKTK          ;CLEAR TICK COUNTER
10070  036476  053737  001720  001600            BIS     DTYPE,L.CS1     ;SET DRV TYP
10071  036504  013762  001600  000000            MOV     L.CS1,RKCS1(R2) ;LOAD COMMAND
10072
10073  036512  005737  001662            3$:     TST     INTSET          ;TEST IF INT OCCURRED
10074  036516  001020                            BNE     4$              ;YES - SKIP
10075  036520  004737  035314                    JSR     PC,MYTIME       ;WAIT 1 MS
10076  036524  005737  001674                    TST     LCLKTK          ;HAVE WE WAITED 16 MS?
10077  036530  001770                            BEQ     3$              ;NO - LOOP ON WAIT
10078
10079  036532  062766  000006  000006            ADD     #6,6(SP)        ;SET RETURN FOR TO SLOW
10080  036540  104420                            TGETRK                  ;GET RK REGS
10081  036542  012737  053616  001370            MOV     #EM4,EM2N       ;LOAD MESSAGE "TO SLOW/NOT COMPLETE"
10082  036550  012737  050414  001372            MOV     #OPER24,DH2N    ;LOAD COMMAND "READ HEADER" FOR REPORT
10083  036556  000466                            BR      10$             ;SKIP
10084
10085  036560  005762  000000            4$:     TST     RKCS1(R2)       ;TEST FOR CONTROLLER ERROR
10086  036564  100474                            BMI     11$             ;YES - SKIP
10087
10088  036566  011324                            MOV     (R3),(R4)+      ;STORE HEADERS
10089  036570  011324                            MOV     (R3),(R4)+
10090  036572  011324                            MOV     (R3),(R4)+
10091
10092  036574  005762  000010                    TST     RKCS2(R2)       ;TEST IF DATA LATE
10093  036600  100443                            BMI     8$              ;YES - SKIP
10094
10095  036602  005300                            DEC     R0              ;DEC SECTOR COUNT
10096  036604  001325                            BNE     2$              ;IF NOT ZERO - LOOP
10097
10098  036606  032737  100000  001664            BIT     #LCLKPR,OPTFLG  ;TEST IF CLOCK PRESENT
10099  036614  001403                            BEQ     5$              ;NO - SKIP
10100  036616  012777  000100  143064            MOV     #BIT6,@KWLADD   ;SET INTERRUPT ENABLE
10101  036624  032761  000037  000002  5$:       BIT     #37,2(R1)       ;HEADER AT TOP OF BUFF=HEAD 0?
10102  036632  001413                            BEQ     6$              ;YES - SKIP
10103  036634  012124                            MOV     (R1)+,(R4)+     ;ELSE MOV THIS HEADER TO BOTTOM
10104  036636  012124                            MOV     (R1)+,(R4)+
10105  036640  012124                            MOV     (R1)+,(R4)+
```

```
10106
10107  036642  005305                          DEC     R5              ;TEST FO INSURE HEAD 0 IS FOUND
10108  036644  001367                          BNE     5$              ;IF ALL HEADERS NOT CHECKED - LOOP
10109  036646  012737  056366  001370          MOV     #EM56,EM2N      ;ELSE "HEADER 0 NOT FOUND" MESSAGE
10110  036654  005037  001372                  CLR     DH2N
10111  036660  000421                          BR      9$              ;SKIP
10112
10113  036662  012700  070414          6$:     MOV     #IBUFF,R0       ;GET TOP OF IBUFF
10114  036666  012120                  7$:     MOV     (R1)+,(R0)+     ;MOVE HEADERS SO THEY START AT TOP OF IBUFF
10115  036670  012120                          MOV     (R1)+,(R0)+
10116  036672  012120                          MOV     (R1)+,(R0)+
10117  036674  020004                          CMP     R0,R4           ;ALL HEADERS MOVED?
10118  036676  001373                          BNE     7$              ;NO - LOOP
10119
10120  036700  062766  000010  000006          ADD     #10,6(SP)       ;SET UP FOR GOOD RETURN
10121  036706  000423                          BR      11$
10122
10123  036710  012737  054631  001500  8$:     MOV     #EMDLT,EM13N    ;"DATA LATE SET RESULT OF READ DB"
10124  036716  012737  056777  061112          MOV     #EMRDB,DF011A
10125  036724  062766  000004  000006  9$:     ADD     #4,6(SP)        ;SET ERROR RETURN
10126  036732  104420                          TGETRK                  ;GET RK REGS
10127  036734  013700  001302          10$:    MOV     $TESTN,R0       ;GET TEST NUMBER
10128  036740  006300                          ASL     R0              ;SHIFT FOR INDEX
10129  036742  016037  033122  001264          MOV     $SW08TB(R0),$ESCAPE  ;SET ESCAPE
10130  036750  162737  000002  001264          SUB     #2,$ESCAPE      ;TO NEXT SCOPE CALL
10131
10132  036756  104414                  11$:    RESREG
10133  036760  000204                          RTS     R4
10134
10135                                  .SBTTL  GET DRIVE STATUS
10136                                  ;*      THIS ROUTINE GETS ALL THE DRIVE STATUS AND PLACES IT IN $REG10
10137                                  ;*      THROUGH $REG17.   THESE REGISTORS ARE FIRST CLEARED TO ALL ONES AND
10138                                  ;*      THEN IF ERROR OCCURS WHILE GETTING STATUS, THE 1'S ARE LEFT
10139                                  ;*      IN THE REGISTERS.
10140                                  ;*
10141                                  ;*CALL: JSR     R4,GETDRS
10142                                  ;*      BR      ERROR PROCESSING        ERROR RETURN
10143                                  ;*      BR      NO ERROR PROCESSING     GOOD RETURN
10144
10145  036762  104413                  GETDRS: SAVREG
10146  036764  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR ANY OLD ERRORS LAYING AROUND
10147  036772  012700  001202                  MOV     #$REG10,R0      ;PRESET ALL STATUS STORAGE TO
10148  036776  012701  000010                  MOV     #8.,R1          ;ALL ONES
10149  037002  012720  177777          1$:     MOV     #177777,(R0)+
10150  037006  005301                          DEC     R1
10151  037010  001374                          BNE     1$
10152  037012  012700  001206                  MOV     #$REG12,R0      ;SET POINTER TOREG12 FOR A01 & B01
10153  037016  012701  000001                  MOV     #1,R1           ;PRESET FOR PAIR ONE.
10154  037022  005037  001230                  CLR     $TMP3           ;CLEAR ERROR SWITCH
```

```
10155  037026  013762  001610  000010  2$:     MOV     L.CS2,RKCS2(R2) ;LOAD DRIVE #
10156  037034  010162  000026                  MOV     R1,RKMR1(R2)    ;LOAD MR1
10157  037040  012762  000001  000000          MOV     #BIT0,RKCS1(R2) ;DO SELECT
10158  037046  012703  000050                  MOV     #40.,R3         ;WAIT FOR A FEW MICRO RECORDS TO
10159  037052  005303                  3$:     DEC     R3              ;BIT SELECT FINISH
10160  037054  001376                          BNE     3$
10161  037056  032762  100000  000000          BIT     #CERR,RKCS1(R2) ;ANY ERROR SET AS A RESULT OF SELECT?
10162  037064  001415                          BEQ     4$              ;NO - SKIP
10163  037066  032762  024000  000000          BIT     #CTO!SPAR,RKCS1(R2) ;CHECK IF TIMEOUT OR PARITY ERROR
10164  037074  001004                          BNE     8$              ;YES - SKIP
10165  037076  032762  037400  000010          BIT     #37400,RKCS2(R2) ;TEST FOR ERRORS:
10166                                                                  ;   NED!UPE!MDS!UFE!NEM!PGE
10167  037104  001405                          BEQ     4$              ;NO - SKIP
10168  037106  012737  000001  001230  8$:     MOV     #1,$TMP3        ;SET ERROR FLAG
10169  037114  022020                          CMP     (R0)+,(R0)+     ;BUMP TO LET THAT PAIR STAY ALL 1'S.
10170  037116  000404                          BR      5$              ;SKIP
10171  037120  016220  000034          4$:     MOV     RKMR2(R2),(R0)+ ;STORE A WORD
10172  037124  016220  000036                  MOV     RKMR3(R2),(R0)+ ;STORE B WORD
10173  037130  012762  100000  000000  5$:     MOV     #CCLR,RKCS1(R2) ;CLEAR ANY OLD ERROR IN CONTROLLER
10174  037136  005701                          TST     R1              ;IS R1 A 0 (LAST TRANSFER, PAIR 0)
10175  037140  001410                          BEQ     6$              ;YES - SKIP
10176  037142  005201                          INC     R1              ;ELSE BUMP TO NEXT PAIR
10177  037144  022701  000004                  CMP     #4,R1           ;PAIR 3  JUST STORED?
10178  037150  001326                          BNE     2$              ;NO - SKIP
10179  037152  005001                          CLR     R1              ;ELSE SET TO PAIR 0
10180  037154  012700  001202                  MOV     #$REG10,R0      ;PRESET POINTER FOR PAIR 0
10181  037160  000722                          BR      2$              ;GO GET THEM
10182  037162  104414                  6$:     RESREG                  ;EXIT HERE
10183  037164  005737  001230                  TST     $TMP3           ;ANY ERROR IN STATUS GETTING
10184  037170  001001                          BNE     7$              ;YES - SKIP
10185  037172  005724                          TST     (R4)+           ;ELSE BUMP PART ERROR
10186  037174  000204                  7$:     RTS     R4              ;RETURN
10187
10188                                  .SBTTL  SUBSYSTEM INITIALIZE AND INITIALIZE STATE TEST
10189                                  ;*      THE SUBSYSTEM IS INITIALIZED WITH A SUBSYSTEM CLEAR
10190                                  ;*      COMMAND.  CERR AND DI ARE MONITORED FOR A SHORT
10191                                  ;*      PERIOD OF TIME DURING WHICH THEY SHOULD BOTH RESET.
10192                                  ;*
10193                                  ;*      IF THEY DO RESET, READY IS TESTED TO INSURE IF SETS.
10194                                  ;*
10195                                  ;*      IF ANY OF THESE THREE CONDITIONS ARE NOT MET AN APPROPRIATE
10196                                  ;*      ERROR MESSAGE IS PREPARED AND REPORTED WHEN THE ROUTINE
10197                                  ;*      RETURN TO THE CALL. IF EVERY THING IS GOOD, THE RETURN
10198                                  ;*      SKIPS OVER THE ERROR CALL AND TEST ABORT.
10199                                  ;*
10200                                  ;*      THE USUAL CALL TO THIS ROUTINE WILL BE FOLLOWED BY
10201                                  ;*      AN ERROR MESSAGE AND BRANCH TO END OF TEST.  THIS
10202                                  ;*      IS DONE BECAUSE FAILURE TO INITIALIZE CORRECTLY IS FATAL TO
10203                                  ;*      THE TEST.
10204
10205  037176                  SSINIT:
10206  037176  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10207  037200  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10208  037202  012701  000007                  MOV     #7,R1           ;SET CLEAR COUNT
10209  037206  012700  001600                  MOV     #L.CS1,R0       ;GET ADDRESS OF "L" REGS
10210  037212  012720  000100                  MOV     #100,(R0)+      ;PRESET CS1  INTR ENABLE
```

```
10211  037216  005020                    7$:     CLR     (R0)+           ;CLEAR THE NEXT
10212  037220  005300                            DEC     R1              ;COUNT 0?
10213  037222  001375                            BNE     7$              ;NO - LOOP
10214  037224  012762  000040  000010            MOV     #SCLR,RKCS2(R2) ;CLEAR SUBSYSTEM
10215  037232  012737  000012  001222            MOV     #10.,$TMP0      ;SET A COUNTER
10216  037240  016237  000000  001540    1$:     MOV     RKCS1(R2),T.CS1 ;GET CS1
10217  037246  032737  140000  001540            BIT     #CERR.DI,T.CS1  ;TEST IF ERROR OR DI SET
10218  037254  001433                            BEQ     2$              ;NO - SKIP TO READY TEST
10219  037256  005337  001222                    DEC     $TMP0           ;ELSE DECREMENT COUNTER
10220  037262  001366                            BNE     1$              ;AND LOOP
10221  037264  032737  100000  001540            BIT     #CERR,T.CS1     ;TEST - IS IT CERR STILL SET
10222  037272  001404                            BEQ     3$              ;NO  - SKIP TO DI MESSAGE
10223  037274  012737  053711  001400            MOV     #EM5,EM3N       ;MESSAGE (SUBSYS CLR NOT RESET ERROR)
10224  037302  000403                            BR      4$
10225  037304  012737  053755  001400    3$:     MOV     #EM6,EM3N       ;MESSAGE (SUBSYS CLEAR NOT RESET DI)
10226  037312  104420                    4$:     TGETRK
10227  037314  013700  001302                    MOV     $TESTN,R0       ;GET PRESENT TEST NUMBER
10228  037320  006300                            ASL     R0              ;SHIFT FOR INDEX
10229  037322  016037  033122  001264            MOV     $SW08TBL(R0),$ESCAPE ;LOAD ESCAPE TO ABORT TEST
10230  037330  162737  000002  001264            SUB     #2,$ESCAPE      ;SET TO NEXT SCOPE CALL
10231  037336  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
10232  037340  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
10233  037342  000414                            BR      6$              ;SKIP TO EXIT
10234  037344  032737  000200  001540    2$:     BIT     #RDY,T.CS1      ;TEST READY SET
10235  037352  001004                            BNE     5$              ;YES - GOOD EXIT
10236  037354  012737  054034  001400            MOV     #EM7,EM3N       ;MESSAGE (SUBSYS CLR NOT SET READY)
10237  037362  000753                            BR      4$
10238  037364  012601                    5$:     MOV     (SP)+,R1        ;RESTORE REGS
10239  037366  012600                            MOV     (SP)+,R0
10240  037370  062716  000002                    ADD     #2,(SP)         ;GOOD RETURN
10241  037374  000002                    6$:     RTI
10242
10243                                    .SBTTL  WORD COUNT AT END OF OPERATION CHECK
10244                                    ;*      THIS ROUTINE COMPARES THE CONTENTS OF THE TEST STORAGE FOR
10245                                    ;*      THE WORD COUNT AGAINST THE SUPPLIED VALUE.  IF UNEQUAL, THE
10246                                    ;*      ERROR FLAG (WCERR) IS SET IN GROUP 4 ERROR FLAGS (GRP4ER)
10247                                    ;*
10248                                    ;*CALL: JSR     R4,CHKWC
10249                                    ;*      .WORD                   ;EXPECTED WC VALUE
10250
10251  037376  012437  050034            CHKWC:  MOV     (R4)+,EXPWC     ;STORE EXPECTED VALUE
10252                                                                    ;
10253  037402  023737  050034  001542            CMP     EXPWC,T.WC      ;COMPARE
10254  037410  001406                            BEQ     1$              ;EQUAL - SKIP
10255  037412  052737  000001  050072            BIS     #WCERR,GRP4ER   ;SET ERROR FLAG
10256  037420  013737  001542  050050            MOV     T.WC,REALWC     ;STORE REAL WORD COUNT
10257  037426  000204                    1$:     RTS     R4              ;RETURN.
10258
10259                                    .SBTTL  BUS  ADDRESS AT END OF OPERATION CHECK
10260                                    ;*      THIS ROUTINE COMPUTES THE EXPECTED BUS ADDRESS AT THE END OF
10261                                    ;*      A TRANSFER BY USING THE INITIAL BUS ADDRESS, ADDING IN THE
10262                                    ;*      INITIAL WORD COUNT, AND SUBTRACTING ANY RESIDUAL WORD COUNT.
10263                                    ;*      IF THIS COMPUTED BA DOES NOT EQUAL THE CONTENTS OF RKBA
10264                                    ;*      AN ERROR FLAG (BAERR) IS SET IN GROUP 4 ERROR FIELD (GRP4ER)
10265                                    ;*
10266                                    ;*      IF BUS ADDRESS INCREMENT INHIBIT WAS SET, THE EXPECTED BUS
```

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10267                                   ;*      ADDRESS IS THE STARTING BUS ADDRESS.
10268                                   ;*CALL: JSR     R4,CHKBA
10269
10270  037430  010046                   CHKBA:  MOV     R0,-(SP)
10271  037432  010146                           MOV     R1,-(SP)
10272  037434  010346                           MOV     R3,-(SP)
10273  037436  032737  000020  001610           BIT     #BAI,L.CS2      ;TEST IF BAI SET
10274  037444  001404                           BEQ     4$              ;NO - SKIP
10275  037446  013737  001604  050040           MOV     L.BA,EXPBA      ;STORE EXPECTED BA (SAME AS STARTING BA)
10276  037454  000441                           BR      3$
10277  037456  013700  001602           4$:     MOV     L.WC,R0         ;GET INITIAL WORD COUNT
10278  037462  005400                           NEG     R0
10279  037464  113703  001601                   MOVB    L.CS1+1,R3      ;GET BA16 & BA17
10280  037470  042703  177774                   BIC     #177774,R3      ;CLEAR UNWANTED BITS
10281
10282  037474  005700                           TST     R0              ;TEST IF INITIAL WORD COUNT 0
10283  037476  001003                           BNE     6$              ;NO - SKIP
10284  037500  062703  000002                   ADD     #2,R3           ;ADD 2 TO BA16,17 (65K WORD XFER)
10285  037504  000407                           BR      9$              ;SKIP
10286  037506  005700           6$:     TST     R0              ;TEST IF INITIAL WC BIT 15 SET
10287  037510  100001                           BPL     5$              ;NO - SKIP
10288  037512  005203                           INC     R3              ;BUMP BA16,17 (32K WORD XFER)
10289  037514  006300           5$:     ASL     R0              ;SHIFT WORD COUNT TO MAKE MEM ADD CNT
10290  037516  063700  001604                   ADD     L.BA,R0         ;ADD IN START BUFFER ADD
10291  037522  005503                           ADC     R3              ;IF CARRY - ADD INTO BA16,17
10292  037524  013701  001542           9$:     MOV     T.WC,R1         ;GET END OF OPERATION WORD COUNT
10293  037530  001411                           BEQ     1$              ;BRANCH IF ZERO
10294  037532  005401                           NEG     R1
10295  037534  005701                           TST     R1              ;TEST END OPERATION WC BIT 15 SET
10296  037536  100001                           BPL     7$              ;NO - SKIP
10297  037540  005303                           DEC     R3              ;DEC BA 16,17 (32K WC LEFT)
10298  037542  006301           7$:     ASL     R1              ;SHIFT WC TO MAKE MEM ADD CNT
10299  037544  160100                           SUB     R1,R0           ;SUB FROM COMPUTED BUS ADDRESS
10300  037546  005603                           SBC     R3              ;SUB CARRY FROM BA16,17
10301  037550  010337  050036                   MOV     R3,EXPUBA       ;STORE EXPECTED UPPER BA BITS
10302  037554  010037  050040           1$:     MOV     R0,EXPBA
10303  037560  020037  001544           3$:     CMP     R0,T.BA         ;EQUAL TO COMPUTED?
10304  037564  001406                           BEQ     2$              ;YES - SKIP
10305  037566  052737  000004  050072           BIS     #BAERR,GRP4ER   ;ELSE SET BAERR FLAG
10306  037574  013737  001544  050054           MOV     T.BA,REALBA     ;STORE REAL BUS ADDRESS
10307  037602  113703  001541           2$:     MOVB    T.CS1+1,R3      ;GET REAL UPPER BA
10308  037606  042703  177774                   BIC     #177774,R3      ;CLEAR UNWANTED BITS
10309  037612  020337  050036                   CMP     R3,EXPUBA       ;CHECK IF EQUAL
10310  037616  001405                           BEQ     8$              ;YES - SKIP
10311  037620  052737  000002  050072           BIS     #UBAERR,GRP4ER  ;ELSE SET UBA ERROR
10312  037626  010337  050052                   MOV     R3,REALUB       ;STORE REAL UPPER BA
10313  037632  012603           8$:     MOV     (SP)+,R3
10314  037634  012601                   MOV     (SP)+,R1
10315  037636  012600                   MOV     (SP)+,R0
10316  037640  000204                   RTS     R4
10317
10318                                   .SBTTL  CYLINDER,TRACK,SECTOR TEST AT END OF OPERATION
10319                                   ;*      THIS ROUTINE CHECKS THAT THE CONTENTS OF THE RKDCYL AND RKDA
10320                                   ;*      ARE CORRECT FOR ANY SIZE DATA TRANSFER AT THE END OF THE
10321                                   ;*      OPERATION.  THE CONTENTS OF THE LOAD REGISTER STORAGE ARE
10322                                   ;*      COUNTED ON TO HAVE THE INITIAL VALUES TO MAKE THE
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10323                                   ;*      NECESSARY CALCULATION.
10324                                   ;*
10325                                   ;*      ALL THREE VALUES ARE GENERATED AND STORED IN EXPECTED VALUES
10326                                   ;*      STORAGE EXPCYL, EXPTRK, EXPSEC.  ALL 3 ARE CHECKED AND
10327                                   ;*      IF ONE OR MORE ARE WRONG, THE CORRESPONDING BIT IN THE
10328                                   ;*      ERROR FLAGS FIELD (GRP4ER) IS SET.
10329                                   ;*
10330                                   ;*CALL: JSR     R4,CHKCTS
10331
10332  037642  104413                  CHKCTS: SAVREG
10333  037644  013700  001602                  MOV     L.WC,R0         ;GET SPECIFIED WORD COUNT
10334  037650  005400                          NEG     R0              ;NEGATE IT
10335  037652  013701  001542                  MOV     T.WC,R1         ;GET END OF OPERATION WORD COUNT
10336  037656  001401                          BEQ     10$             ;IF ZERO - SKIP
10337  037660  005401                          NEG     R1              ;NEGATE IT
10338  037662  160100                  10$:    SUB     R1,R0           ;COMPUTE ACTUAL WORDS TRANSFERRED
10339  037664  005001                          CLR     R1              ;CLEAR R1 FOR COUNTING
10340                                   ;       THE FOLLOWING CODE DETERMINES HOW MAY SECTORS OF DATA HAS BEEN
10341                                   ;       TRANSFERRED IN THE OPERATION. ONCE IT HAS COMPUTED THAT, THE
10342                                   ;       END OF OPERATION VALUES FOR THE CYLINDER, TRACK, AND SECTOR
10343                                   ;       IS CALCULATED.
10344  037666  022700  000400          1$:     CMP     #400,R0
10345  037672  003004                          BGT     2$
10346  037674  005201                          INC     R1
10347  037676  162700  000400                  SUB     #400,R0
10348  037702  000771                          BR      1$
10349  037704  005700                  2$:     TST     R0
10350  037706  001401                          BEQ     3$
10351  037710  005201                          INC     R1
10352                                   ;       AT THIS POINT R1 HAS A COUNT OF THE
10353                                   ;       NUMBER OF FULL SECTOR TRANSFER + 1 IF A
10354                                   ;       PARTIAL SECTOR WAS TRANSFERRED.
10355  037712  012703  000026          3$:     MOV     #26,R3
10356  037716  032737  010000  001600          BIT     #CFMT,L.CS1
10357  037724  001402                          BEQ     4$
10358  037726  012703  000024                  MOV     #24,R3
10359                                   ;       R3 HAS BEEN SET UP WTH THE NUMBER
10360                                   ;       OF SECTORS IN A TRACK FOR THE FORMAT USED
10361  037732  013737  001614  050042  4$:     MOV     L.DCYL,EXPCYL   ;GET STARTING VALUES FOR CYLINDER
10362  037740  113704  001607                  MOVB    L.DT,R4         ;TRACK
10363  037744  042704  177400                  BIC     #177400,R4
10364  037750  113705  001606                  MOVB    L.DS,R5         ;SECTOR
10365  037754  042705  177400                  BIC     #177400,R5
10366  037760  005301                          DEC     R1              ;ADJUST COUNT FOR ZERO DETECT
10367  037762  005205                  5$:     INC     R5              ;BUMP SECTOR COUNT
10368  037764  020503                          CMP     R5,R3           ;DID THIS MAKE SECTOR COUTN > 1 TRACK?
10369  037766  001010                          BNE     6$              ;NO - SKIP
10370  037770  005005                          CLR     R5              ;ELSE CLEAR SECTOR COUNT
10371  037772  005204                          INC     R4              ;BUMP TRACK COUNT
10372  037774  022704  000003                  CMP     #3,R4           ;DID THIS MAKE TRK COUNT > 1 CYLINDER?
10373  040000  001003                          BNE     6$              ;NO - SKIP
10374  040002  005004                          CLR     R4              ;ELSE CLEAR TRACK COUNT
10375  040004  005237  050042                  INC     EXPCYL          ;BUMP CYLINDER COUNT
10376  040010  005301                  6$:     DEC     R1              ;DEC COUNT
10377  040012  001363                          BNE     5$              ;IF ZERO - EXIT
10378  040014  010437  050046                  MOV     R4,EXPTRK       ;STORE EXPECTED TRACK
```

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10379  040020  010537  050044                    MOV     R5,EXPSEC       ;STORE EXPECTED SECTOR (CYL ALREADY SLOW)
10380  040024  023737  001560  050042            CMP     T.DCYL,EXPCYL   ;TEST IF CYLINDER OK
10381  040032  001403                            BEQ     7$              ;YES - SKIP
10382  040034  052737  000010  050072            BIS     #CYLERR,GRP4ER  ;NO - SET ERROR FLAG
10383  040042  120437  001547          7$:       CMPB    R4,T.DA+1       ;TEST TRACK OK
10384  040046  001403                            BEQ     8$              ;YES - SKIP
10385  040050  052737  000020  050072            BIS     #TRKERR,GRP4ER  ;NO - SET ERROR FLAG
10386  040056  120537  001546          8$:       CMPB    R5,T.DA         ;TEST SECTOR COUNT OK
10387  040062  001403                            BEQ     9$              ;YES - SKIP
10388  040064  052737  000040  050072            BIS     #SECERR,GRP4ER  ;USE SET ERROR FLAG
10389  040072  012700  050050          9$:       MOV     #REALWC,R0
10390  040076  013720  001542                    MOV     T.WC,(R0)+      ;STORE REAL WORD COUNT
10391  040102  013720  001544                    MOV     T.BA,(R0)+      ;STORE REAL BUS ADDRESS
10392  040106  013720  001560                    MOV     T.DCYL,(R0)+    ;STORE REAL CYLINDER ADDRESS
10393  040112  113710  001547                    MOVB    T.DA+1,(R0)     ;STORE REAL TRACK ADDRESS
10394  040116  005720                            TST     (R0)+
10395  040120  113710  001546                    MOVB    T.DA,(R0)       ;STORE REAL SECTOR ADDRESS
10396  040124  104414                            RESREG
10397  040126  000204                            RTS     R4
10398
10399                                    .SBTTL  OPERATION CHECK ROUTINE
10400                                    ;*      THIS IS WHERE ALL HARDWARE ERROR INDICATORS AND SOME  SOFTWARE
10401                                    ;*      ERRORS ARE CHECKED. THE GENERAL PROCEDURE FLOW IS AS FOLLOWS:
10402                                    ;*      THE ROUTINE IS CALLED WITH A TRAP (TCHKOP). THE LOCATION
10403                                    ;*      FOLLOWING THE TRAP CALL WILL HAVE AN ERROR TRAP WHICH
10404                                    ;*      THE ROUTINE WILL BYPASS IF NO ERROR IS FOUND. IF AN
10405                                    ;*      ERROR IS DETECTED, THE ERROR TRAP CALL IS MODIFIED
10406                                    ;*      BY THIS ROUTINE SUCH THAT THE ERROR TABLE ITEM WILL
10407                                    ;*      BE THE PROPER ITEM FOR  THE FORMAT REQUIRED BY THIS
10408                                    ;*      ERROR. THE ERROR TRAP WILL BE MADE EITHER ERROR 4,5,6,
10409                                    ;*      7, OR 10. REFER TO THE ERROR ITEM TABLE FOR A DESCRIPTION
10410                                    ;*      OF THE FORMAT AND WHICH ERRORS ARE DISPLAYED IN WHAT
10411                                    ;*      FORMAT.
10412
10413  040130  104413                    CHKWE:  SAVREG
10414  040132  011600                            MOV     (SP),R0         ;GET POINTER TO ERROR WORDS
10415  040134  012037  001242                    MOV     (R0)+,$TMP10    ;STORE EXPECTED ERROR GROUP 1
10416  040140  012037  001244                    MOV     (R0)+,$TMP11    ;STORE EXPECTED ERROR GROUP 2
10417  040144  012037  001246                    MOV     (R0)+,$TMP12    ;STORE EXPECTED ERROR GROUP 3
10418  040150  010016                            MOV     R0,(SP)         ;STORE RETURN
10419  040152  012737  177777  001250            MOV     #-1,$TMP13      ;SET FLAG - EXPECTED ERROR
10420  040160  000403                            BR      CHKST
10421
10422  040162  104413                    CHKOP:  SAVREG
10423  040164  005037  001250                    CLR     $TMP13          ;RESET EXPECTED ERROR FLAG
10424
10425  040170  104420                    CHKST:  TGETRK                  ;GET 611 REGS IO TRAP
10426  040172  005037  050064                    CLR     GRP1ER          ;CLEAR ERROR FLAGS
10427  040176  005037  050066                    CLR     GRP2ER
10428  040202  005037  050070                    CLR     GRP3ER
10429  040206  005037  050072                    CLR     GRP4ER
10430  040212  005037  050206                    CLR     GPSUMF          ;CLEAR SUMMARY FLAGS
10431  040216  032737  024000  001540            BIT     #CS1ERBIT,T.CS1 ;TEST IF ERROR SET IN CS1
10432  040224  001111                            BNE     4$              ;YES - SKIP
10433  040226  032737  177400  001550            BIT     #CS2ERBIT,T.CS2 ;TEST IF ERROR SET IN CS2
10434  040234  001105                            BNE     4$              ;YES - SKIP
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10435  040236  032737  000070  001552          BIT     #DSERBIT,T.DS   ;TEST IF ERROR SET IN DS
10436  040244  001101                          BNE     4$              ;YES - SKIP
10437  040246  005737  001554                  TST     T.ER            ;TEST IF ERROR SET IN ER
10438  040252  001076                          BNE     4$              ;YES - SKIP
10439  040254  032737  100000  001540          BIT     #CERR,T.CS1     ;COMBINED ERROR SET?
10440  040262  001405                          BEQ     9$              ;NO - SKIP
10441  040264  052737  100000  050064          BIS     #CERNER,GRP1ER  ;SET ERROR FLAG IN GROUP 1
10442  040272  000137  041022                  JMP     25$             ;SKIP
10443
10444                                  ;       CODE TO CHECK WORD COUNT, BUFFER ADDRESS, CYLINDER, TRACK,
10445                                  ;       AND SECTOR AT THE END OF THE OPERATION. THIS IS DONE ONLY
10446                                  ;       IF CERR NOT SET BY THE OPERATION.
10447                                  ;
10448                                  ;       ALL OF THE ABOVE CONDITIONS ARE CHECKED AND A BIT SET FOR
10449                                  ;       EACH CHECK THAT FAILS. HOWEVER, ONLY ONE ERROR IS REPORTED.
10450                                  ;       THE ORDER OF PRIORITY FOR REPORTING THE ERROR IS THE ORDER
10451                                  ;       LISTED ABOVE.
10452
10453  040276  005737  001250          9$:     TST     $TMP13          ;TEST IF ERROR EXPECTED
10454  040302  001402                          BEQ     62$             ;NO - SKIP
10455  040304  000137  041022                  JMP     25$             ;YES - JUMP
10456  040310  013700  001540          62$:    MOV     T.CS1,R0        ;GET CS1
10457  040314  042700  177741                  BIC     #177741,R0      ;CHECK IF OPERATION IS READ DATA,
10458  040320  022700  000020                  CMP     #20,R0          ;WRITE DATA, OR WRITE CHECK. IF
10459  040324  002445                          BLT     3$              ;NOT, SKIP ALL CHECKING IN GROUP
10460  040326  022700  000030                  CMP     #30,R0          ;FOUR
10461  040332  003042                          BGT     3$
10462  040334  004437  037376                  JSR     R4,CHKWC        ;CHECK WORD COUNT
10463  040340  000000                          .WORD   0               ;EXPECTED WORD COUNT
10464  040342  004437  037430                  JSR     R4,CHKBA        ;CHECK BUS ADDRESSS
10465  040346  004437  037642                  JSR     R4,CHKCTS       ;CHECK CY', TRACK, & SECTOR
10466  040352  005737  050072                  TST     GRP4ER          ;ANY GROUP 4 ERRORS?
10467  040356  001430                          BEQ     3$              ;NO - SKIP
10468  040360  016037  050210  061072          MOV     CMNDLB(R0),DF010A ;LOAD ADDRESS OF COMMAND MESSAGE
10469  040366  013700  050072                  MOV     GRP4ER,R0       ;PUT GROUP 4 ERROR FLAG IN R0
10470  040372  005001                          CLR     R1              ;CLEAR R1 FOR INDEX COUNTER
10471  040374  006200                  1$:     ASR     R0              ;SHIFT FLAGS - FIRST ONE ON RIGHT IS ERROR TO
10472  040376  103402                          BCS     2$              ;BE REPORTED, REST ARE IGNORED
10473  040400  005720                          TST     (R0)+           ;WHEN AN ERROR BIT IS FOUND,
10474  040402  000774                          BR      1$              ;GET THE ERROR MESSAGE ASSOCIATED
10475  040404  016037  050074  001450  2$:     MOV     GRP4MS(R0),EM10N ;WITH IT AND SET ERROR TABLE ITEM TO
10476  040412  016037  050034  001202          MOV     EXPWC(R0),$REG10 ;POINT TO THE MESSAGE. LOAD REG10 & 11
10477  040420  016037  050050  001204          MOV     REALWC(R0),$REG11 ;WITH EXPECTED & IS VALUES
10478  040426  104414                          RESREG                  ;RESTORE REGISTER
10479  040430  012776  000010  000000          MOV     #10,@(SP)       ;MAKE THE ERROR CALL POINT TO THE
10480  040436  000002                          RTI                     ;RIGHT TABLE ENTRY & RETURN.
10481  040440                          3$:
10482  040440  104414                          RESREG
10483  040442  062716  000002                  ADD     #2,(SP)         ;BUMP RETURN PAST ERROR
10484  040446  000002                          RTI                     ;RETURN
10485
10486                                  ;       THE FOLLOWING CODE BUILDS THE GROUP 1,2, & 3 ERROR WORDS.
10487
10488  040450  012700  050064          4$:     MOV     #GRP1ER,R0      ;SET UP GENERAL REGISTER AS POINTER
10489  040454  012701  001540                  MOV     #T.CS1,R1       ;CS1
10490  040460  012703  001550                  MOV     #T.CS2,R3       ;CS2
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10491  040464  012704  001552              MOV     #T.DS,R4        ;DS
10492  040470  012705  001554              MOV     #T.ER,R5        ;AND ER
10493
10494  040474  051510                      BIS     (R5),(R0)       ;SET ALL BITS IN GRP1ER THAT
10495                                                               ;CORRESPOND TO ERROR BITS IN RKER
10496  040476  042710  120701              BIC     #ILF!ECH.BSE.HVRC.OPI.DCK,(R0) ; CLEAR ALL THAT DON'T BELONG GRP1
10497
10498  040502  032711  020000              BIT     #SPAR,(R1)      ;TEST IF SPAR SET
10499  040506  001402                      BEQ     5$              ;NO - SKIP
10500  040510  052710  000001              BIS     #SPARERR,(R0)   ;SET SPAR ERROR FLAG
10501
10502  040514  032714  000010      5$:     BIT     #ACLO,(R4)      ;TEST ACLO SET
10503  040520  001402                      BEQ     6$              ;NO - SKIP
10504  040522  052710  000100              BIS     #ACLOERR,(R0)   ;SET ACLO ERROR FLAG
10505
10506  040526  032714  000020      6$:     BIT     #SPDLSS,(R4)    ;TEST SPEED LOSS SET
10507  040532  001402                      BEQ     7$              ;NO - SKIP
10508  040534  052710  000200              BIS     #SPDERR,(R0)    ;SET SPEED LOSS ERROR FLAG
10509
10510  040540  032714  000040      7$:     BIT     #DROT,(R4)      ;TEST IF DROT SET
10511  040544  001402                      BEQ     8$              ;NO - SKIP
10512  040546  052710  000400              BIS     #DROTERR,(R0)   ;SET DROT ERROR FLAG
10513
10514  040552  032711  100000      9$:     BIT     #CERR,(R1)      ;TEST CERR ITSELF SET
10515  040556  001002                      BNE     10$             ;YES - SKIP
10516  040560  032710  020000              BIT     #NCERWE,(R0)    ;SET NO CERR WITH ERROR FLAG
10517
10518  040564  012700  050066      10$:    MOV     #GRP2ER,R0      ;SET POINTER TO GROUP 2 ERROR FLAGS
10519
10520  040570  032715  000100              BIT     #ECH,(R5)       ;TEST IF ECH SET
10521  040574  001402                      BEQ     11$             ;NO - SKIP
10522  040576  052710  000001              BIS     #ECHERR,(R0)    ;SET ECH FLAG
10523
10524  040602  032715  100000      11$:    BIT     #DCK,(R5)       ;TEST DCK SET
10525  040606  001402                      BEQ     12$             ;NO - SKIP
10526  040610  052710  000002              BIS     #DCKERR,(R0)    ;SET DCK ERROR FLAG.
10527
10528  040614  032713  040000      12$:    BIT     #WCE,(R3)       ;TEST WRITE CHECK ERROR
10529  040620  001402                      BEQ     120$            ;NO - SKIP
10530  040622  052710  000004              BIS     #WCKERR,(R0)    ;SET WCE BIT
10531  040626  032713  100000      120$:   BIT     #DLT,(R3)       ;TEST DATA LATE
10532  040632  001402                      BEQ     13$             ;NO - SKIP
10533  040634  052710  000010              BIS     #DLTERR,(R0)    ;SET DLT ERROR FLAG
10534
10535  040640  032715  020000      13$:    BIT     #OPI,(R5)       ;TEST OPI SET
10536  040644  001402                      BEQ     14$             ;NO - SKIP
10537  040646  052710  000020              BIS     #OPIERR,(R0)    ;SET OPI ERROR FLAG
10538
10539  040652  032715  000400      14$:    BIT     #HVRC,(R5)      ;TEST HVRC SET
10540  040656  001402                      BEQ     16$             ;NO - SKIP
10541  040660  052710  000040              BIS     #HVRCERR,(R0)   ;SET HVRC FLAG
10542
10543  040664  032715  000200      16$:    BIT     #BSE,(R5)       ;TEST BSE ERROR FLAG
10544  040670  001402                      BEQ     17$             ;NO - SKIP
10545  040672  052710  000100              BIS     #BSERR,(R0)     ;SET BSE FLAG
10546
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10547  040676  012700  050070          17$:    MOV     #GRP3ER,R0      ;SET POINTER TO GROUP 3 FLAGS
10548
10549  040702  032713  010000                  BIT     #NED,(R3)       ;TEST NED SET
10550  040706  001402                          BEQ     18$             ;NO - SKIP
10551  040710  052710  000001                  BIS     #NEDERR,(R0)    ;SET NED FLAG
10552
10553  040714  032711  004000          18$:    BIT     #CTO,(R1,       ;TEST CTO SET
10554  040720  001402                          BEQ     19$             ;NO - SKIP
10555  040722  052710  000002                  BIS     #CTOERR,(R0)    ;SET CTO FLAG
10556
10557  040726  032713  000400          19$:    BIT     #UFE,(R3)       ;TEST UFE SET
10558  040732  001402                          BEQ     20$             ;NO - SKIP
10559  040734  052710  000004                  BIS     #UFERR,(R0)     ;SET UFE FLAG
10560
10561  040740  032713  001000          20$:    BIT     #MDS,(R3)       ;TEST MDS SET
10562  040744  001402                          BEQ     21$             ;NO - SKIP
10563  040746  052710  000010                  BIS     #MDSERR,(R0)    ;SET MDE FLAG
10564
10565  040752  032713  002000          21$:    BIT     #PGE,(R3)       ;TEST PGE SET
10566  040756  001402                          BEQ     22$             ;NO - SKIP
10567  040760  052710  000020                  BIS     #PGERR,(R0)     ;SET PGE FLAG
10568
10569  040764  032713  004000          22$:    BIT     #NEM,(R3)       ;TEST NEM SET
10570  040770  001402                          BEQ     23$             ;NO - SKIP
10571  040772  052710  000040                  BIS     #NEMERR,(R0)    ;SET NEM FLAG
10572
10573  040776  032713  020000          23$:    BIT     #UPE,(R3)       ;TEST UPE SET
10574  041002  001402                          BEQ     24$             ;NO - SKIP
10575  041004  052710  000100                  BIS     #UPERR,(R0)     ;SET UPE FLAG
10576
10577  041010  032715  000001          24$:    BIT     #ILF,(R5)       ;TEST ILF SET
10578  041014  001402                          BEQ     25$             ;NO - SKIP
10579  041016  052710  000200                  BIS     #ILFERR,(R0)    ;SET ILF FLAG.
10580
10581                                  ;       THE FOLLOWING CODE IS EXECUTED ONLY IF ERRORS WERE EXPECTED.
10582                                  ;       THE FLAG IN $TMP13 INDICATES IF
10583                                  ;       AN ERROR WAS EXPECTED AND THE CONTENTS OF TMP10,
10584                                  ;       TEMP11, & TEMP12 SPECIFY WHICH ERRORS. THESE ARE COMPARED AGAINST
10585                                  ;       THE ERRORS FOUND AND STORED IN GRP1ER, GRP2ER, AND GRP3ER.
10586                                  ;       THE CONTENTS OF GRP1,2, & 3 ARE MODIFIED TO INDICATE ERRORS THAT
10587                                  ;       OCCURRED BUT WERE NOT EXPECTED. THE CONTENTS OF $TMP10,11,
10588                                  ;       & 12 ARE MODIFIED TO INDICATE EXPECTED ERRORS THAT DID NOT
10589                                  ;       OCCUR. BOTH CONDITIONS CAN EXIST AT THE SAME TIME AND MUST
10590                                  ;       BE REPORTED.
10591
10592  041022  005737  001250          25$:    TST     $TMP13          ;CHECK IF AN ERROR WAS EXPECTED
10593  041026  001423                          BEQ     110$            ;NO - SKIP
10594  041030  012704  050064                  MOV     #GRP1ER,R4      ;GET ADDRESS OF ERROR
10595  041034  012705  001242                  MOV     #$TMP10,R5      ;GET ADDRESS OF EXPECTED ERRORS
10596
10597  041040  011500                  26$:    MOV     (R5),R0         ;GET EXPECTED ERROR
10598  041042  011401                          MOV     (R4),R1         ;GET GROUP ERROR FLAGS
10599  041044  020001                          CMP     R0,R1           ;ARE THEY EQUAL?
10600  041046  001003                          BNE     27$             ;NO - SKIP
10601  041050  005000                          CLR     R0              ;CLEAR EXPECTED ED
10602  041052  005001                          CLR     R1              ;CLEAR OCCURED
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10603  041054  000403                    BR      28$
10604
10605  041056  010003            27$:    MOV     R0,R3           ;STORE EXPECTED ERRORS
10606  041060  C40100                    BIC     R1,R0           ;RESET EXPECTED THAT OCCURRED
10607  041062  040301                    BIC     R3,R1           ;RESET OCCURRED THAT EXPECTED
10608  041064  010025            28$:    MOV     R0,(R5)+        ;STORE EXPECTED THAT DID NOT OCCUR
10609  041066  C10124                    MOV     R1,(R4)+        ;STORE OCCURRED THAT WERE NOT EXPECTED
10610  041070  022705  001250            CMP     #$TMP13,R5      ;ALL GROUPS CHECKED.
10611  041074  001361                    BNE     26$             ;NO - LOOP
10612
10613                              ;       THE FOLLOWING CODE:
10614                              ;
10615                              ;       A. DETERMINES WHICH FORMAT IS TO BE USED
10616                              ;       B. LOADS THE ADDRESSES OF THE ASCIZ TEXT INTO THE SELECTED
10617                              ;          ERROR TABLE ITEM AND FORMAT FIELD
10618                              ;       C. COUNTS THE NUMBER OF ERRORS THAT MUST BE REPORTED
10619                              ;       D. GETS DRIVE STATUS IF GROUP 1 ERROR.
10620                              ;
10621                              ;       THE DECISION OF WHICH ERROR IS TO BE USED
10622                              ;       IS BASED ON THE ERROR GROUP (OR GROUPS) THAT HAVE
10623                              ;       F AGS SET. IF ANY BIT IS SET IN GROUP 1,2, OR 3, GROUP 1 FORMAT (ERROR 4 OR 5)
10624                              ;       WILL BE USED; ANY SET IN GROUP 2 OR 3, GROUP 2 (ERROR 6) WILL BE USED; AND A
10625                              ;       FLAG SET IN GROUP 3 ONLY, GROUP 3 (ERROR 7) IS USED.
10626                              ;
10627                              ;       THE FORMAT TO BE USED IN THE CONTROLLING FACTOR IN HOW THE
10628                              ;       ERROR TRAP IS CHANGED IN THE MAIN CALL. IF GROUP 1 FORMAT IS
10629                              ;       USED THE ERROR TRAP WILL BE CHANGED TO ERROR 4 OR 5(DEPENDING ON
10630                              ;       AVAILABILITY OF DRIVE STATUS), GROUP 2 FORMAT WILL BE ERROR
10631                              ;       6, AND GROUP 3 WILL BE ERROR 7. ONLY THE LOW ORDER BYTE
10632                              ;       OF THE ERROR TRAP WILL BE ALTERED. THE SP WILL BE
10633                              ;       POINTING TO THE LOCATION THAT CONTAINS THE ERROR CALL TRAP.
10634                              ;
10635                              ;       IF THE STATUS IS READ FROM THE DRIVE WITH NO PROBLEM,
10636                              ;       ERROR 4 IS USED. IF ANY ERROR IS ENCOUNTERED READING
10637                              ;       STATUS, ERROR 5 IS USED. ERROR 5 INCLUDES A WARNING MESSAGE.
10638
10639  041076  005004            110$:   CLR     R4              ;CLEAR COUNTERS
10640  041100  005005                    CLR     R5
10641  041102  012700  001224            MOV     #$TMP1,R0       ;LOAD POINTERS FOR TEMPORARY STORAGE OF ADDRESS
10642  041106  012701  001226            MOV     #$TMP2,R1       ;WHERE ASCIZ ADDRESSES GO
10643  041112  012703  050206            MOV     #GPSUMF,R3      ;POINTERS TO GROUP SUMMARY FLAGS
10644  041116  012710  061052            MOV     #DF007A,(R0)    ;PRESET FOR GRP3 ERR MESSAGE BUILD
10645  041122  012711  001442            MOV     #DH7N,(R1)
10646  041126  013746  050070            MOV     GRP3ER,-(SP)    ;GET GROUP 3 ERRORS, PUT ON STACK
10647  041132  004437  036242            JSR     R4,BITCNT       ;GO COUNT NUMBER AT ERRORS
10648  041136  005716                    TST     (SP)            ;ANY ERRORS?
10649  041140  001403                    BEQ     29$             ;NO - SKIP
10650  041142  061605                    ADD     (SP),R5         ;ADD IN ERROR TOTAL
10651  041144  052713  000004            BIS     #GRP3ST,(R3)    ;SET BIT TO INDICATE GROUP 3 ERROR
10652
10653  041150  005726            29$:    TST     (SP)+           ;CLEAR OFF STACK
10654  041152  005737  001250            TST     $TMP13          ;ERROR EXPECTED
10655  041156  001412                    BEQ     31$             ;NO - SKIP
10656  041160  013746  001246            MOV     $TMP2,-(SP)     ;PUT GROUP 3 NOT RECEIVED ERRORS ON STACK
10657  041164  004437  036242            JSR     R4,BITCNT       ;COUNT NUMBER OF ERRORS.
10658  041170  005716                    TST     (SP)            ;WERE THERE ANY
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10659  041172  001403                    BEQ     30$             ;NO - SKIP
10660  041174  052713  000040            BIS     #GP3NR,(R3)     ;SET GROUP 3 NOT RECEIVED ERROR FLAG
10661  041200  061604                    ADD     (SP),R4         ;ADD COUNT TO TOTAL THESE
10662
10663  041202  005726            30$:    TST     (SP)+           ;CLEAR OFF STACK
10664  041204  013746  050066    31$:    MOV     GRP2ER,-(SP)    ;GET GROUP 2 ERRORS FOR COUNTING
10665  041210  004437  036242            JSR     R4,BITCNT       ;COUNT BITS
10666  041214  005716                    TST     (SP)            ;ANY SET?
10667  041216  001407                    BEQ     32$             ;NO - SKIP
10668  041220  052713  000002            BIS     #GRP2ST,(R3)    ;SET FLAG FOR GROUP 2 ERRORS
10669  041224  061605                    ADD     (SP),R5         ;ADD INTO TOTAL
10670  041226  012710  061026            MOV     #DF006A,(R0)    ;STORE ADDRESS FOR BUILDING REPORT
10671  041232  012711  001432            MOV     #DH6N,(R1)
10672
10673  041236  005726            32$:    TST     (SP)+           ;CLEAR OFF STACK
10674  041240  005737  001250            TST     $TMP13          ;ANY EXPECTED ERRORS
10675  041244  001416                    BEQ     34$             ;NO - SKIP
10676  041246  013746  001244            MOV     $TMP11,-(SP)    ;GET GROUP 2 NOT RECEIVED ERRORS
10677  041252  004437  036242            JSR     R4,BITCNT       ;COUNT NUMBER OF BITS
10678  041256  005716                    TST     (SP)            ;ANY SET?
10679  041260  001407                    BEQ     33$             ;NO - SKIP
10680  041262  052713  000020            BIS     #GP2NR,(R3)     ;SET FLAG FOR GROUP 2 NOT RECEIVED
10681  041266  061604                    ADD     (SP),R4         ;ADD INTO TOTAL
10682  041270  012710  061026            MOV     #DF006A,(R0)    ;STORE ADDRESS FOR BUILDING REPORT
10683  041274  012711  001432            MOV     #DH6N,(R1)
10684
10685  041300  005726            33$:    TST     (SP)+           ;CLEAR OFF STACK
10686  041302  013746  050064    34$:    MOV     GRP1ER,-(SP)    ;GET GROUP 1 ERROR FLAGS
10687  041306  004437  036242            JSR     R4,BITCNT       ;COUNT THE NUMBER OF BITS
10688  041312  005716                    TST     (SP)            ;ANY SET?
10689  041314  001407                    BEQ     35$             ;NO - SKIP
10690  041316  052713  000001            BIS     #GRP1ST,(R3)    ;SET FLAG FOR GROUP 1 ERRORS SET
10691  041322  061605                    ADD     (SP),R5         ;ADD INTO TOTAL
10692  041324  012710  060742            MOV     #DF004A,(R0)    ;LOAD ADDRESS FOR BUILDING REPORT
10693  041330  012711  001412            MOV     #DH4N,(R1)
10694  041334  005726            35$:    TST     (SP)+           ;CLEAR OFF STACK
10695  041336  005737  001250            TST     $TMP13          ;ANY EXPECTED ERRORS?
10696  041342  001416                    BEQ     60$             ;NO - SKIP
10697  041344  013746  001242            MOV     $TMP10,-(SP)    ;GET GROUP 1 NO RECEIVED ERROR
10698  041350  004437  036242            JSR     R4,BITCNT       ;COUNT # OF BITS
10699  041354  005716                    TST     (SP)            ;ANY SET?
10700  041356  001407                    BEQ     36$             ;NO - SKIP
10701  041360  052713  000010            BIS     #GP1NR,(R3)     ;SET FLAG FOR GROUP 1 NOT RECEIVED
10702  041364  061604                    ADD     (SP),R4         ;ADD INTO TOTAL
10703  041366  012710  060742            MOV     #DF004A,(R0)    ;LOAD ADDRESS FOR BUILDING REPORT
10704  041372  012711  001412            MOV     #DH4N,(R1)
10705  041376  005726            36$:    TST     (SP)+           ;CLEAR OFF STACK.
10706  041400  032713  000011    60$:    BIT     #GRP1ST!GP1NR,(R3) ;ANY GROUP 1 ERROR
10707  041404  001414                    BEQ     52$             ;NO - SKIP
10708  041406  042713  040000            BIC     #DRSTER,(R3)
10709  041412  004437  036762            JSR     R4,GETDRS
10710  041416  000401                    BR      51$             ;ERROR RETURN
10711  041420  000406                    BR      52$             ;NO ERROR RETURN
10712  041422  012710  060772    51$:    MOV     #DF005A,(R0)    ;CHANGE TO FORMAT 5 - STORE ADDRESS
10713  041426  012711  001422            MOV     #DH5N,(R1)      ;FOR BUILDING REPORT
10714  041432  052713  040000            BIS     #DRSTER,(R3)    ;SET DRIVE STATUS ERROR
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10715  041436                          52$:
10716
10717                                  ;       THE ERRORS ARE COUNTED, FLAGS SET TO INDICATE WHICH ERRORS
10718                                  ;       ARE TO BE REPORTED, AND THE ERROR FORMAT HAS BEEN SELECTED.
10719                                  ;       THE FOLLOWING CODE WILL TYPE ALL THE ERRORS, LOAD THE
10720                                  ;       PROPER HEADER MESSAGE ADDRESS IN THE ERROR ITEM TABLE
10721                                  ;       AND LOAD THE PROPER HEADER MESSAGE ADDRESS IN THE PROPER
10722                                  ;       DF TABLE.
10723                                  ;
10724                                  ;       AT THIS TIME
10725                                  ;           R5 CONTAINS EITHER THE NUMBER OF ERRORS THAT OCCURRED BUT WERE
10726                                  ;               NOT EXPECTED OR
10727                                  ;               THE NUMBER OF ERRORS THE OCCURRED IF NONE WERE EXPECTED
10728                                  ;           R4 CONTAINS THE NUMBER OF ERRORS THAT WERE EXPECTED BUT
10729                                  ;               DID NOT OCCUR.
10730                                  ;           $TMP10 CONTAINS GROUP 1 ERRORS THAT WERE EXPECTED BUT DID NOT OCCUR
10731                                  ;           $TMP11 CONTAINS GROUP 2 ERRORS THAT WERE EXPECTED BUT DID NOT OCCUR
10732                                  ;           $TMP12 CONTAINS GROUP 3 ERRORS THAT WERE EXPECTED BUT DID NOT OCCUR
10733                                  ;           GRP1ER CONTAINS GROUP 1 ERRORS THAT OCCURRED OR OCCURRED AND WERE NOT EXPECT
10734                                  ;           GRP2ER CONTAINS GROUP 2 ERRORS THAT OCCURRED OR OCCURRED AND WERE NOT EXPECT
10735                                  ;           GRP3ER CONTAINS GROUP 3 ERRORS THAT OCCURRED OR OCCURRED AND WERE NOT EXPECT
10736                                  ;       (R1)=#$TMP2 CONTAINS THE ADDRESS OF THE HEADER MESSAGE ADDRESS IN
10737                                  ;               DF THAT MUST BE ALTERED TO IDENTIFY THE OPERATION
10738                                  ;       (R0)=#$TMP1 CONTAINS THE ADDRESS OF THE HEADER MESSAGE ADDRESS IN
10739                                  ;               THE ERROR ITEM TABLE THAT MUST BE ALTERED TO PROVIDE A
10740                                  ;               PROPER MESSAGE TO REPORT.
10741                                  ;       (R3)=#GRSUMF CONTAIN FLAGS TO INDICATE WHICH OF THE GROUP
10742                                  ;               ERROR FLAG FIELDS HAVE ERROR BITS STORED.
10743  041436  032777  020000  137474          BIT     #SW13,@SWR      ;IS REPORT INHIBITED?
10744  041444  001402                          BEQ     37$             ;NO - SKIP
10745  041446  000137  042034                  JMP     49$             ;ELSE EXIT
10746  041452  005737  001250          37$:    TST     $TMP13          ;WERE ERRORS EXPECTED?
10747  041456  001004                          BNE     38$             ;YES - SKIP
10748
10749                                  ;       IF NO ERRORS WERE EXPECTED, $TMP10,11, &12 ARE NOT MEANINGFUL
10750
10751  041460  012771  057745  000000          MOV     #DH007,@(R1)    ;HEADER = ERROR IN OPERATION
10752  041466  000411                          BR      39$
10753  041470  012771  057566  000000  38$:    MOV     #DH005,@(R1)    ;PRESET HDRMSG = EXPECTED NOT SET
10754  041476  032713  000070                  BIT     #GP1NR.GP2NR.GP3NR,(R3) ;ANY NOT RECEIVED ERRORS?
10755  041502  001003                          BNE     39$             ;YES - SKIP
10756  041504  012771  057663  000000          MOV     #DH006,@(R1)    ;SET MESSAGE TO UNEXPECTED ERROR SET
10757  041512  013701  001540          39$:    MOV     T.CS1,R1        ;GET CS1
10758  041516  042701  177741                  BIC     #177741,R1      ;CLEAR ALL BUT COMMAND
10759
10760  041522  016170  050210  000000          MOV     CMNDLB(R1),@(R0) ;MOVE ADDRESS OF COMMAND MESSAGE
10761                                                                  ;INTO REPORT
10762  041530  032713  000007                  BIT     #GRP1ST.GRP2ST.GRP3ST,(R3) ;ANY GPR ERRORS?
10763  041534  001462                          BEQ     46$             ;NO - SKIP GPR REPORT
10764
10765                                  ;       PRINT ALL THE ERRORS CONTAINED IN THE GPR1,2,3ER(UNEXPECTED ERRORS)
10766
10767  041536  013701  050070                  MOV     GRP3ER,R1       ;GET GROUP 3 ERROR FLAGS
10768  041542  012700  050110                  MOV     #GRP3MS,R0      ;SET POINTER TO GRP3 ERROR MESSAGES
10769  041546  005037  001252          140$:   CLR     $TMP14          ;CLEAR GROUP PRINTING INDICATOR
10770  041552  012737  000021  001254  40$:    MOV     #17.,$TMP15     ;PRESET SHIFT COUNT
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10771  041560  000241                    CLC                 ;CLEAR CARRY
10772  041562  006001            41$:    ROR     R1          ;ROTATE ERROR FLAGS
10773  041564  103406                    BCS     42$         ;WAS BIT SHIFTED OUT SET?
10774  041566  062700  000002            ADD     #2,R0       ;NO - BUMP POINTER
10775  041572  005337  001254    141$.   DEC     $TMP15      ;DEC SHIFT COUNT
10776  041576  001371                    BNE     41$         ;LOOP IF SHIFT NOT ZERO
10777  041600  000411                    BR      44$
10778  041602  011037  041614    42$:    MOV     (R0),43$    ;GET ERROR MESSAGE ADDRESS FROM TABLE
10779  041606  104401  001273            TYPE    ,$CRLF      ;TYPE CRLF
10780  041612  104401                    TYPE                ;TYPE ERROR MESSAGE
10781  041614  000000            43$:    .WORD               ;MESSAGE ADDRESS GOES HERE
10782  041616  005305                    DEC     R5          ;DECEREMENT TOTAL ERROR COUNT.
10783  041620  001362                    BNE     141$        ;LOOP IF ZERO
10784  041622  000427                    BR      46$         ;ELSE EXIT GPR ERROR PRINT LOOP
10785
10786  041624  005713            44$:    TST     (R3)        ;TEST GPSUMF FLAG FOR PRINTING ERROR NOT RECEIVED
10787  041626  100455                    BMI     47$         ;YES - SKIP
10788  041630  005737  001252            TST     $TMP14      ;PRINTING GROUP 3?
10789  041634  001007                    BNE     45$         ;NO -SKIP
10790  041636  013701  050066            MOV     GRP2ER,R1   ;ELSE SET TO GROUP 2, GET GRP2ER
10791  041642  012700  050130            MOV     #GRP2MS,R0  ;& SET POINTER TO GROUP 2 ERROR MESSAGE TABLE
10792  041646  005237  001252            INC     $TMP14      ;BUMP TO INDICATE PRINTING GROUP 2
10793  041652  000737                    BR      40$         ;GO RESTART PRINT LOOP
10794  041654  022737  000002  001252  45$:    CMP     #2,$TMP14   ;PRINTING GROUP 1?
10795  041662  001407                    BEQ     46$         ;YES - EXIT GPR ERROR PRINT LOOP.
10796  041664  013701  050064            MOV     GRP1ER,R1   ;ELSE SET TO GROUP 1, GET GROUP 1 ERROR
10797  041670  012700  050146            MOV     #GRP1MS,R0  ;SET POINTER TO GROUP 1 ERROR MESSAGE TABLE
10798  041674  005237  001252            INC     $TMP14      ;BUMP TO INDICATE PRINTING GROUP 1
10799  041700  000724                    BR      40$         ;RESTART PRINT LOOP.
10800
10801  041702  005737  001250    46$:    TST     $TMP13      ;EXPECTING ERRORS?
10802  041706  001452                    BEQ     49$         ;NO - SKIP
10803
10804                           ;        PRINT ALL ERRORS CONTAINED IN $TMP10, 11, 12(NOT RECEIVED ERRORS)
10805
10806  041710  005713                    TST     (R3)        ;TEST IF PRINTING NOT RECEIVED ERRORS
10807  041712  100423                    BMI     47$         ;YES - SKIP
10808  041714  032713  000070            BIT     #GP1NR!GP2NR!GP3NR,(R3) ;ANY NOT RECEIVED ERRORS
10809  041720  001445                    BEQ     49$         ;NO - SKIP
10810  041722  032713  000007            BIT     #GRP1ST!GRP2ST!GRP3ST,(R3) ;ANY NOT RECEIVED ERRORS?
10811  041726  001404                    BEQ     146$        ;NO - SKIP LABEL FOR UNEXPECTED ERRORS
10812  041730  104401  001273            TYPE    ,$CRLF      ;TYPE CRLF
10813  041734  104401  057663            TYPE    ,DH006      ;TYPE HEADER FOR PREVIOUS ERRORS
10814  041740  052737  100000  050206  146$:    BIS     #REPNR,GPSUMF   ;SET PRINTING NOT RECEIVED ERRORS SWITCH
10815  041746  010405                    MOV     R4,R5       ;MOVE TOTAL ERRORS TO R5
10816  041750  013701  001246            MOV     $TMP12,R1   ;GET GRP3 NOT RECEIVED ERRORS
10817  041754  012700  050110            MOV     #GRP3MS,R0  ;SET POINTER TO GROUP 3 MESSAGES
10818  041760  000672                    BR      140$        ;GO START PRINT LOOP
10819  041762  005737  001252    47$:    TST     $TMP14      ;PRINTING GROUP 3?
10820  041766  001007                    BNE     48$         ;NO - SKIP
10821  041770  013701  001244            MOV     $TMP11,R1   ;ELSE SETUP TO PRINT GROUP 2 - GET ERRORS
10822  041774  012700  050130            MOV     #GRP2MS,R0  ;& SET POINTER TO GROUP 2 MESSAGE TABLE
10823  042000  005237  001252            INC     $TMP14      ;BUMP TO INDICATE GROUP 2 PRINTING
10824  042004  000662                    BR      40$         ;GO START PRINT LOOP
10825  042006  022737  000002  001252  48$:    CMP     #2,$TMP14   ;PRINTING GROUP 1?
10826  042014  001407                    BEQ     49$         ;YES - EXIT LOOP
```

```
10827  042016  013701  001242          MOV     $TMP10,R1       ;SET POINTER TO GROUP 1 MESSAGE
10828  042022  012700  050146          MOV     #GRP1MS,R0      ;TABLE AND GET GROUP 1 ERRORS.
10829  042026  005237  001252          INC     $TMP14          ;BUMP TO INDICATE GROUP 1 PRINTING
10830  042032  000647                  BR      40$             ;START LOOP AGAIN.
10831
10832  042034  032713  000077  49$:    BIT     #77,(R3)        ;TEST IF ANY ERRORS TO BE REPORTED
10833                                                          ;  GRP2ST.GRP2ST.GRP3ST
10834                                                          ;  GP1NR.GP2NR!GP3NR
10835  042040  001004                  BNE     61$             ;YES - SKIP
10836  042042  104414                  RESREG                  ;ELSE EXIT
10837  042044  062716  000002          ADD     #2,(SP)         ;BUMP FOR GOOD RETURN
10838  042050  000002                  RTI
10839
10840  042052  112776  000007  000000 61$:    MOVB    #7,@(SP)        ;PRESET FOR GROUP 3 ERROR RETURN.
10841  042060  032713  000022          BIT     #GRP2ST.GP2NR,(R3) ;ANY GROUP 2 ERRORS?
10842  042064  001403                  BEQ     50$             ;NO - SKIP
10843  042066  112776  000006  000000  MOVB    #6,@(SP)        ;ELSE SET FOR GROUP 2 ERROR RETURN
10844
10845  042074  032713  000011  50$:    BIT     #GRP1ST!GP1NR,(R3) ;ANY GROUP 1 ERRORS?
10846  042100  001411                  BEQ     53$             ;NO - SKIP
10847  042102  112776  000004  000000  MOVB    #4,@(SP)        ;ELSE SET FOR GROUP 1 ERROR RETURN.
10848  042110  032713  040000          BIT     #DRSTER,(R3)    ;CHECK IF ERROR GETTING DRIVE STATUS
10849  042114  001403                  BEQ     53$             ;NO - SKIP
10850  042116  112776  000005  000000  MOVB    #5,@(SP)        ;ELSE CHANGE RETURN FORM GROUP 1
10851
10852  042124  005737  001264  53$:    TST     $ESCAPE         ;CHECK IF ESCAPE ALREADY SET
10853  042130  001011                  BNE     54$             ;YES - SKIP
10854  042132  013700  001302          MOV     $TESTN,R0       ;SET UP $ESCAPE TO FORCE
10855  042136  006300                  ASL     R0              ;ABORT TO PRESENT TEST AFTER
10856  042140  016037  033122  001264  MOV     $SW08TB(R0),$ESCAPE ;ERROR IS REPORTED
10857  042146  162737  000002  001264  SUB     #2,$ESCAPE      ;BUT GO TO NEXT SCOPE STATEMENT
10858  042154  104414          54$:    RESREG
10859  042156  000002                  RTI                     ;RETURN
10860
10861                          ;;*****************************************************************
10862                          .SBTTL  BAD SECTOR CHECK
10863                          ;*      THE FIELD WHOSE ADDRESS IS IN THE LOCATION AFTER THE
10864                          ;*      CALL IS CHECKED TO SEE IF ANY SECTORS ARE LISTED THEREIN
10865                          ;*      THAT HAVE THE CYLINDER AND TRACK ADDRESS SPECIFIED IN
10866                          ;*      L.DCYL AND L.DT. IF A SECTOR IS FOUND IN THIS FIELD
10867                          ;*      THAT IS BAD FOR THAT CYLINDER AND TRACK, THE SECTOR NUMBER
10868                          ;*      IS PLACED ON THE STACK. THE TOTAL NUMBER OF BAD SECTORS
10869                          ;*      IS PLACED ON THE STACK AFTER THE ENTIRE
10870                          ;*      FIELD IS SEARCHED.
10871                          ;*
10872                          ;*      CALL:   JSR     R4,BDSRCK
10873                          ;*              <ADDRESS OF FIELD TO BE SEARCHED>
10874                          ;;*****************************************************************
10875
10876  042160  012637  001236  BDSRCK: MOV     (SP)+,$TMP6     ;STORE OLD R4 CONTENTS
10877  042164  010437  001240          MOV     R4,$TMP7        ;GET RETURN ADDRESS
10878  042170  011404                  MOV     (R4),R4         ;GET POINTER TO FIELD TO BE CHECKED
10879  042172  005037  001234          CLR     $TMP5           ;CLEAR A COUNTER
10880  042176  005714          4$:     TST     (R4)            ;TEST IF FIELD HAS NO (OR NO MORE)ENTRIES
10881  042200  100417                  BMI     4$              ;YES - EXIT
10882  042202  023724  001614          CMP     L.DCYL,(R4)+    ;IS THIS ENTRY FOR THIS CYLINDER?
```

```
10883  042206  001012                          BNE     3$              ;NO - SKIP
10884  042210  005204                          INC     R4              ;BUMP TO TRACK
10885  042212  123714  001607                  CMPB    L.DT,(R4)       ;IS ENTRY FOR THIS TRACK?
10886  042216  001005                          BNE     2$              ;NO - SKIP
10887  042220  005046                          CLR     -(SP)           ;CLEAR STACK LOCATION
10888  042222  114416                          MOVB    -(R4),(SP)      ;PUT SECTOR NUMBER ON STACK
10889  042224  005237  001234                  INC     $TMP5           ;BUMP COUNTER
10890  042230  000401                          BR      3$              ;BRANCH
10891
10892  042232  005304                  2$:     DEC     R4              ;DECREMENT POINTER TO WORD ALIGN
10893  042234  005724                  3$:     TST     (R4)+           ;BUMP TO NEXT ENTRY
10894  042236  000757                          BR      1$              ;TEST NEXT ENTRY
10895
10896  042240  013746  001234          4$:     MOV     $TMP5,-(SP)     ;PUT COUNT ON STACK
10897  042244  013746  001236                  MOV     $TMP6,-(SP)     ;PUT OLD R4 CONTENTS BACK ON STACK
10898  042250  013704  001240                  MOV     $TMP7,R4        ;SET UP RETURN
10899  042254  005724                          TST     (R4)+           ;BUMP PAST PARAMETER
10900  042256  000204                          RTS     R4              ;RETURN
10901
10902                                  ;*****************************************************************
10903                                  .SBTTL  DATA GENERATION AND COMPARE ROUTINE
10904                                  ;*  CALLS:      JSR     R4,GENCOM
10905                                  ;*              CONTROL WORD
10906                                  ;*
10907                                  ;*              JSR     R4,GENCOM
10908                                  ;*              CONTROL WORD
10909                                  ;*              LENGTH
10910                                  ;*
10911                                  ;*              JSR     R4,GENCOM
10912                                  ;*              CONTROL WORD
10913                                  ;*              RELOCATION CONSTANT
10914                                  ;*              LENGTH
10915                                  ;*
10916                                  ;*  RETURN:     RTS     R4
10917                                  ;*      R4 IS ADJUSTED IN THE CODE FOR THE FOLLOWING RETURNS:
10918                                  ;*      THE FIRST CALL RETURNS TO THE LOCATION FOLLOWING THE
10919                                  ;*      CONTROL WORD. THIS IS UNCONDITIONAL.
10920                                  ;*
10921                                  ;*      THE SECOND CALL RETURNS TO THE LOCATION FOLLOWING THE LENGTH IF
10922                                  ;*      THE OPERATION REQUIRES DATA COMPARE AND DATA MISCOMPARED.
10923                                  ;*      IF DATA IS TO BE GENERATED ONLY OR NO DATA COMPARE
10924                                  ;*      ERRORS OCCURRED, THE RETURN IS TO LENGTH +4.
10925                                  ;*
10926                                  ;*      THE THIRD CALL IS IDENTICAL TO THE SECOND.
10927                                  ;*
10928                                  ;*  DEFINITION OF CONTROL WORD:
10929                                  ;*      BIT 15 - DO COMPARE OPERATION OF IBUFF (SOURCE) TO OBUFF
10930                                  ;*               (DESTINATION). EXPECTED VALUES ARE IN OBUFF (DESTINATION.
10931                                  ;*      BIT 14 - RESUME COMPARE OPERATION FROM POINT LEFT BY LAST COMPARE.
10932                                  ;*      BIT 13 - INVOKE MEMORY MANAGEMENT FOR SOURCE (IBUFF).
10933                                  ;*      BIT 12 - INVOKE MEMORY MANAGEMENT FOR DESTINATION (OBUFF).
10934                                  ;*      BIT 11 - REPEAT FIRST WORD OF SELECTED PATTERN THROUGHOUT OBUFF.
10935                                  ;*      BIT 10 - CLEAR IBUFF TO PATTERN SELECTED.
10936                                  ;*      BIT 9 - BUILD HEADERS, CONSIDERING BS FILES
10937                                  ;*      BIT 8 - BUILD HEADERS, ALL SECTORS INDICATE GOOD SECTORS.
10938                                  ;*      BIT 7 - HEADER OPERATION SPECIFIED (EITHER COMPARE OR BUILD).
```

```
10939                                   ;*      BIT 6 TO 0 - PATTERN SELECT FIELD, OCTAL ENCODED. 0 INDICATES
10940                                   ;*              NO DATA GENERATION, 1 IS ALL ZEROS, AND 7 IS ALL ONES.
10941                                   ;*              OTHER PATTERNS PROVIDED ARE PATTERNS 2-6, 8-16.
10942                                   ;*
10943                                   ;*  EXPLANATION OF CALLS:
10944                                   ;*      THE CALL WITH CONTROL WORD THE ONLY PARAMETER IS USED FOR
10945                                   ;*      BUILDING OR COMPARING HEADERS OR RESUMING A COMPARE OPERATION.
10946                                   ;*
10947                                   ;*      THE CALL WITH CONTROL WORD AND LENGTH AS PARAMETERS IS USED
10948                                   ;*      FOR DATA GENERATION OR COMPARE AND FOR IBUFF INITALIZATION.
10949                                   ;*
10950                                   ;*      THE CALL WITH CONTROL WORD, RELOCATION CONSTANT, AND LENGTH IS
10951                                   ;*      USED FOR DATA GENERATION OR COMPARE WITH MEMORY MANAGEMENT.
10952                                   ;*
10953                                   ;*
10954                                   ;*  DESCRIPTION:
10955                                   ;*
10956                                   ;*      THIS ROUTINE IS MULTI-PURPOSE AND WILL PERFORM THE FOLLOWING:
10957                                   ;*        A.    BUILD HEADERS, EITHER 20 OR 22 SECTORS/TRACK MODE. THE
10958                                   ;*              ROUTINE WILL BUILD THE HEADERS AS ALL GOOD SECTORS (BIT 8)
10959                                   ;*              OR TAKE THE BAD SECTOR FILES (HARDWARE OR SOFTWARE) FOR
10960                                   ;*               EITHER FORMAT) INTO ACCOUNT AND BUILD THE HEADERS WITH THE
10961                                   ;*              SECTORS MARKED BAD IF ANY SECTORS FOR THE CYLINDER - TRACK
10962                                   ;*              ARE LISTED THEREIN (BIT 9).
10963                                   ;*
10964                                   ;*        B.    COMPARE THE CONTENTS OF IBUFF AND OBUFF (BIT 15). THE
10965                                   ;*              CONTENTS OF THE BUFFER MAY BE HEADERS OR DATA. A
10966                                   ;*              HEADER COMPARE OPERATION MAY BE SPECIFIED (BIT 7) WHICH
10967                                   ;*              WILL CAUSE THE COMPARE TO BE LIMITED TO 74(8) OR 102(8)
10968                                   ;*              WORDS OF HEADERS. THE LENGTH DEPENDS ON THE FORMAT
10969                                   ;*              BIT THAT WAS LAST SPECIFIED IN L.CS1. THE HEADERS
10970                                   ;*              MAY BE BUILT BEFORE THE COMPARE AS PART OF THE
10971                                   ;*              OPERATION (BIT 15 AND BIT 8 OR 9). DATA CAN ALSO BE
10972                                   ;*              GENERATED BEFORE THE COMPARE (NON-ZERO BITS 6-0).
10973                                   ;*
10974                                   ;*        C.    RESUME COMPARE OPERATION. IF A COMPARE OPERATION
10975                                   ;*              DETECTS A MISCOMPARE, THE ROUTINE RETURNS TO CALLER
10976                                   ;*              BUT STORES PARAMETERS SUCH THAT THE COMPARE CAN BE
10977                                   ;*              RESUMED. THIS IS DONE BY CALLING GENCOM WITH BIT 14
10978                                   ;*              SET IN THE CONTROL WORD.
10979                                   ;*
10980                                   ;*        D.    DATA GENERATION OR COMPARE USING MEMORY MANAGEMENT.
10981                                   ;*              MEMORY MANAGEMENT CAN BE INVOKED FOR EITHER
10982                                   ;*              SOURCE OR DESTINATION BUT NOT FOR BOTH. IN THIS
10983                                   ;*              MANNER, DATA GENERATION CAN BE MADE TO
10984                                   ;*              PLACE DATA ANYWHERE IN AVAILABLE MEMORY. LIKEWISE
10985                                   ;*              DATA COMPARE WILL COMPARE THE CONTENTS OF IBUFF TO
10986                                   ;*              ANY AREA OF AVAILABLE MEMORY.
10987
10988   042260                          GENCOM:
10989   042260  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10990   042262  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10991   042264  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
10992   042266  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
10993   042270  012400                          MOV     (R4)+,R0        ;GET PARAMETER WORD
10994   042272  012737  056312  001520          MOV     #EM54,EM15N     ;PRESET FOR HEADER COMPARE ERROR
```

```
10995  042300  032700  000200          BIT     #BIT7,R0        ;HEADER OPERATION SPECIFIED?
10996  042304  001005                  BNE     18$             ;YES - SKIP
10997  042306  012737  056341  001520  MOV     #EM55,EM15N     ;CHANGE FOR DATA COMPARE ERROR
10998  042314  000137  043046          JMP     17$             ;ELSE JUMP TO DATA ROUTINE
10999  042320                  18$:
11000  042320  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
11001  042322  032700  001400          BIT     #BIT8.BIT9,R0   ;MUST HEADERS BE BUILT?.
11002  042326  001002                  BNE     19$             ;YES - SKIP
11003  042330  000137  042630          JMP     11$             ;ELSE JUMP TO HEADER COMPARE
11004  042334  113701  001607  19$:    MOVB    L.DT,R1         ;START HEADER BUILD ROUTINE
11005  042340  013703  001614          MOV     L.DCYL,R3       ;GET TRACK AND CYL
11006  042344  012705  000005          MOV     #5,R5           ;SET COUNT TO SHIFT TRACK FOR HDR WORD
11007
11008  042350  006301          1$:     ASL     R1              ;SHIFT TRACK
11009  042352  005305                  DEC     R5              ;DECREMENT TRACK
11010  042354  001375                  BNE     1$              ;LOOP UNTIL COUNT 0
11011
11012  042356  012704  000026          MOV     #26,R4          ;PRESET FOR 26 SECTOR MODE
11013  042362  032737  010000  001600  BIT     #CFMT,L.CS1     ;IS IT 24 SECTOR MODE?
11014  042370  001404                  BEQ     2$              ;NO - SKIP
11015  042372  012704  000024          MOV     #24,R4          ;CHANGE COUNT FOR 24 SECTOR MODE
11016  042376  052701  001000          BIS     #BIT9,R1        ;SET 24 SECTOR MODE BIT IN WRD 2 OF HDR
11017
11018  042402  052701  140000  2$:     BIS     #BIT15!BIT14,R1 ;SET BS BITS TO INDICATE GOOD SECTOR
11019  042406  012705  072414          MOV     #OBUFF,R5       ;SET POINTER TO ADDRESS WHERE HEADERS GO
11020  042412  010325          3$:     MOV     R3,(R5)+        ;INSERT CYLINDER
11021  042414  010125                  MOV     R1,(R5)+        ;INSERT TRACK AND SECTOR
11022  042416  010337  001224          MOV     R3,$TMP1        ;CALCULATE HVRC WORD
11023  042422  010115                  MOV     R1,(R5)
11024  042424  040137  001224          BIC     R1,$TMP1
11025  042430  040315                  BIC     R3,(R5)
11026  042432  053725  001224          BIS     $TMP1,(R5)+     ;COMPLETE HVRC WORD INSERTION
11027
11028  042436  005304                  DEC     R4              ;DECREMENT HEADER COUNT
11029  042440  001402                  BEQ     4$              ;DONE? - YES, SKIP
11030  042442  005201                  INC     R1              ;BUMP SECTOR
11031  042444  000762                  BR      3$              ;LOOP
11032
11033  042446  032700  001000  4$:     BIT     #BIT9,R0        ;MUST HEADERS BE CORRECTED FOR TABLE ENTRIES?
11034  042452  001003                  BNE     5$              ;YES - SKIP
11035  042454  005700          10$:    TST     R0              ;IS THIS A COMPARE OPERATION?
11036  042456  100464                  BMI     11$             ;YES-GO DO HDR COMPARE
11037  042460  000534                  BR      50$             ;ELSE GET OUT
11038
11039  042462  013737  001640  042520  5$:     MOV     BSF26P,6$       ;PRESET FOR BS FACTORY LIST
11040  042470  012737  100000  001224          MOV     #BIT15,$TMP1    ;SET BIT TO BE RESET IN BAD HEADER
11041  042476  032737  010000  001600          BIT     #CFMT,L.CS1     ;IS THIS 26 SECTOR MODE?
11042  042504  001403                          BEQ     8$              ;YES - SKIP
11043  042506  013737  001636  042520          MOV     BSF24P,6$       ;ELSE CHANGE FOR 24 SECTOR MODE
11044
11045  042514  004437  042160          8$:     JSR     R4,BDSRCK       ;GO CHECK FOR BAD SECTOR THIS ADDRESS
11046  042520  000000          6$:     .WORD   0               ;POINTER TO FILE TO BE CHECKED GOES HERE
11047  042522  012605                  MOV     (SP)+,R5        ;GET # OF BAD SECTORS THIS PACK ADDRESS
11048  042524  001417                  BEQ     9$              ;SKIP IF ZERO
11049
11050  042526  011601          7$.     MOV     (SP),R1         ;GET 1ST BAD SECTOR NUMBER
```

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11051  042530  006301                        ASL     R1              ;MULTIPLY SECTOR NUMBER BY 6 TO
11052  042532  006301                        ASL     R1              ;LOACATE SECTOR TO BE MARKED BAD
11053  042534  061601                        ADD     (SP),R1
11054  042536  062601                        ADD     (SP)+,R1
11055  042540  062701  000002                ADD     #2,R1           ;ADD 2 FOR 2ND WORD THAT SECTOR
11056  042544  043761  001224  072414        BIC     $TMP1,OBUFF(R1) ; CLEAR BIT FOR BAD SECTOR IN HDR
11057  042552  043761  001224  072416        BIC     $TMP1,OBUFF+2(R1) ; CORRECT THE HVRC BIT
11058  042560  005305                        DEC     R5              ;DECREMENT BAD SECTOR COUNT
11059  042562  001361                        BNE     7$              ;LOOP IF NOT ZERO
11060
11061  042564  032737  100000  001224  9$:   BIT     #BIT15,$TMP1    ;WERE WE DOING BS FACTORY LIST?
11062  042572  001730                        BEQ     10$             ;NO - GO CHECK IF COMPARE MUST BE DONE
11063  042574  012737  040000  001224        MOV     #BIT14,$TMP1    ;ELSE SET BIT TO BE RESET IN BAD HDR
11064  042602  013737  001644  042520        MOV     BSS26P,6$       ;PRESET POINTER FOR 26 SECTOR MODE
11065  042610  032737  010000  001600        BIT     #CFMT.L.CS1     ;TEST IF WE ARE DOING 26 SECTOR MODE
11066  042616  001736                        BEQ     8$              ;YES - SKIP TO START CHECK
11067  042620  013737  001642  042520        MOV     BSS24P,6$       ;CHANGE POINTER TOR 24 SECTOR MODE
11068  042626  000732                        BR      8$              ;SKIP TO START CHECK
11069
11070                                  ;       START OF COMPARE
11071  042630  012701  000102          11$:   MOV     #102,R1         ;PRESET FOR 102 WORDS OF HEADER
11072  042634  032737  010000  001600        BIT     #CFMT.L.CS1     ;CHECK IF 26 SECTOR MODE
11073  042642  001402                        BEQ     12$             ;YES - SKIP
11074  042644  012701  000074                MOV     #74,R1          ;CHANGE TO 74 WORDS OF HEADER
11075
11076  042650  012704  070414          12$:   MOV     #IBUFF,R4       ;SET START OF HEADERS TO BE COMPARED
11077  042654  012705  072414                MOV     #OBUFF,R5       ;SET START OF GOOD HEADERS
11078  042660  005003                        CLR     R3              ;CLEAR COUNTER
11079  042662  032700  040000                BIT     #BIT14,R0       ;IS THIS A CONTINUATION OF EARLIER COMPARE
11080  042666  001412                        BEQ     13$             ;NO - SKIP
11081  042670  013705  001700          28$:   MOV     DESHLD,R5       ;GET VALUES WHERE PREVIOUS CHECK STOPPED
11082  042674  013704  001702                MOV     SRCHLD,R4       ;  DESTINATION AND SOURCE
11083  042700  013703  001704                MOV     WRDNUM,R3       ;  WORD NUMBER IN ERROR
11084  042704  013701  001706                MOV     WRDCNT,R1       ;  WORD COUNT LEFT IN COMPARE
11085  042710  005701                        TST     R1              ;TEST IF WORD COUNT LEFT - 0
11086  042712  001417                        BEQ     50$             ;YES - EXIT
11087
11088  042714  032700  030000          13$:   BIT     #BIT12.BIT13,R0 ;MEM MANAGE REQUIRED?
11089  042720  001402                        BEQ     25$             ;NO - SKIP
11090  042722  005237  177572                INC     @#SRC           ;TURN IT ON
11091  042726  022425                  25$:   CMP     (R4)+,(R5)+     ;COMPARE THE WORDS
11092  042730  001012                        BNE     14$             ;SKIP IF NOT EQUAL
11093  042732  005203                        INC     R3              ;BUMP WORD NUMBER IN ERROR
11094  042734  005301                        DEC     R1              ;DEC WORD COUNT LEFT IN COMPARE
11095  042736  001373                        BNE     25$             ;LOOP IF NOT ZERO
11096  042740  032700  030000                BIT     #BIT12.BIT13,R0 ;MEM MANAGE IN USE?
11097  042744  001402                        BEQ     50$             ;NO - SKIP
11098  042746  005337  177572                DEC     @#SR0           ;TURN IT OFF
11099  042752                          50$:
11100  042752  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
11101  042754  000427                        BR      16$
11102
11103                                  ;       ERROR REPORT PREP AND PARAMETER STORAGE FOR CONTINUATION
11104
11105  042756  010537  001700          14$:   MOV     R5,DESHLD       ;STORE DESTINATION
11106  042762  010437  001702                MOV     R4,SRCHLD       ;       SOURCE
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11107  042766  014537  001202                  MOV     -(R5),$REG10    ;LOAD GOOD WORD FOR REPORT
11108  042772  014437  001204                  MOV     -(R4),$REG11    ;       BAD WORD
11109  042776  010337  001206                  MOV     R3,$REG12       ;       WORD NUMBER
11110  043002  005301                          DEC     R1              ;DEC COUNT LEFTFOR CONTINUATION
11111  043004  005203                          INC     R3              ;BUMP BAD WORD NUMBER
11112  043006  010137  001706                  MOV     R1,WRDCNT       ;STORE COUNT LEFT
11113  043012  010337  001704                  MOV     R3,WRDNUM       ;       WORD NUM IN ERROR
11114  043016  032700  030000                  BIT     #BIT12.BIT13,R0 ;MEM MANAGE IS USE?
11115  043022  001402                          BEQ     15$             ;NO - SKIP
11116  043024  005337  177572                  DEC     @#SR0           ;TURN IT OFF
11117
11118  043030                          15$:
11119  043030  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
11120  043032  005724                          TST     (R4)+           ;ERROR RETURN
11121
11122  043034                          16$:
11123  043034  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
11124  043036  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
11125  043040  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
11126  043042  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
11127  043044  000204                          RTS     R4
11128
11129                           ;       DATA PATTERN PROCESSING ROUTINE
11130
11131  043046  032700  040000          17$:    BIT     #BIT14,R0       ;CONTINUE WITH COMPARE?
11132  043052  001402                          BEQ     29$             ;NO - SKIP
11133  043054  010446                          MOV     R4,-(SP)        ;STORE RETURN
11134  043056  000704                          BR      28$             ;GO CONTINUE COMPARE
11135
11136  043060  012705  072414          29$:    MOV     #OBUFF,R5       ;GET DESTINATION
11137  043064  012703  070414                  MOV     #IBUFF,R3       ;GET SOURCE
11138  043070  032700  030000                  BIT     #BIT12.BIT13,R0 ;USE MEM MANAGE?
11139  043074  001412                          BEQ     21$             ;NO - SKIP
11140
11141  043076  012437  172354                  MOV     (R4)+,@#KIPAR6  ;LOAD PAR FOR RELOCATION
11142  043102  032700  010000                  BIT     #BIT12,R0       ;RELOCATE SOURCE?
11143  043106  001403                          BEQ     20$             ;NO - SKIP
11144  043110  012705  140070                  MOV     #140070,R5      ;SET DESTINATION TO USE PAR6 + OFFSET
11145  043114  000402                          BR      21$             ;SKIP
11146  043116  012703  140070          20$:    MOV     #140070,R3      ;SET SOURCE TO USE PAR6 + OFFSET
11147
11148  043122  012401                  21$:    MOV     (R4)+,R1        ;STORE COUNT
11149  043124  010446                          MOV     R4,-(SP)        ;STORE RETURN
11150  043126  010304                          MOV     R3,R4           ;PUT IN IBUFF POINTER
11151  043130  005003                          CLR     R3              ;CLEAR R3 FOR WORD NUMBER COUNTER
11152  043132  032700  000077                  BIT     #77,R0          ;ANY DATA PATTERN SPECIFIED?
11153  043136  001666                          BEQ     13$             ;NO - GO DO COMPARE
11154
11155                           ;       START OF GENERATION ROUTINE
11156
11157  043140  010537  001700                  MOV     R5,DESHLD       ;STORE PARAMETERS FOR COMPARE
11158  043144  010437  001702                  MOV     R4,SRCHLD
11159  043150  010337  001704                  MOV     R3,WRDNUM
11160  043154  010137  001706                  MOV     R1,WRDCNT
11161
11162                           ;       CODE TO GENERATE DATA PATTERN IN AREA POINTED TO BY R5.
```

```
11163                                   ;       MEMORY MANAGEMENT WILL BE TURNED ON BUT RELOCATION
11164                                   ;       WILL NOT OCCUR UNLESS REQUIRED BY SWITCHES
11165
11166  043160  032700  030000                   BIT     #BIT12.BIT13,R0 ;MEMORY MANAGEMENT REQUIRED?
11167  043164  001402                           BEQ     33$             ;NO - SKIP
```

```
11168  043166  005237  177572          INC     @#SR0           ;TURN IT ON
11169  043172  032700  002000  33$:    BIT     #BIT10,R0       ;GENERATE PATTERN IN IBUFF?
11170  043176  001403                  BEQ     32$             ;NO - SKIP
11171  043200  010346                  MOV     R4,-(SP)        ;ELSE SWAP R4 AND R5
11172  043202  010504                  MOV     R5,R4
11173  043204  012605                  MOV     (SP)+,R5
11174
11175  043206  122700  000001  32$:    CMPB    #1,R0           ;PATTERN 1 (ALL ZEROS.?
11176  043212  001004                  BNE     55$             ;NO - SKIP
11177  043214  005025          30$:    CLR     (R5)+           ;CLEAR WORD IN BUFF
11178  043216  005301                  DEC     R1              ;DEC WORD COUNT
11179  043220  001375                  BNE     30$             ;LOOP UNTIL WORD COUNT ZERO
11180  043222  000550                  BR      22$             ;EXIT BUILD
11181
11182  043224  122700  000007  55$:    CMPB    #7,R0           ;PATTERN 7 (ALL ONES)?
11183  043230  001005                  BNE     56$             ;NO - SKIP
11184  043232  012725  177777  31$:    MOV     #-1,(R5)+       ;LOAD WORD IN BUFF
11185  043236  005301                  DEC     R1              ;DEC WORD COUNT
11186  043240  001374                  BNE     31$             ;LOOP UNTIL WORD COUNT ZERO
11187  043242  000540                  BR      22$             ;EXIT BUILD
11188
11189  043244  122700  000002  56$:    CMPB    #2,R0           ;PATTERN 2 SET UP
11190  043250  001003                  BNE     57$
11191  043252  012703  047234          MOV     #PAT02,R3
11192  043256  000504                  BR      70$
11193
11194  043260  122700  000003  57$:    CMPB    #3,R0           ;PATTERN 3 SET UP
11195  043264  001003                  BNE     58$
11196  043266  012703  047274          MOV     #PAT03,R3
11197  043272  000476                  BR      70$
11198
11199  043274  122700  000004  58$:    CMPB    #4,R0           ;PATTERN 4 SET UP
11200  043300  001003                  BNE     59$
11201  043302  012703  047334          MOV     #PAT04,R3
11202  043306  000470                  BR      70$
11203
11204  043310  122700  000005  59$:    CMPB    #5,R0           ;PATTERN 5 SET UP
11205  043314  001003                  BNE     60$
11206  043316  012703  047374          MOV     #PAT05,R3
11207  043322  000462                  BR      70$
11208
11209  043324  122700  000006  60$:    CMPB    #6,R0           ;PATTERN 6 SET UP
11210  043330  001003                  BNE     61$
11211  043332  012703  047434          MOV     #PAT06,R3
11212  043336  000454                  BR      70$
11213
11214  043340  122700  000010  61$:    CMPB    #10,R0          ;PATTERN 10 SET UP
11215  043344  001003                  BNE     62$
11216  043346  012703  047474          MOV     #PAT10,R3
11217  043352  000446                  BR      70$
11218
11219  043354  122700  000011  62$:    CMPB    #11,R0          ;PATTERN 11 SET UP
11220  043360  001003                  BNE     63$
11221  043362  012703  047534          MOV     #PAT11,R3
11222  043366  000440                  BR      70$
11223
```

```
11224  043370  122700  000012          63$:    CMPB    #12,R0          ;PATTERN 12 SET UP
11225  043374  001003                          BNE     64$
11226  043376  012703  047574                  MOV     #PAT12,R3
11227  043402  000432                          BR      70$
11228
11229  043404  122700  000013          64$:    CMPB    #13,R0          ;PATTERN 13 SET UP
11230  043410  001003                          BNE     65$
11231  043412  012703  047634                  MOV     #PAT13,R3
11232  043416  000424                          BR      70$
11233
11234  043420  122700  000014          65$:    CMPB    #14,R0          ;PATTERN 14 SET UP
11235  043424  001003                          BNE     66$
11236  043426  012703  047674                  MOV     #PAT14,R3
11237  043432  000416                          BR      70$
11238
11239  043434  122700  000015          66$:    CMPB    #15,R0          ;PATTERN 15 SET UP
11240  043440  001003                          BNE     67$
11241  043442  012703  047734                  MOV     #PAT15,R3
11242  043446  000410                          BR      70$
11243
11244  043450  122700  000016          67$:    CMPB    #16,R0          ;PATTERN 16 SET UP
11245  043454  001003                          BNE     68$
11246  043456  012703  047774                  MOV     #PAT16,R3
11247  043462  000402                          BR      70$
11248
11249  043464  012703  047774          68$:    MOV     #PAT16,R3       ;SET UP FOR 16
11250
11251  043470  032700  004000          70$:    BIT     #BIT11,R0       ;FIRST WORD REPEAT?
11252  043474  001020                          BNE     73$             ;YES - SKIP
11253  043476  010446                          MOV     R4,-(SP)        ;STORE R4
11254  043500  010046                          MOV     R0,-(SP)        ;STORE R0
11255  043502  012700  000020                  MOV     #16.,R0         ;PRESET COUNT FOR PATTERN LENGTH
11256  043506  010504                          MOV     R5,R4           ;STORE START OF BUFF
11257
11258  043510  012325                  71$:    MOV     (R3)+,(R5)+     ;MOV WORD TO BUFF
11259  043512  005301                          DEC     R1              ;DEC WORD COUNT
11260  043514  001405                          BEQ     74$             ;EXIT IF ZERO
11261  043516  005300                          DEC     R0              ;DEC PAT LENGTH COUNT
11262  043520  001373                          BNE     71$             ;LOOP IF NOT ZERO
11263
11264  043522  012425                  72$:    MOV     (R4)+,(R5)+     ;REPEAT PATTERN IN BUFFER
11265  043524  005301                          DEC     R1              ;DEC WORD COUNT
11266  043526  001375                          BNE     72$             ;LOOP UNTIL WORD COUNT ZERO
11267
11268  043530  012600                  74$:    MOV     (SP)+,R0        ;RESTORE R0
11269  043532  012604                          MOV     (SP)+,R4        ;RESTORE R4
11270  043534  000403                          BR      22$             ;EXIT BUILD
11271
11272  043536  011325                  73$:    MOV     (R3),(R5)+      ;MOV THE SAME WORD INTO BUFFER
11273  043540  005301                          DEC     R1              ;DEC WORD COUNT
11274  043542  001375                          BNE     73$             ;LOOP UNTIL ZERO
11275
11276  043544  032700  030000          22$:    BIT     #BIT12.BIT13,R0 ;MEMORY MANAGEMENT REQUIRED?
11277  043550  001402                          BEQ     34$             ;NO - SKIP
11278  043552  005337  177572                  DEC     @#SR0           ;TURN OFF MEM MANAGEMENT
11279  043556  005700                  34$:    TST     R0              ;IS COMPARE REQUIRED?
```

```
11280  043560  100012                        BPL     23$             ;NO - SKIP
11281  043562  013705  001700                MOV     DESHLD,R5       ;RESTORE COMPARE PARAMETERS
11282  043566  013704  001702                MOV     SRCHLD,R4
11283  043572  013703  001704                MOV     WRDNUM,R3
11284  043576  013701  001706                MOV     WRDCNT,R1
11285  043602  000137  042714                JMP     13$             ;GO START COMPARE
11286  043606                          23$:
11287  043606  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
11288  043610  000137  043034                JMP     16$             ;GO TO EXIT
11289
11290                                  ;;*****************************************************************
11291                                  .SBTTL  PHASE LOCK LOOP CLOCK ADJUSTMENT ROUNTINE
11292                                  ;*      THIS ROUTINE IS ENTERED VIA A START AT LOCATION 220(8). THE
11293                                  ;*      PROGRAM FIRST RUNS TEST 1, 2, AND 3 TO SET UP THE INTERNAL
11294                                  ;*      PROGRAM VARIABLES AND THEN JUMPS TO THE CLOCK ADJUST ROUTINE.
11295                                  ;*      THE ROUTINE SELECTS THE FIRST AVAILABLE DRIVE AND SETS AND
11296                                  ;*      RESETS DIAGNOSTIC MODE BIT IN MR1. INSTRUCTIONS ON WHERE TO
11297                                  ;*      SCOPE AND WHAT TO ADJUST ARE TYPED ON THE CONSOLE.
11298                                  ;*
11299                                  ;*      THIS ROUTINE WILL LOOP UNTIL THE PROCESSOR IS HALTED.
11300
11301  043614  104401  052752          ADJCLK: TYPE    ,OPR019         ;TYPE ADJUSTMENT INSTRUCTIONS
11302
11303  043620  012762  000040  000010        MOV     #SCLR,RKCS2(R2) ;CLEAR SUBSYSTEM
11304  043626  013762  001626  000010        MOV     DRVNUM,RKCS2(R2)        ;SELECT DRIVE
11305  043634  012762  000001  000000        MOV     #1,RKCS1(R2)
11306  043642  032762  000200  000000  5$:   BIT     #RDY,RKCS1(R2)  ;WAIT FOR READY
11307  043650  001774                        BEQ     5$
11308  043652  032737  100000  001664        BIT     #LCLKPR,OPTFLG  ;TEST IF CLOCK PRESENT
11309  043660  001402                        BEQ     1$              ;NO - SKIP
11310  043662  005077  136022                CLR     @KWLADD         ;CLEAR INTERRUPT ENABLE
11311
11312  043666  012762  000040  000C26  1$:   MOV     #DMD,RKMR1(R2)  ;SET DIAG MODE
11313  043674  012701  000014                MOV     #12.,R1         ;SET A COUNT
11314  043700  005301                  2$:   DEC     R1              ;DEC COUNT
11315  043702  001376                        BNE     2$              ;LOOP UNTIL ZERO
11316  043704  012762  000000  000026        MOV     #0,RKMR1(R2)    ;CLEAR MR1
11317  043712  012701  000014                MOV     #12.,R1         ;SET COUNT
11318  043716  005301                  3$:   DEC     R1              ;DEC COUNT
11319  043720  001376                        BNE     3$              ;LOOP UNTIL ZERO
11320  043722  000761                        BR      1$              ;RESTART LOOP
11321
11322                                  .SBTTL  CONTROLLED HALT SUBROUTINE
11323                                  ;*      THIS ROUTINE IS ENTERED WHEN A CONTROL C IS TYPED. THE
11324                                  ;*      SUBSYSTEM IS CLEARED, THE DRIVE IS RECALIBRATED, AND, IF
11325                                  ;*      NECESSARY, CERTAIN CYLINDERS ARE REFORMATED. THE REFORMATTING
11326                                  ;*      IS CONTROLLED BY THE LOCATION REFMT WHICH CONTAINS THE ADDRESS
11327                                  ;*      OF THE CYLINDER TO BE REFORMATTED.
11328
11329  043724  012737  000111  001302  CTRHLT: MOV     #$TN,$TESTN             ;SET UP FOR HALT FAIL
11330
11331  043732  104416                        TSSINIT                 ;CLEAR SUBSYSTEM
11332  043734  104003                        ERROR   3               ;BAD INIT ERROR
11333
11334  043736  113700  001102                MOVB    $TSTNM,R0       ;GET CURRENT TEST NUMBER
11335  043742  042700  177400                BIC     #177400,R0      ;CLEAR UNUSED BITS
```

```
11336  043746  022700  000003          CMP     #3,R0           ;TEST IF TEST NUMBER 3
11337  043752  001464                  BEQ     PROGEND         ;GO TO HALT PROG
11338  043754  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
11339  043760  000113                  RECAL                   ;RECAL
11340  043762  000000                  0                       ;0 WORDS
11341  043764  000000                  0                       ;0 IS BUFF ADDRESS
11342  043766     000                  .BYTE   0               ;SECTOR 0
11343  043767     000                  .BYTE   0               ;TRACK 0
11344  043770  000000                  0                       ;CYLINDER 0
11345
11346  043772  104417                  TLOADRK                 ;LOAD RK REGS
11347  043774  104423                  TWAT16                  ;WAIT FOR INTERRUPT
11348  043776  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
11349
11350  044000  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
11351  044002  104004                  ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
11352
11353  044004  005037  001662          CLR     INTSET          ;CLEAR INTERRUPT FLAG
11354  044010  104437                  TWAT8S                  ;WAIT FOR SECOND INTERRUPT
11355  044012  104002                  ERROR   2
11356
11357  044014  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
11358  044016  104004                  ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
11359
11360  044020  104416                  TSSINIT                 ;CLEAR SUBSYSTEM
11361  044022  104003                  ERROR   3               ;BAD INIT ERROR
11362
11363  044024  005737  001676          TST     REFMT           ;TEST IF REFORMAT REQUIRED
11364  044030  001435                  BEQ     PROGEND         ;NO - GO TO HALT
11365  044032  104401  053115          TYPE    ,OPR020         ;TYPE MESSAGE
11366
11367  044036  004437  035674          JSR     R4,LRLOAD       ;LOAD "L" REGS
11368  044042  000127                  WRHEAD                  ;WRHEAD
11369  044044  177676                  -102                    ;-102 WORDS
11370  044046  072414                  OBUFF                   ;OBUFF IS BUFF ADDRESS
11371  044050     000                  .BYTE   0               ;SECTOR 0
11372  044051     000                  .BYTE   0               ;TRACK 0
11373  044052  000312                  312                     ;CYLINDER 312
11374
11375  044054  005737  001676          TST     REFMT           ;TEST IF CYL 0
11376  044060  100002                  BPL     5$              ;NO - SKIP
11377  044062  005037  001614          CLR     L.DCYL          ;ELSE LOAD FOR CYL 0
11378  044066  004437  042260  5$:     JSR     R4,GENCOM       ;GENERATE HEADERS
11379  044072  001200                  1200
11380
11381  044074  104417                  TLOADRK                 ;LOAD RK REGS
11382  044076  104434                  TWAT159                 ;WAIT FOR INTERRUPT
11383  044100  104002                  ERROR   2               ;TO SLOW/NOT COMPLETE ERROR
11384
11385  044102  104421                  TCHKOP                  ;CHECK OPERATION FOR ANY ERRORS
11386  044104  104004                  ERROR   4  ;OR 5, 6, 7  ;REPORT ALL ERRORS
11387
11388  044106  122737  000002  001607  CMPB    #2,L.DT         ;TEST IF TRACK 2 FORMATTED
11389  044114  001403                  BEQ     PROGEND         ;YES - SKIP
11390  044116  105237  001607          INCB    L.DT            ;ELSE BUMP TRACK
11391  044122  000761                  BR      5$              ;DO NEXT TRACK
```

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11392
11393  044124  104401  053211          PROGEND:        TYPE    ,OPR021 ;TYPE HALT MESSAGE
11394  044130  012706  001100                  MOV     #STACK,SP       ;CLEAR STACK
11395  044134  105037  001103                  CLRB    $ERFLG          ;CLEAR ERROR FLAG
11396  044140  005037  001264                  CLR     $ESCAPE         ;CLEAR ESCAPE
11397  044144  005737  000042                  TST     @#42            ;TEST IF MONITOR PRESENT
11398  044150  001404                          BEQ     10$             ;NO - SKIP
11399  044152  005037  032020                  CLR     $EOPCT          ;SET FOR END OF PROGRAM
11400  044156  000137  031772                  JMP     $EOP            ;GO TO END OF PASS
11401
11402  044162  000000                  10$:    HALT                    ;HALT PROGRAM
11403  044164  000137  001776                  JMP     START1          ;GO TO RESTART IF CONTINUE
11404
11405                                  .SBTTL  HALT FAIL ROUTINE
11406                                  ;*      THIS ROUTINE IS ENTERED IF A HARDWARE ERROR IS DETECTED WHEN
11407                                  ;*      THE CARTRIDGE IS BEING REFORMATTED PRIOR TO HALT.
11408  044170  000240                  ABTFAIL:        NOP
11409  044172  104401  053252                  TYPE    ,OPR022         ;TYPE HALT FAIL MESSAGE
11410  044176  000137  044124                  JMP     PROGEND         ;GO STOP PROGRAM
11411                                  .SBTTL  TYPE ROUTINE
11412
11413                                  ;;**************************************************************
11414                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
11415                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
11416                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
11417                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
11418                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
11419                                  ;*
11420                                  ;*CALL:
11421                                  ;*1) USING A TRAP INSTRUCTION
11422                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
11423                                  ;*OR
11424                                  ;*      TYPE
11425                                  ;*      MESADR
11426                                  ;*
11427
11428  044202  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
11429  044206  100002                          BPL     1$              ;;BR IF YES
11430  044210  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
11431  044212  000430                          BR      3$              ;;LEAVE
11432  044214  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
11433  044216  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
11434  044222  122737  000001  001316          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
11435  044230  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
11436  044232  132737  000100  001317          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
11437  044240  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
11438  044242  010037  044252                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
11439  044246  004737  033354                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
11440  044252  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
11441  044254  132737  000040  001317  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
11442  044262  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
11443  044264  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
11444  044266  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
11445  044270  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
11446  044272  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
11447  044274  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
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11448  044300  000002                        RTI                     ;;RETURN
11449  044302  122716  000011          4$:   CMPB    #HT,(SP)          ;;BRANCH IF <HT>
11450  044306  001430                        BEQ     8$
11451  044310  122716  000200                CMPB    #CRLF,(SP)        ;;BRANCH IF NOT <CRLF>
11452  044314  001006                        BNE     5$
11453  044316  005726                        TST     (SP)+             ;;POP  <CR><LF> EQUIV
11454  044320  104401                        TYPE                      ;;TYPE A CR AND LF
11455  044322  001273                        $CRLF
11456  044324  105037  044532                CLRB    $CHARCNT          ;;CLEAR CHARACTER COUNT
11457  044330  000755                        BR      2$                ;;GET NEXT CHARACTER
11458  044332  004737  044414          5$:   JSR     PC,$TYPEC         ;;GO TYPE THIS CHARACTER
11459  044336  123726  001156          6$:   CMPB    $FILLC,(SP)+      ;;IS IT TIME FOR FILLER CHARS.?
11460  044342  001350                        BNE     2$                ;;IF NO GO GET NEXT CHAR.
11461  044344  013746  001154                MOV     $NULL,-(SP)       ;;GET # OF FILLER CHARS. NEEDED
11462                                                                  ;;AND THE NULL CHAR.
11463  044350  105366  000001          7$:   DECB    1(SP)             ;;DOES A NULL NEED TO BE TYPED?
11464  044354  002770                        BLT     6$                ;;BR IF NO--GO POP THE NULL OFF OF STACK
11465  044356  004737  044414                JSR     PC,$TYPEC         ;;GO TYPE A NULL
11466  044362  105337  044532                DECB    $CHARCNT          ;;DO NOT COUNT AS A COUNT
11467  044366  000770                        BR      7$                ;;LOOP
11468
11469                                  ;HORIZONTAL TAB PROCESSOR
11470
11471  044370  112716  000040          8$:   MOVB    #' ,(SP)          ;;REPLACE TAB WITH SPACE
11472  044374  004737  044414          9$:   JSR     PC,$TYPEC         ;;TYPE A SPACE
11473  044400  132737  000007  044532        BITB    #7,$CHARCNT       ;;BRANCH IF NOT AT
11474  044406  001372                        BNE     9$                ;;TAB STOP
11475  044410  005726                        TST     (SP)+             ;;POP SPACE OFF STACK
11476  044412  000724                        BR      2$                ;;GET NEXT CHARACTER
11477  044414                         $TYPEC:
11478  044414  105777  134524                TSTB    @$TKS             ;;CHAR IN KYBD BUFFER?
11479  044420  100022                        BPL     10$               ;;BR IF NOT
11480  044422  017746  134520                MOV     @$TKB,-(SP)       ;;GET CHAR
11481  044426  042716  177600                BIC     #177600,(SP)      ;;STRIP EXTRANEOUS BITS
11482  044432  122716  000023                CMPB    #$XOFF,(SP)       ;;WAS CHAR XOFF
11483  044436  001012                        BNE     102$              ;BR IF NOT
11484  044440                         101$:
11485  044440  105777  134500                TSTB    @$TKS             ;;WAIT FOR CHAR
11486  044444  100375                        BPL     101$
11487  044446  117716  134474                MOVB    @$TKB,(SP)        ;;GET CHAR
11488  044452  042716  177600                BIC     #177600,(SP)      ;;STRIP IT
11489  044456  122716  000021                CMPB    #$XON,(SP)        ;;WAS IT XON?
11490  044462  001366                        BNE     101$              ;BR IF NOT
11491  044464                         102$:
11492  044464  005726                        TST     (SP)+             ;;FIX STACK
11493  044466                         10$:
11494  044466  105777  134456                TSTB    @$TPS             ;;WAIT UNTIL PRINTER IS READY
11495  044472  100375                        BPL     10$
11496  044474  116677  000002  134450        MOVB    2(SP),@$TPB       ;;LOAD CHAR TO BE TYPED INTO DATA REG.
11497  044502  122766  000015  000002        CMPB    #CR,2(SP)         ;;IS CHARACTER A CARRIAGE RETURN?
11498  044510  001003                        BNE     1$                ;;BRANCH IF NO
11499  044512  105037  044532                CLRB    $CHARCNT          ;;YES--CLEAR CHARACTER COUNT
11500  044516  000406                        BR      $TYPEX            ;;EXIT
11501  044520  122766  000012  000002  1$:   CMPB    #LF,2(SP)         ;;IS CHARACTER A LINE FEED?
11502  044526  001402                        BEQ     $TYPEX            ;;BRANCH IF YES
11503  044530  105227                        INCB    (PC)+             ;;COUNT THE CHARACTER
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```
11504  044532  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
11505  044534  000207                  $TYPEX: RTS     PC
11506
11507                                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
11508
11509                                  ;;**********************************************************************
11510                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
11511                                  ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
11512                                  ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
11513                                  ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
11514                                  ;*REPLACED WITH SPACES.
11515                                  ;*CALL:
11516                                  ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
11517                                  ;*      TYPDS                   ;;GO TO THE ROUTINE
11518
11519  044536                          $TYPDS:
11520  044536  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11521  044540  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11522  044542  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11523  044544  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
11524  044546  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
11525  044550  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
11526  044554  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
11527  044560  100004                          BPL     1$              ;;BR IF INPUT IS POS.
11528  044562  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
11529  044564  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
11530  044572  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
11531  044574  012703  044752                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
11532  044600  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
11533  044604  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
11534  044606  016001  044742                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
11535  044612  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
11536  044614  002402                          BLT     4$              ;;BR IF DONE
11537  044616  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
11538  044620  000774                          BR      3$
11539  044622  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
11540  044624  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
11541  044626  001002                          BNE     5$              ;;FALL THROUGH IF 0
11542  044630  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
11543  044632  100407                          BMI     7$              ;;BR IF YES
11544  044634  106316                  5$:     ASLB    (SP)            ;;MSD?
11545  044636  103003                          BCC     6$              ;;BR IF NO
11546  044640  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
11547  044646  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
11548  044652  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
11549  044656  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
11550  044660  005720                          TST     (R0)+           ;;JUST INCREMENTING
11551  044662  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
11552  044666  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
11553  044670  003002                          BGT     8$              ;;GO TO EXIT
11554  044672  010502                          MOV     R5,R2           ;;GET THE LSD
11555  044674  000764                          BR      6$              ;;GO CHANGE TO ASCII
11556  044676  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
11557  044700  100003                          BPL     9$              ;;BR IF NO
11558  044702  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
11559  044710  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
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11560  044712  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
11561  044714  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
11562  044716  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
11563  044720  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
11564  044722  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
11565  044724  104401  044752          TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
11566  044730  016666  000002  000004  MOV     2(SP),4(SP)     ;;ADJUST THE STACK
11567  044736  012616                  MOV     (SP)+,(SP)
11568  044740  000002                  RTI                     ;;RETURN TO USER
11569  044742  023420          $DTBL:  10000.
11570  044744  001750                  1000.
11571  044746  000144                  100.
11572  044750  000012                  10.
11573  044752  000004          $DBLK:  .BLKW   4
11574                          .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
11575
11576                          ;;**********************************************************************
11577                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
11578                          ;*OCTAL (ASCII) NUMBER AND TYPE IT.
11579                          ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
11580                          ;*CALL:
11581                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
11582                          ;*      TYPOS                   ;;CALL FOR TYPEOUT
11583                          ;*      .BYTE   N               ;;N-1 TO 6 FOR NUMBER OF DIGITS TO TYPE
11584                          ;*      .BYTE   M               ;;M=1 OR 0
11585                          ;*                                      ;;1=TYPE LEADING ZEROS
11586                          ;*                                      ;;0=SUPPRESS LEADING ZEROS
11587                          ;*
11588                          ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
11589                          ;*$TYPOS OR $TYPOC
11590                          ;*CALL:
11591                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
11592                          ;*      TYPON                   ;;CALL FOR TYPEOUT
11593                          ;*
11594                          ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
11595                          ;*CALL:
11596                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
11597                          ;*      TYPOC                   ;;CALL FOR TYPEOUT
11598
11599  044762  017646  000000  $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
11600  044766  116637  000001  045205  MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
11601  044774  112637  045207          MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
11602  045000  062716  000002          ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
11603  045004  000406                  BR      $TYPON
11604  045006  112737  000001  045205  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
11605  045014  112737  000006  045207          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
11606  045022  112737  000005  045204  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
11607  045030  010346                  MOV     R3,-(SP)        ;;SAVE R3
11608  045032  010446                  MOV     R4,-(SP)        ;;SAVE R4
11609  045034  010546                  MOV     R5,-(SP)        ;;SAVE R5
11610  045036  113704  045207          MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
11611  045042  005404                  NEG     R4
11612  045044  062704  000006          ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
11613  045050  110437  045206          MOVB    R4,$OMODE       ;;SAVE IT FOR USE
11614  045054  113704  045205          MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
11615  045060  016605  000012          MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
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11616  045064  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
11617  045066  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
11618  045070  000404                          BR      3$              ;;GO DO MSB
11619  045072  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
11620  045074  006105                          ROL     R5
11621  045076  006105                          ROL     R5
11622  045100  010503                          MOV     R5,R3
11623  045102  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
11624  045104  105337  045206                  DECB    $OMODE          ;;TYPE THIS DIGIT?
11625  045110  100016                          BPL     7$              ;;BR IF NO
11626  045112  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
11627  045116  001002                          BNE     4$              ;;TEST FOR 0
11628  045120  005704                          TST     R4              ;;SUPPRESS THIS 0?
11629  045122  001403                          BEQ     5$              ;;BR IF YES
11630  045124  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
11631  045126  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
11632  045132  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
11633  045136  110337  045202                  MOVB    R3,8$           ;;SAVE FOR TYPING
11634  045142  104401  045202                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
11635  045146  105337  045204          7$:     DECB    $OCNT           ;;COUNT BY 1
11636  045152  003347                          BGT     2$              ;;BR IF MORE TO DO
11637  045154  002402                          BLT     6$              ;;BR IF DONE
11638  045156  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
11639  045160  000744                          BR      2$              ;;GO DO THE LAST DIGIT
11640  045162  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
11641  045164  012604                          MOV     (SP)+,R4        ;;RESTORE R4
11642  045166  012603                          MOV     (SP)+,R3        ;;RESTORE R3
11643  045170  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
11644  045176  012616                          MOV     (SP)+,(SP)
11645  045200  000002                          RTI                     ;;RETURN
11646  045202     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
11647  045203     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
11648  045204     000                  $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
11649  045205     000                  $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
11650  045206  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
11651                                   .SBTTL  TTY INPUT ROUTINE
11652
11653                                   ;;**************************************************************************
11654                                   .ENABL  LSB
11655  045210  000000                  $TKCNT: .WORD   0               ;;NUMBER OF ITEMS IN QUEUE
11656  045212  000000                  $TKQIN: .WORD   0               ;;INPUT POINTER
11657  045214  000000                  $TKQOUT: .WORD  0               ;;OUTPUT POINTER
11658  045216  000001                  $TKQSRT: .BLKB  1               ;;TTY KEYBOARD QUEUE
11659          045217                  $TKQEND=.
11660          045220                  .EVEN
11661
11662                                   ;*TK INITIALIZE ROUTINE
11663                                   ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
11664                                   ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
11665                                   ;
11666                                   ;*CALL:
11667                                   ;*      JSR     PC,$TKINT
11668                                   ;*      RETURN
11669                                   ;
11670  045220  005037  045210          $TKINT: CLR     $TKCNT          ;;CLEAR COUNT OF ITEMS IN QUEUE
11671  045224  012737  045216  045212          MOV     #$TKQSRT,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
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11672  045232  013737  045212  045214          MOV     $TKQIN,$TKQOUT  ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
11673  045240  012737  045270  000060          MOV     #$TKSRV,@#TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
11674  045246  012737  000200  000062          MOV     #200,@#TKVEC+2  ;;'BR' LEVEL 4
11675  045254  005777  133666                  TST     @$TKB           ;;CLEAR DONE FLAG
11676  045260  012777  000100  133656          MOV     #100,@$TKS      ;;ENABLE TTY KEYBOARD INTERRUPT
11677  045266  000207                          RTS     PC              ;;RETURN TO CALLER
11678
11679                                  ;*TK SERVICE ROUTINE
11680                                  ;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
11681                                  ;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
11682                                  ;*IT IN THE QUEUE.
11683                                  ;*IF THE CHARACTER IS A "CONTROL-C" (^C) $TKINT IS CALLED AND
11684                                  ;*UPON RETURN EXIT IS MADE TO THE "CONTROL-C" RESTART ADDRESS (CTRHLT)
11685                                  ;
11686  045270  117746  133652  $TKSRV: MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
11687  045274  042716  177600          BIC     #^C177,(SP)     ;;STRIP THE JUNK
11688  045300  042716  177600          BIC     #^C177,(SP)     ;;STRIP THE JUNK
11689  045304  021627  000021          CMP     (SP),#$XON      ;;IS IT A RANDOM XON?
11690  045310  001002                  BNE     30$             ;;BRANCH IF NO
11691  045312  005726                  TST     (SP)+           ;;CLEAN RANDOM XON OFF STACK
11692  045314  000002                  RTI                     ;;RETURN
11693  045316                  30$:
11694  045316  021627  000003          CMP     (SP),#3         ;;IS IT A CONTROL C?
11695  045322  001007                  BNE     1$              ;;BRANCH IF NO
11696  045324  104401  046422          TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (^C)
11697  045330  004737  045220          JSR     PC,$TKINT       ;;INIT THE KEYBOARD
11698  045334  005726                  TST     (SP)+           ;;CLEAN UP STACK
11699  045336  000137  043724          JMP     CTRHLT          ;;CONTROL C RESTART
11700  045342  021627  000007  1$:     CMP     (SP),#7         ;;IS IT A CONTROL G?
11701  045346  001004                  BNE     2$              ;;BRANCH IF NO
11702  045350  022737  000176  001140  CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
11703  045356  001500                  BEQ     6$              ;;GO TO SWR CHANGE
11704
11705  045360                  2$:
11706  045360  022737  000001  045210  CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
11707  045366  001004                  BNE     3$              ;;BRANCH IF NO
11708  045370  104401  001266          TYPE    ,$BELL          ;;RING THE TTY BELL
11709  045374  005726                  TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
11710  045376  000451                  BR      5$              ;;EXIT
11711  045400  021627  000023  3$:     CMP     (SP),#23        ;;IS IT A CONTROL-S?
11712  045404  001021                  BNE     32$             ;;BRANCH IF NO
11713  045406  005077  133532          CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
11714  045412  005726                  TST     (SP)+           ;;CLEAN CHAR OFF STACK
11715  045414  105777  133524  31$:     TSTB    @$TKS           ;;WAIT FOR A CHAR
11716  045420  100375                  BPL     31$             ;;LOOP UNTIL ITS THERE
11717  045422  117746  133520          MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
11718  045426  042716  177600          BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
11719  045432  022627  000021          CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
11720  045436  001366                  BNE     31$             ;;BRANCH IF NO
11721  045440  012777  000100  133476  MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
11722  045446  000002                  RTI                     ;;RETURN
11723  045450  005237  045210  32$:     INC     $TKCNT          ;;COUNT THIS CHARACTER
11724  045454  021627  000140          CMP     (SP),#140       ;;IS IT UPPER CASE?
11725  045460  002405                  BLT     4$              ;;BRANCH IF YES
11726  045462  021627  000175          CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
11727  045466  003002                  BGT     4$              ;;BRANCH IF YES
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11728  045470  042716  000040                  BIC     #40,(SP)          ;;MAKE IT UPPER CASE
11729  045474  112677  177512          4$:     MOVB    (SP)+,@$TKQIN     ;;AND PUT IT IN QUEUE
11730  045500  005237  045212                  INC     $TKQIN            ;;UPDATE THE POINTER
11731  045504  023727  045212  045217          CMP     $TKQIN,#$TKQEND   ;;GO OFF THE END?
11732  045512  001003                          BNE     5$                ;;BRANCH IF NO
11733  045514  012737  045216  045212          MOV     #$TKQSRT,$TKQIN   ;;RESET THE POINTER
11734  045522  000002                  5$:     RTI                       ;;RETURN
11735
11736                                  ;;*****************************************************************
11737                                  ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
11738                                  ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
11739                                  ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
11740                                  ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
11741  045524  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR        ;;IS THE SOFT-SWR SELECTED
11742  045532  001124                          BNE     15$               ;;EXIT IF NOT
11743  045534  105777  133404                  TSTB    @$TKS             ;;IS A CHAR WAITING?
11744  045540  100121                          BPL     15$               ;;IF NOT, EXIT
11745  045542  117746  133400                  MOVB    @$TKB,-(SP)       ;;YES
11746  045546  042716  177600                  BIC     #^C177,(SP)       ;;MAKE IT  7-BIT ASCII
11747  045552  021627  000007                  CMP     (SP),#7           ;;IS IT A CONTROL-G?
11748  045556  001300                          BNE     2$                ;;IF NOT, PUT IT IN THE TTY QUEUE
11749                                                                    ;;AND EXIT
11750
11751                                  ;;*****************************************************************
11752                                  ;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
11753                                  ;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
11754                                  ;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
11755  045560  123727  001134  000001  6$:     CMPB    $AUTOB,#1         ;;ARE WE RUNNING IN AUTO-MODE?
11756  045566  001674                          BEQ     2$                ;;BRANCH IF YES
11757  045570  005726                          TST     (SP)+             ;;CLEAR CONTROL-G OFF STACK
11758  045572  004737  045220                  JSR     PC,$TKINT         ;;FLUSH THE TTY INPUT QUEUE
11759  045576  005077  133342                  CLR     @$TKS             ;;DISABLE TTY KEYBOARD INTERRUPTS
11760  045602  112737  000001  001135          MOVB    #1,$INTAG         ;;SET INTERRUPT MODE INDICATOR
11761
11762  045610  104401  046434                  TYPE    ,$CNTLG           ;;ECHO THE CONTROL-G (^G)
11763  045614  104401  046441          $GTSWR: TYPE    ,$MSWR            ;;TYPE CURRENT CONTENTS
11764  045620  013746  000176                  MOV     SWREG,-(SP)       ;;SAVE SWREG FOR TYPEOUT
11765  045624  104402                          TYPOC                     ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
11766  045626  104401  046452                  TYPE    ,$MNEW            ;;PROMPT FOR NEW SWR
11767  045632  005046                  19$:    CLR     -(SP)             ;;CLEAR COUNTER
11768  045634  005046                          CLR     -(SP)             ;;THE NEW SWR
11769  045636  105777  133302          7$:     TSTB    @$TKS             ;;CHAR THERE?
11770  045642  100375                          BPL     7$                ;;IF NOT TRY AGAIN
11771
11772  045644  117746  133276                  MOVB    @$TKB,-(SP)       ;;PICK UP CHAR
11773  045650  042716  177600                  BIC     #^C177,(SP)       ;;MAKE IT 7-BIT ASCII
11774
11775  045654  021627  000003                  CMP     (SP),#3           ;;IS IT A CONTROL-C?
11776  045660  001015                          BNE     9$                ;;BRANCH IF NOT
11777  045662  104401  046422                  TYPE    ,$CNTLC           ;;YES, ECHO CONTROL-C (^C)
11778  045666  062706  000006                  ADD     #6,SP             ;;CLEAN UP STACK
11779  045672  123727  001135  000001          CMPB    $INTAG,#1         ;;REENABLE TTY KEYBOARD INTERRUPTS?
11780  045700  001003                          BNE     8$                ;;BRANCH IF NO
11781  045702  012777  000100  133234          MOV     #100,@$TKS        ;;ALLOW TTY KEYBOARD INTERRUPTS
11782  045710  000137  043724          8$:     JMP     CTRHLT            ;;CONTROL-C RESTART
11783
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11784
11785  045714  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
11786  045720  001005                          BNE     10$             ;;BRANCH IF NOT
11787  045722  104401  046427                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
11788  045726  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
11789  045732  000737                          BR      19$             ;;LET'S TRY IT AGAIN
11790
11791
11792  045734  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
11793  045740  001022                          BNE     16$             ;;BRANCH IF NO
11794  045742  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
11795  045746  001403                          BEQ     11$             ;;BRANCH IF YES
11796  045750  016677  000002  133162          MOV     2(SP),@SWR      ;;SAVE NEW SWR
11797  045756  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
11798  045762  104401  001273          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
11799  045766  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
11800  045774  001003                          BNE     15$             ;;BRANCH IF NOT
11801  045776  012777  000100  133140          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
11802  046004  000002          15$:    RTI                             ;;RETURN
11803  046006  004737  044414          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
11804  046012  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
11805  046016  002420                          BLT     18$             ;;BRANCH IF YES
11806  046020  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
11807  046024  003015                          BGT     18$             ;;BRANCH IF YES
11808  046026  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
11809  046032  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
11810  046036  001403                          BEQ     17$             ;;BRANCH IF YES
11811  046040  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
11812  046042  006316                          ASL     (SP)            ;;   CHAR OVER TO MAKE
11813  046044  006316                          ASL     (SP)            ;;   ROOM FOR NEW ONE.
11814  046046  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
11815  046052  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
11816  046056  000667                          BR      7$              ;;GET THE NEXT ONE
11817  046060  104401  001272          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
11818  046064  000720                          BR      20$             ;;SIMULATE CONTROL-U
11819                                  .DSABL  LSB
11820
11821
11822                                  ;;**************************************************
11823                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
11824                                  ;*CALL:
11825                                  ;*      RDCHR                   ;;GET A CHARACTER FROM THE QUEUE
11826                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
11827                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
11828                                  ;
11829
11830  046066  011646          $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC AND
11831  046070  016666  000004  000002          MOV     4(SP),2(SP)     ;;THE PS
11832  046076  005066  000004                  CLR     4(SP)           ;;GET READY FOR A CHARACTER
11833  046102  005046                          CLR     -(SP)           ;;PUT NEW PS ON STACK
11834  046104  012746  046112                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
11835  046110  000002                          RTI                     ;;POP NEW PC AND PS
11836  046112                          64$:
11837  046112  005737  045210          1$:     TST     $TKCNT          ;;WAIT ON A CHARACTER
11838  046116  001775                          BEQ     1$
11839  046120  005337  045210                  DEC     $TKCNT          ;;DECREMENT THE COUNTER
```

```
11840  046124  117766  177064  000004          MOVB    @$TKQOUT,4(SP)  ;;GET ONE CHARACTER
11841  046132  005237  045214                  INC     $TKQOUT         ;;UPDATE THE POINTER
11842  046136  023727  045214  045217          CMP     $TKQOUT,#$TKQEND ;;DID IT GO OFF OF THE END?
11843  046144  001003                          BNE     2$              ;;BRANCH IF NO
11844  046146  012737  045216  045214          MOV     #$TKQSRT,$TKQOUT ;;RESET THE POINTER
11845  046154  000002                  2$:     RTI                     ;;RETURN
11846                                  ;;**************************************************************
11847                                  ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
11848                                  ;*CALL:
11849                                  ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
11850                                  ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
11851                                  ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
11852
11853  046156  010346                  $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
11854  046160  005046                          CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
11855  046162  012703  046412          1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
11856  046166  022703  046422          2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
11857  046172  101456                          BLOS    4$              ;;BR IF YES
11858  046174  104410                          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
11859  046176  112613                          MOVB    (SP)+,(R3)      ;;GET CHARACTER
11860  046200  122713  000177          10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
11861  046204  001022                          BNE     5$              ;;BR IF NO
11862  046206  005716                          TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
11863  046210  001007                          BNE     6$              ;;BR IF NO
11864  046212  112737  000134  046410          MOVB    #'\,9$          ;;TYPE A BACK SLASH
11865  046220  104401  046410                  TYPE    ,9$
11866  046224  012716  177777                  MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
11867  046230  005303                  6$:     DEC     R3              ;;BACKUP BY ONE
11868  046232  020327  046412                  CMP     R3,#$TTYIN      ;;STACK EMPTY?
11869  046236  103434                          BLO     4$              ;;BR IF YES
11870  046240  111337  046410                  MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
11871  046244  104401  046410                  TYPE    ,9$             ;;GO TYPE
11872  046250  000746                          BR      2$              ;;GO READ ANOTHER CHAR.
11873  046252  005716                  5$:     TST     (SP)            ;;RUBOUT KEY SET?
11874  046254  001406                          BEQ     7$              ;;BR IF NO
11875  046256  112737  000134  046410          MOVB    #'\,9$          ;;TYPE A BACK SLASH
11876  046264  104401  046410                  TYPE    ,9$
11877  046270  005016                          CLR     (SP)            ;;CLEAR THE RUBOUT KEY
11878  046272  122713  000025          7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
11879  046276  001003                          BNE     8$              ;;BR IF NO
11880  046300  104401  046427                  TYPE    ,$CNTLU         ;;TYPE A CONTROL 'U'
11881  046304  000726                          BR      1$              ;;GO START OVER
11882  046306  122713  000022          8$:     CMPB    #22,(R3)        ;;IS CHARACTER A '^R'?
11883  046312  001011                          BNE     3$              ;;BRANCH IF NO
11884  046314  105013                          CLRB    (R3)            ;;CLEAR THE CHARACTER
11885  046316  104401  001273                  TYPE    ,$CRLF          ;;TYPE A 'CR' & 'LF'
11886  046322  104401  046412                  TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
11887  046326  000717                          BR      2$              ;;GO PICKUP ANOTHER CHACTER
11888  046330  104401  001272          4$:     TYPE    ,$QUES          ;;TYPE A '?'
11889  046334  000712                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
11890  046336  111337  046410          3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
11891  046342  104401  046410                  TYPE    ,9$
11892  046346  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
11893  046352  001305                          BNE     2$              ;;LOOP IF NOT RETURN
11894  046354  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE LF)
11895  046360  104401  001274                  TYPE    ,$LF            ;;TYPE A LINE FEED
```

```
11896  046364  005726                          TST     (SP)+           ;;CLEAN PUBOUT KEY FROM THE STACK
11897  046366  012603                          MOV     (SP)+,R3        ;;RESTORE R3
11898  046370  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
11899  046372  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
11900  046400  012766  046412  000004          MOV     #$TTYIN,4(SP)
11901  046406  000002                          RTI                     ;;RETURN
11902  046410     000                  9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
11903  046411     000                          .BYTE   0               ;;TERMINATOR
11904  046412  000010                  $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
11905  046422  041536  005015     000  $CNTLC: .ASCIZ  /^C/<15><12>    ;;CONTROL "C"
11906  046427     136  006525  000012  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
11907  046434  043536  005015     000  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
11908  046441     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR = /
11909  046446  036440  000040
11910  046452  020040  042516  020127  $MNEW:  .ASCIZ  /  NEW = /
11911  046460  020075     000
11912          046464                  .EVEN
11913                                  .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
11914
11915                                  ;;*****************************************************************
11916                                  ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
11917                                  ;*CHANGE IT TO BINARY.
11918                                  ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
11919                                  ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
11920                                  ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
11921                                  ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
11922                                  ;*CALL:
11923                                  ;*      RDOCT                   ;;READ AN OCTAL NUMBER
11924                                  ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
11925                                  ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
11926
11927  046464  011646          $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
11928  046466  016666  000004  000002  MOV     4(SP),2(SP)     ;;INPUT NUMBER
11929  046474  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11930  046476  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11931  046500  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11932  046502  104411                  RDLIN                   ;;READ AN ASCIZ LINE
11933  046504  012600                  MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
11934  046506  010037  046612          MOV     R0,5$           ;;AND SAVE IT
11935  046512  005001                  CLR     R1              ;;CLEAR DATA WORD
11936  046514  005002                  CLR     R2
11937  046516  112046          2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
11938  046520  001420                  BEQ     3$              ;;IF ZERO GET OUT
11939  046522  122716  000060          CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
11940  046526  003026                  BGT     4$              ;;IS AN OCTAL DIGIT
11941  046530  122716  000067          CMPB    #'7,(SP)
11942  046534  002423                  BLT     4$
11943  046536  006301                  ASL     R1              ;;*2
11944  046540  006102                  ROL     R2
11945  046542  006301                  ASL     R1              ;;*4
11946  046544  006102                  ROL     R2
11947  046546  006301                  ASL     R1              ;;*8
11948  046550  006102                  ROL     R2
11949  046552  042716  177770          BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
11950  046556  062601                  ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
11951  046560  000756                  BR      2$              ;;LOOP
```

```
11952  046562  005726                  3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
11953  046564  010166  000012                  MOV     R1,12(SP)       ;;SAVE THE RESULT
11954  046570  010237  046622                  MOV     R2,$HIOCT
11955  046574  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
11956  046576  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
11957  046600  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
11958  046602  000002                          RTI                     ;;RETURN
11959  046604  005726                  4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
11960  046606  105010                          CLRB    (R0)            ;;SET A TERMINATOR
11961  046610  104401                          TYPE                    ;;TYPE UP THRU THE BAD CHAR.
11962  046612  000000                  5$:     .WORD   0
11963  046614  104401  001272                  TYPE    ,$QUES          ;;"?" "CR" & "LF"
11964  046620  000730                          BR      1$              ;;TRY AGAIN
11965  046622  000000                  $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
11966                                  .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
11967
11968                                  ;;**************************************************************
11969                                  ;*SAVE R0-R5
11970                                  ;*CALL:
11971                                  ;*      SAVREG
11972                                  ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
11973                                  ;*
11974                                  ;*TOP---(+16)
11975                                  ;* +2---(+18)
11976                                  ;* +4---R5
11977                                  ;* +6---R4
11978                                  ;* +8---R3
11979                                  ;*+10---R2
11980                                  ;*+12---R1
11981                                  ;*+14---R0
11982
11983  046624                          $SAVREG:
11984  046624  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11985  046626  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11986  046630  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11987  046632  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
11988  046634  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
11989  046636  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
11990  046640  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
11991  046644  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
11992  046650  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
11993  046654  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
11994  046660  000002                          RTI
11995
11996                                  ;*RESTORE R0-R5
11997                                  ;*CALL:
11998                                  ;*      RESREG
11999  046662                          $RESREG:
12000  046662  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
12001  046666  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
12002  046672  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
12003  046676  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
12004  046702  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
12005  046704  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
12006  046706  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
12007  046710  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
12008  046712  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
12009  046714  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
12010  046716  000002                          RTI
12011                                  .SBTTL  POWER DOWN AND UP ROUTINES
12012
12013                                  ;;**********************************************************************
12014                                  ;POWER DOWN ROUTINE
12015  046720  012737  047060  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
12016  046726  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
12017  046734  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
12018  046736  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
12019  046740  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
12020  046742  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
12021  046744  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
12022  046746  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
12023  046750  017746  132164                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
12024  046754  010637  047064                  MOV     SP,$SAVR6       ;;SAVE SP
12025  046760  012737  046772  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
12026  046766  000000                          HALT
12027  046770  000776                          BR      .-2             ;;HANG UP
12028
12029                                  ;;**********************************************************************
12030                                  ;POWER UP ROUTINE
12031  046772  012737  047060  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
12032  047000  013706  047064                  MOV     $SAVR6,SP       ;;GET SP
12033  047004  005037  047064                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
12034  047010  005237  047064          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
12035  047014  001375                          BNE     1$              ;;OF  WORD
12036  047016  012677  132116                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
12037  047022  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
12038  047024  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
12039  047026  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
12040  047030  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
12041  047032  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
12042  047034  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
12043  047036  012737  046720  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
12044  047044  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
12045  047052  104401                          TYPE                    ;REPORT THE POWER FAILURE
12046  047054  047066          $PWRMG: .WORD   $POWER                  ;;POWER FAIL MESSAGE POINTER
12047  047056  000002                          RTI
12048  047060  000000          $ILLUP: HALT                            ;;THE POWER UP SEQUENCE WAS STARTED
12049  047062  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
12050  047064  000000          $SAVR6: 0                               ;;PUT THE SP HERE
12051  047066  005015  047520  042527  $POWER: .ASCIZ  <15><12>''POWER''
12052  047074  000122
12053                                          .EVEN
12054                                  .SBTTL  TRAP DECODER
12055
12056                                  ;;**********************************************************************
12057                                  ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE ''TRAP'' INSTRUCTION
12058                                  ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
12059                                  ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
12060                                  ;*GO TO THAT ROUTINE.
12061
12062  047076  010046          $TRAP:  MOV     R0,-(SP)                ;;SAVE R0
12063  047100  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
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12064  047104  005740                  TST     -(R0)           ;;BACKUP BY 2
12065  047106  111000                  MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
12066  047110  006300                  ASL     R0              ;;POSITION FOR INDEXING
12067  047112  016000  047132          MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
12068  047116  000200                  RTS     R0              ;;GO TO ROUTINE
12069
12070
12071                          ;;THIS IS USE TO HANDLE THE ''GETPRI'' MACRO
12072
12073  047120  011646          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
12074  047122  016666  000004  000002  MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
12075  047130  000002                  RTI                     ;;RESTORE THE PSW
12076
12077                          .SBTTL  TRAP TABLE
12078
12079                          ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLE
12080                          ;*BY THE ''TRAP'' INSTRUCTION.
12081
12082                          ;       ROUTINE
12083                          ;       -------
12084  047132  047120          $TRPAD: .WORD   $TRAP2
12085  047134  044202                  $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
12086  047136  045006                  $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
12087  047140  044762                  $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
12088  047142  045022                  $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
12089  047144  044536                  $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
12090
12091  047146  045614                  $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
12092
12093  047150  045524                  $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
12094  047152  046066                  $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
12095  047154  046156                  $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
12096  047156  046464                  $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
12097  047160  046624                  $SAVREG ;;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
12098  047162  046662                  $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
12099  047164  035222                  SCOP1$  ;;CALL=SCOP1    TRAP+15(104415) INTERNAL LOOP ON ERROR
12100  047166  037176                  SSINIT  ;;CALL=TSSINIT  TRAP+16(104416) INITIALIZE SUBSYSTEM
12101  047170  035734                  LOADRK  ;;CALL=TLOADRK  TRAP+17(104417) LOAD RK611 FOR OPERATION
12102  047172  036164                  GETRK   ;;CALL=TGETRK   TRAP+20(104420) GET RK611 REGISTERS
12103  047174  040162                  CHKOP   ;;CALL=TCHKOP   TRAP+21(104421) CHECK OPREATION FOR ANY ERRORS
12104  047176  040130                  CHKWE   ;;CALL=TCHKWE   TRAP+22(104422) CHECK OPERATION FOR EXPECTED ERRORS
12105  047200  035530                  IWAT16  ;;CALL=TWAT16   TRAP+23(104423) WAIT 16 MS
12106  047202  035520                  IWAT32  ;;CALL=TWAT32   TRAP+24(104424) WAIT 32 MS
12107  047204  035510                  IWAT48  ;;CALL=TWAT48   TRAP+25(104425) WAIT 48 MS
12108  047206  035500                  IWAT64  ;;CALL=TWAT64   TRAP+26(104426) WAIT 64 MS
12109  047210  035470                  IWAT80  ;;CALL=TWAT80   TRAP+27(104427) WAIT 80 MS
12110  047212  035460                  IWAT96  ;;CALL=TWAT96   TRAP+30(104430) WAIT 96 MS
12111  047214  035450                  IWAT112 ;;CALL=TWAT112  TRAP+31(104431) WAIT 112 MS
12112  047216  035440                  IWAT128 ;;CALL=TWAT128  TRAP+32(104432) WAIT 128 MS
12113  047220  035430                  IWAT144 ;;CALL=TWAT144  TRAP+33(104433) WAIT 144 MS
12114  047222  035420                  IWAT159 ;;CALL=TWAT159  TRAP+34(104434) WAIT 160 MS
12115  047224  035410                  IWAT1S  ;;CALL=TWAT1S   TRAP+35(104435) WAIT FOR 1 SECOND
12116  047226  035400                  IWAT2S  ;;CALL=TWAT2S   TRAP+36(104436) WAIT FOR 2 SECONDS
12117  047230  035360                  IWAT8S  ;;CALL=TWAT8S   TRAP+37(104437) WAIT FOR 8 SECONDS
12118  047232  035370                  IWAT1M  ;;CALL=TWAT1M   TRAP+40(104440) WAIT FOR 1 MIN
12119          000102          $TERM=.-$TRPAD
```

```
12120                                   .SBTTL  DATA PATTERNS
12121                                   ;DATA PATTERN 1
12122                                   ;       PATTERN IS ALL ZEROS
12123
12124                                   ;DATA PATTERN 2
12125                                   ;       HI-LO FREQ. MIX
12126  047234                           PAT02:
12127  047234  177777                             177777
12128  047236  177777                             177777
12129  047240  177777                             177777
12130  047242  052525                             052525
12131  047244  052525                             052525
12132  047246  052525                             052525
12133  047250  177777                             177777
12134  047252  177777                             177777
12135  047254  052525                             052525
12136  047256  052525                             052525
12137  047260  177777                             177777
12138  047262  052525                             052525
12139  047264  177252                             177252
12140  047266  177252                             177252
12141  047270  172765                             172765
12142  047272  172765                             172765
12143
12144                                   ;DATA PATERN 3
12145                                   ;       HI FREQ. PHASE MIX
12146  047274                           PAT03:
12147  047274  000000                             000000
12148  047276  000000                             000000
12149  047300  000000                             000000
12150  047302  177777                             177777
12151  047304  177777                             177777
12152  047306  177777                             177777
12153  047310  000000                             000000
12154  047312  000000                             000000
12155  047314  177777                             177777
12156  047316  177777                             177777
12157  047320  000000                             000000
12158  047322  177777                             177777
12159  047324  000000                             000000
12160  047326  177777                             177777
12161  047330  000000                             000000
12162  047332  177777                             177777
12163
12164                                   ;DATA PATTERN 4
12165                                   ;       LO FREQ. PHASE MIX
12166  047334                           PAT04:
12167  047334  052525                             052525
12168  047336  052525                             052525
12169  047340  052525                             052525
12170  047342  125252                             125252
12171  047344  125252                             125252
12172  047346  125252                             125252
12173  047350  052525                             052525
12174  047352  052525                             052525
12175  047354  125252                             125252
```

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12176  047356  125252                    125252
12177  047360  052525                    052525
12178  047362  125252                    125252
12179  047364  052525                    052525
12180  047366  125252                    125252
12181  047370  052525                    052525
12182  047372  125252                    125252
12183
12184                                    ;DATA PATTERN 5
12185                                    ;       MAX PRECOMP. PHASE MIX
12186  047374                            PAT05:
12187  047374  133333                    133333
12188  047376  066666                    066666
12189  047400  155555                    155555
12190  047402  155555                    155555
12191  047404  133333                    133333
12192  047406  066666                    066666
12193  047410  066666                    066666
12194  047412  155555                    155555
12195  047414  155555                    155555
12196  047416  133333                    133333
12197  047420  133333                    133333
12198  047422  133333                    133333
12199  047424  133333                    133333
12200  047426  133333                    133333
12201  047430  133333                    133333
12202  047432  133333                    133333
12203
12204                                    ;DATA PATTERN 6
12205                                    ;       ROTATING BOUNDARY PULSE PRECOMP.
12206  047434                            PAT06:
12207  047434  121105                    121105
12208  047436  150442                    150442
12209  047440  064221                    064221
12210  047442  132110                    132110
12211  047444  055044                    055044
12212  047446  026422                    026422
12213  047450  013211                    013211
12214  047452  105504                    105504
12215  047454  042642                    042642
12216  047456  021321                    021321
12217  047460  110550                    110550
12218  047462  044264                    044264
12219  047464  022132                    022132
12220  047466  011055                    011055
12221  047470  104426                    104426
12222  047472  042213                    042213
12223
12224                                    ;DATA PATTERN 7
12225                                    ;       FIELD OF ALL ONES
12226
12227                                    ;DATA PATTERN 10
12228                                    ;       ROTATING CELL PULSE PRECOMP.
12229  047474                            PAT10:
12230  047474  026455                    026455
12231  047476  113226                    113226
```

```
12232  047500  045513                          045513
12233  047502  122645                          122645
12234  047504  151322                          151322
12235  047506  064551                          064551
12236  047510  132264                          132264
12237  047512  055132                          055132
12238  047514  026455                          026455
12239  047516  113226                          113226
12240  047520  045513                          045513
12241  047522  122645                          122645
12242  047524  151322                          151322
12243  047526  064551                          064551
12244  047530  132264                          132264
12245  047532  055132                          055132
12246
12247                                  ;DATA PATTERN 11
12248                                  ;       SHIFTED 1 IN A FIELD OF ZEROS
12249  047534                          PAT11:
12250  047534  000001                          000001
12251  047536  000002                          000002
12252  047540  000004                          000004
12253  047542  000010                          000010
12254  047544  000020                          000020
12255  047546  000040                          000040
12256  047550  000100                          000100
12257  047552  000200                          000200
12258  047554  000400                          000400
12259  047556  001000                          001000
12260  047560  002000                          002000
12261  047562  004000                          004000
12262  047564  010000                          010000
12263  047566  020000                          020000
12264  047570  040000                          040000
12265  047572  100000                          100000
12266
12267                                  ;DATA PATTERN 12
12268                                  ;       SHIFTED 0 IN A FIELD OF ONES
12269  047574                          PAT12:
12270  047574  177776                          177776
12271  047576  177775                          177775
12272  047600  177773                          177773
12273  047602  177767                          177767
12274  047604  177757                          177757
12275  047606  177737                          177737
12276  047610  177677                          177677
12277  047612  177577                          177577
12278  047614  177377                          177377
12279  047616  176777                          176777
12280  047620  175777                          175777
12281  047622  173777                          173777
12282  047624  167777                          167777
12283  047626  157777                          157777
12284  047630  137777                          137777
12285  047632  077777                          077777
12286
12287                                  ;DATA PATTERN 13
```

```
12288
12289  047634
12290  047634  052525                ;       ALTERNATING 0-1
12291  047636  052525                PAT13:
12292  047640  052525                        052525
12293  047642  052525                        052525
12294  047644  052525                        052525
12295  047646  052525                        052525
12296  047650  052525                        052525
12297  047652  052525                        052525
12298  047654  052525                        052525
12299  047656  052525                        052525
12300  047660  052525                        052525
12301  047662  052525                        052525
12302  047664  052525                        052525
12303  047666  052525                        052525
12304  047670  052525                        052525
12305  047672  052525                        052525
12306
12307                                  ;DATA PATTERN 14
12308                                  ;       ALTERNATING 1-0
12309  047674                          PAT14:
12310  047674  125252                        125252
12311  047676  125252                        125252
12312  047700  125252                        125252
12313  047702  125252                        125252
12314  047704  125252                        125252
12315  047706  125252                        125252
12316  047710  125252                        125252
12317  047712  125252                        125252
12318  047714  125252                        125252
12319  047716  125252                        125252
12320  047720  125252                        125252
12321  047722  125252                        125252
12322  047724  125252                        125252
12323  047726  125252                        125252
12324  047730  125252                        125252
12325  047732  125252                        125252
12326
12327                                  ;DATA PATTERN 15
12328                                  ;       SHIFTING ZEROS AND ONES
12329  047734                          PAT15:
12330  047734  000001                        000001
12331  047736  000003                        000003
12332  047740  000007                        000007
12333  047742  000017                        000017
12334  047744  000037                        000037
12335  047746  000077                        000077
12336  047750  000177                        000177
12337  047752  000377                        000377
12338  047754  000777                        000777
12339  047756  001777                        001777
12340  047760  003777                        003777
12341  047762  007777                        007777
12342  047764  017777                        017777
12343  047766  037777                        037777
```

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12344  047770  077777                          077777
12345  047772  177777                          177777
12346
12347                                  ;DATA PATTERN 16
12348                                  ;       COMPOSITE ROTATING
12349  047774                          ;
12350  047774  072307                  PAT16:
12351  047776  135143                          072307
12352  050000  156461                          135143
12353  050002  167230                          156461
12354  050004  073514                          167230
12355  050006  035646                          073514
12356  050010  016723                          035646
12357  050012  107351                          016723
12358  050014  143564                          107351
12359  050016  061672                          143564
12360  050020  030735                          061672
12361  050022  114356                          030735
12362  050024  046167                          114356
12363  050026  123073                          046167
12364  050030  151453                          123073
12365  050032  164616                          151453
12366                                          164616
```

```
                        .SBTTL  FIELDS AND VARIABLES FOR OPERATION CHECKING
            024000      CS1ERBIT=24000                  ;CS1 ERROR BITS SPAR & CTO
            177400      CS2ERBIT=177400                 ;CS2 ERROR BITS
                                                        ;DLT,WCE,UPE,NED,NEM
                                                        ;PGE,MOS,UFE
            000070      DSERBIT=70                      ;DS ERROR BITS
                                                        ;SPDLSS,DROT,ACLO

 050034     000000      EXPWC:  .WORD   0               ;EXPECTED WORD COUNT (GIVEN)
 050036     000000      EXPUBA: .WORD   0               ;EXPECTED UPPER BA (COMPUTED)
 050040     000000      EXPBA:  .WORD   0               ;EXPECTED BUS ADDRESS (COMPUTED)
 050042     000000      EXPCYL: .WORD   0               ;EXPECTED CYLINDER (COMPUTED)
 050044     000000      EXPSEC: .WORD   0               ;EXPECTED SECTOR (COMPUTED)
 050046     000000      EXPTRK: .WORD   0               ;EXPECTED TRACK (COMPUTED)

 050050     000000      REALWC: .WORD   0               ;WORD COUNT AT END OF OPERATION
 050052     000000      REALUB: .WORD   0               ;REAL UPPER BA
 050054     000000      REALBA: .WORD   0               ;BUS ADDRESS
 050056     000000      REALCY: .WORD   0               ;CYLINDER
 050060     000000      REALTRK:.WORD   0               ;TRACK
 050062     000000      REALSEC:.WORD   0               ;SECTOR

 050064     000000      GRP1ER: .WORD   0               ;GROUP 1 ERROR FIELDS
            000001              SPARERR=BIT0            ;CONTROLLER DETECTED DRIVE BUS PARITY ERR
            000002              SKIERR= BIT1            ;SEEK INCOMPLETE
            000004              NXFERR= BIT2            ;NON-EXECUTABLE DRIVE FUNCTION
            000010              DRPARERR=BIT3           ;DRIVE DETECTED DRIVE BUS PARITY ERROR
            000020              FMTERR= BIT4            ;FORMAT ERROR
            000040              DTYERR= BIT5            ;DRIVE TYPE ERROR
            000100              ACLOERR=BIT6            ;AC LOW ERROR
            000200              SPDERR= BIT7            ;SPEED LOSS ERROR
            000400              DROTERR=BIT8            ;DRIVE OFF TRACK ERROR
            001000              COERR=  BIT9            ;CYLINDER OVER FLOW ERROR
            002000              IDAERR= BIT10           ;ILLEGAL DISK ADDRESS ERROR
            004000              WLERR=  BIT11           ;WRITE LOCK ERROR
            010000              DTERR=  BIT12           ;DRIVE TIMING ERROR
            020000              NCERWE= BIT13           ;NO CERR WITH ERROR SET ERROR
            040000              UNSERR= BIT14           ;DRIVE UNSAFE ERROR
            100000              CERNER= BIT15           ;CERR BUT NO ERROR SET ERROR

 050066     000000      GRP2ER: .WORD   0               ;GROUP 2 ERROR FIELD
            000001              ECHERR= BIT0            ;ECC HARD ERROR
            000002              DCKERR= BIT1            ;DATA CHECK ERROR
            000004              WCKERR= BIT2            ;WRITE CHECK ERROR
            000010              DLTERR= BIT3            ;DATA LATE ERROR
            000020              OPIERR= BIT4            ;OPERATION INCOMPLETE ERROR
            000040              HVRCERR=BIT5            ;HEADER VRC ERROR
            000100              BSERR=  BIT6            ;BAD SECTOR ERROR

 050070     000000      GRP3ER: .WORD   0               ;GROUP 3 ERROR FIELD
            000001              NEDERR= BIT0            ;NON-EXISTANT DRIVE ERROR
            000002              CTOERR= BIT1            ;CONTROLLER TIME OUT ERROR
            000004              UFERR=  BIT2            ;UNIT FIELD ERROR
            000010              MDSERR= BIT3            ;MULTIPLE DRIVE SELECT ERROR
            000020              PGERR=  BIT4            ;PROGRAMMING ERROR
            000040              NEMERR= BIT5            ;NON-EXISTANT MEMORY ERROR
```

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12423           000100                  UPERR=  BIT6            ;UNIBUS PARITY ERROR
12424           000200                  ILFERR= BIT7            ;ILLEGAL FUNCTION ERROR.
12425
12426  050072   000000          GRP4ER: .WORD   0               ;GROUP 4 ERROR FIELD
12427           000001                  WCERR=  BIT0            ;WORD COUNT ERROR FLAG
12428           000002                  UBAERR= BIT1            ;UPPER BA ERROR
12429           000004                  BAERR=  BIT2            ;BUS ADDRESS ERROR FLAG
12430           000010                  CYLERR= BIT3            ;CYL ADDRESS ERROR FLAG
12431           000020                  TRKERR= BIT4            ;TRACK ADDRESS ERROR FLAG
12432           000040                  SECERR= BIT5            ;SECTOR ADDRESS ERROR FLAG
12433
12434  050074   054076          GRP4MS: .WORD   EM10
12435  050076   054151                  .WORD   EM11A
12436  050100   054123                  .WORD   EM11
12437  050102   054225                  .WORD   EM12
12438  050104   054260                  .WORD   EM13
12439  050106   054310                  .WORD   EM14
12440
12441  050110   054342          GRP3MS: .WORD   EM15
12442  050112   054365                  .WORD   EM16
12443  050114   054410                  .WORD   EM17
12444  050116   054431                  .WORD   EM18
12445  050120   054456                  .WORD   EM19
12446  050122   054500                  .WORD   EM20
12447  050124   054524                  .WORD   EM21
12448  050126   054550                  .WORD   EM22
12449
12450  050130   054571          GRP2MS: .WORD   EM23
12451  050132   054602                  .WORD   EM24
12452  050134   054615                  .WORD   EM25
12453  050136   054631                  .WORD   EM26
12454  050140   054643                  .WORD   EM27
12455  050142   054670                  .WORD   EM28
12456  050144   054703                  .WORD   EM29
12457
12458  050146   054724          GRP1MS: .WORD   EM30
12459  050150   054777                  .WORD   EM31
12460  050152   055017                  .WORD   EM32
12461  050154   055055                  .WORD   EM33
12462  050156   055123                  .WORD   EM34
12463  050160   055140                  .WORD   EM35
12464  050162   055161                  .WORD   EM36
12465  050164   055170                  .WORD   EM37
12466  050166   055213                  .WORD   EM38
12467  050170   055233                  .WORD   EM39
12468  050172   055255                  .WORD   EM40
12469  050174   055307                  .WORD   EM41
12470  050176   055330                  .WORD   EM42
12471  050200   055353                  .WORD   EM43
12472  050202   055415                  .WORD   EM44
12473  050204   055432                  .WORD   EM45
12474
12475  050206   000000          GPSUMF: .WORD   0               ;GROUP ERROR SUMMARY FLAGS
12476           000001                  GRP1ST= BIT0            ;GROUP 1 ERROR SET
12477           000002                  GRP2ST= BIT1            ;GROUP 2 ERROR SET
12478           000004                  GRP3ST= BIT2            ;GROUP 3 ERROR SET
```

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12479           000010                          GP1NR=  BIT3            ;GROUP 1 ERROR NOT RECEIVED
12480           000020                          GP2NR=  BIT4            ;GROUP 2 ERROR NOT RECEIVED
12481           000040                          GP3NR=  BIT5            ;GROUP 3 ERROR NOT RECEIVED
12482           040000                          DRSTER= BIT14           ;ERROR IN GETTING DRIVE STATUS FLAG.
12483           100000                          REPNR=  BIT15           ;REPORTING NOT RECEIVED SWITCH
12484
12485                                   .SBTTL  TABLE OF OPERATION MESSAGE ADDRESS
12486                                   ;*      THIS TABLE CONTAINS THE ADDRESS OF ASCIZ FIELDS THAT ARE
12487                                   ;*      USED IN REPORTING TO IDENTIFY THE OPERATION BEING PERFORMED.
12488
12489   050210  050250                  CMNDLB: .WORD   OPER00          ;ADDRESS OF SELECT MESSAGE
12490   050212  050265                          .WORD   OPER02          ;           PACK ACK
12491   050214  050276                          .WORD   OPER04          ;           DRIVE CLEAR
12492   050216  050312                          .WORD   OPER06          ;           UNLOAD
12493   050220  050321                          .WORD   OPER10          ;           START SPINDLE
12494   050222  050337                          .WORD   OPER12          ;           RECALIBRATE
12495   050224  050353                          .WORD   OPER14          ;           OFFSET
12496   050226  050362                          .WORD   OPER16          ;           SEEK
12497   050230  050367                          .WORD   OPER20          ;           READ DATA
12498   050232  050401                          .WORD   OPER22          ;           WRITE DATA
12499   050234  050414                          .WORD   OPER24          ;           READ HEADER
12500   050236  050431                          .WORD   OPER26          ;           WRITE HEADER
12501   050240  050447                          .WORD   OPER30          ;           WRITE CHECK
12502   050242  050463                          .WORD   OPER32          ;ILLEGAL OPERATION 33
12503   050244  050507                          .WORD   OPER34          ;                  35
12504   050246  050533                          .WORD   OPER36          ;                  37
12505
12506                                   .SBTTL  OPERATION MESSAGES
12507   050250  051104  053111  020105  OPER00: .ASCIZ  /DRIVE SELECT/
12508   050256  042523  042514  052103
12509   050264     000
12510   050265     120  041501  020113  OPER02: .ASCIZ  /PACK ACK/
12511   050272  041501  000113
12512   050276  051104  053111  020105  OPER04: .ASCIZ  /DRIVE CLEAR/
12513   050304  046103  040505  000122
12514   050312  047125  047514  042101  OPER06: .ASCIZ  /UNLOAD/
12515   050320     000
12516   050321     123  040524  052122  OPER10: .ASCIZ  /START SPINDLE/
12517   050326  051440  044520  042116
12518   050334  042514     000
12519   050337     122  041505  046101  OPER12: .ASCIZ  /RECALIBRATE/
12520   050344  041111  040522  042524
12521   050352     000
12522   050353     117  043106  042523  OPER14: .ASCIZ  /OFFSET/
12523   050360  000124
12524   050362  042523  045505     000  OPER16: .ASCIZ  /SEEK/
12525   050367     122  040505  020104  OPER20: .ASCIZ  /READ DATA/
12526   050374  040504  040524     000
12527   050401     127  044522  042524  OPER22: .ASCIZ  /WRITE DATA/
12528   050406  042040  052101  000101
12529   050414  042522  042101  044040  OPER24: .ASCIZ  /READ HEADERS/
12530   050422  040505  042504  051522
12531   050430     000
12532   050431     127  044522  042524  OPER26: .ASCIZ  /WRITE HEADERS/
12533   050436  044040  040505  042504
12534   050444  051522     000
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12535  050447     127  044522  042524  OPER30: .ASCIZ  /WRITE CHECK/
12536  050454  041440  042510  045503
12537  050462     000
12538  050463     111  046114  043505  OPER32: .ASCIZ  /ILLEGAL FUNCTION 33/
12539  050470  046101  043040  047125
12540  050476  052103  047511  020116
12541  050504  031463     000
12542  050507     111  046114  043505  OPER34: .ASCIZ  /ILLEGAL FUNCTION 35/
12543  050514  046101  043040  047125
12544  050522  052103  047511  020116
12545  050530  032463     000
12546  050533     111  046114  043505  OPER36: .ASCIZ  /ILLEGAL FUNCTION 37/
12547  050540  046101  043040  047125
12548  050546  052103  047511  020116
12549  050554  033463     000
12550  050557     127  044522  042524  OPER37: .ASCIZ  /WRITE DATA ABORTED WITH BSE/
12551  050564  042040  052101  020101
12552  050572  041101  051117  042524
12553  050600  020104  044527  044124
12554  050606  041040  042523     000
12555  050613                         OPER40:
12556  050613     127  044522  042524  OPER41: .ASCIZ  /WRITE CHECK ABORTED WITH WCE/
12557  050620  041440  042510  045503
12558  050626  040440  047502  052122
12559  050634  042105  053440  052111
12560  050642  020110  041527  000105
12561  050650  051127  052111  020105  OPER42: .ASCIZ  /WRITE DATA ABORTED WITH NON-EXISTANT MEMORY/
12562  050656  040504  040524  040440
12563  050664  047502  052122  042105
12564  050672  053440  052111  020110
12565  050700  047516  026516  054105
12566  050706  051511  040524  052116
12567  050714  046440  046505  051117
12568  050722  000131
12569  050724  042522  042101  042040  OPER43: .ASCIZ  /READ DATA ABORTED WITH NON-EXISTANT MEMORY/
12570  050732  052101  020101  041101
12571  050740  051117  042524  020104
12572  050746  044527  044124  047040
12573  050754  047117  042455  044530
12574  050762  052123  047101  020124
12575  050770  042515  047515  054522
12576  050776     000
12577  050777     127  044522  042524  OPER44: .ASCIZ  /WRITE DATA ABORTED WITH UNIBUS PARITY ERROR/
12578  051004  042040  052101  020101
12579  051012  041101  051117  042524
12580  051020  020104  044527  044124
12581  051026  052440  044516  052502
12582  051034  020123  040520  044522
12583  051042  054524  042440  051122
12584  051050  051117     000
12585
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12586                                   .SBTTL  ASCII MESSAGES
12587
12588  051053     040  000040          SPACE2: .ASCIZ  / /
12589  051056  005015  045522  030466  OPR001: .ASCIZ  <15><12>/RK611 BUS ADDRESS ( /
12590  051064  020061  052502  020123
12591  051072  042101  051104  051505
12592  051100  020123  020050     000
12593  051105     040  020051  020075  OPR002: .ASCIZ  / ) = /
12594  051112      ^0
12595  051113      _2  033113  030461  OPR003: .ASCIZ  /RK611 VECTOR ADDRESS ( /
12596  051120  053040  041505  047524
12597  051126  020122  042101  051104
12598  051134  051505  020123  020050
12599  051142     000
12600  051143     122  033113  030461  OPR004: .ASCIZ  /RK611 PRIORITY ( /
12601  051150  050040  044522  051117
12602  051156  052111  020131  020050
12603  051164     000
12604  051165     111  051516  043125  OPR005: .ASCIZ  /INSUFFICIENT MEMORY. PROGRAM ABORTING./<15><12>
12605  051172  044506  044503  047105
12606  051200  020124  042515  047515
12607  051206  054522  020056  051120
12608  051214  043517  040522  020115
12609  051222  041101  051117  044524
12610  051230  043516  006456  000012
12611  051236                          OPR006:
12612                                   ;       .ASCII  <15><12>/TO BYPASS TESTING DRIVE 0, PLACE IT OFF-LINE/
12613                                   ;       .ASCIZ  <15><12>/TO TEST DRIVE 0, REPLACE PROGRAM PACK WITH SCRATCH PACK/
12614  051236                          OPR007:
12615  051236  005015  044103  047101          .ASCII  <CR><LF>/CHANGE XXDP PACK/
12616  051244  042507  054040  042130
12617  051252  020120  040520  045503
12618  051260  005015  046103  040505          .ASCIZ  <CR><LF>/CLEAR LOC 40,RESTART PROGRAM/
12619  051266  020122  047514  020103
12620  051274  030064  051054  051505
12621  051302  040524  052122  050040
12622  051310  047522  051107  046501
12623  051316     000
12624                                   ;       .ASCII  <15><12>/DRIVE 0 WILL NOT BE TESTED. TO TEST DRIVE 0./<15><12>
12625                                   ;       .ASCIZ  /RESTART AT 214 AND MOUNT SCRATCH PACK AS DIRECTED./
12626  051317     015  047012  020117  OPR008: .ASCIZ  <15><12>/NO DRIVES AVAILABLE FOR TESTING. PROGRAM ABORTED/
12627  051324  051104  053111  051505
12628  051332  040440  040526  046111
12629  051340  041101  042514  043040
12630  051346  051117  052040  051505
12631  051354  044524  043516  020056
12632  051362  051120  043517  040522
12633  051370  020115  041101  051117
12634  051376  042524  000104
12635  051402  005015  044124  020105  OPR009: .ASCIZ  <15><12>/THE FOLLOWING DRIVES WILL BE TESTED/<15><12>
12636  051410  047506  046114  053517
12637  051416  047111  020107  051104
12638  051424  053111  051505  053440
12639  051432  046111  020114  042502
12640  051440  052040  051505  042524
12641  051446  006504  000012
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12642  051452  005015  047516  050040  OPR010: .ASCII  <15><12>/NO PARITY OPTION FOR MEMORY AREA IN USE/<15><12>
12643  051460  051101  052111  020131
12644  051466  050117  044524  047117
12645  051474  043040  051117  046440
12646  051502  046505  051117  020131
12647  051510  051101  040505  044440
12648  051516  020116  051525  006505
12649  051524     012
12650  051525     055  052440  044516          .ASCIZ  /- UNIBUS PARITY ERROR TEST BYPASSED/<15><12>
12651  051532  052502  020123  040520
12652  051540  044522  054524  042440
12653  051546  051122  051117  052040
12654  051554  051505  020124  054502
12655  051562  040520  051523  042105
12656  051570  005015     000
12657  051573     015  046412  046505  OPR011: .ASCII  <15><12>/MEMORY SIZE NOT LARGE ENOUGH FOR BUS ADDRESS BITS 16 & 17 TESTS
12658  051600  051117  020131  044523
12659  051606  042532  047040  052117
12660  051614  046040  051101  042507
12661  051622  042440  047516  043525
12662  051630  020110  047506  020122
12663  051636  052502  020123  042101
12664  051644  051104  051505  020123
12665  051652  044502  051524  030440
12666  051660  020066  020046  033461
12667  051666  052040  051505  051524
12668  051674  005015
12669  051676  046101  020114  040504          .ASCIZ  /ALL DATA XFER TESTS WITH ADDR >/
12670  051704  040524  054040  042506
12671  051712  020122  042524  052123
12672  051720  020123  044527  044124
12673  051726  040440  042104  020122
12674  051734  000076
12675  051736  031063  000113          OPR012: .ASCIZ  /32K/
12676  051742  032066  000113          OPR013: .ASCIZ  /64K/
12677  051746  033071  000113          OPR014: .ASCIZ  /96K/
12678  051752  041040  050131  051501  OPR015: .ASCIZ  / BYPASSED/<15><12>
12679  051760  042523  006504  000012
12680  051766  005015  020012  020040  OPR016: .ASCII  <15><12><12>/       *** CAUTION ***/<15><12><12>
12681  051774  020040  020040  025052
12682  052002  020052  040503  052125
12683  052010  047511  020116  025052
12684  052016  006452  005012
12685  052022  044124  051511  050040          .ASCII  /THIS PROGRAM SHOULD BE HALTED BY TYPING ^C./<15><12>
12686  052030  047522  051107  046501
12687  052036  051440  047510  046125
12688  052044  020104  042502  044040
12689  052052  046101  042524  020104
12690  052060  054502  052040  050131
12691  052066  047111  020107  041536
12692  052074  006456     012
12693  052077     111  020106  040510          .ASCII  /IF HALTED USING THE HALT KEY, THE STATE OF THE DRIVE/<15><12>
12694  052104  052114  042105  052440
12695  052112  044523  043516  052040
12696  052120  042510  044040  046101
12697  052126  020124  042513  026131
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12698  052134  052040  042510  051440
12699  052142  040524  042524  047440
12700  052150  020106  044124  020105
12701  052156  051104  053111  006505
12702  052164     012
12703  052165     117  020122  040503          .ASCII  /OR CARTRIDGE CANNOT BE PREDICTED./<15><12><12>
12704  052172  052122  044522  043504
12705  052200  020105  040503  047116
12706  052206  052117  041040  020105
12707  052214  051120  042105  041511
12708  052222  042524  027104  005015
12709  052230     012
12710  052231     101  046114  042040          .ASCII  /ALL DRIVES TO BE TESTED MUST BE ON-LINE./<15><12>
12711  052236  044522  042526  020123
12712  052244  047524  041040  020105
12713  052252  042524  052123  042105
12714  052260  046440  051525  020124
12715  052266  042502  047440  026516
12716  052274  044514  042516  006454
12717  052302     012
12718  052303     122  040505  054504          .ASCII  /READY, AND WRITE LOCK RESET./<15><12>
12719  052310  020054  047101  020104
12720  052316  051127  052111  020105
12721  052324  047514  045503  051040
12722  052332  051505  052105  006456
12723  052340     012
12724  052341     101  054516  042040          .ASCII  /ANY DRIVE NOT TO BE TESTED MUST BE OFF-LINE./<15><12><12>
12725  052346  044522  042526  047040
12726  052354  052117  052040  020117
12727  052362  042502  052040  051505
12728  052370  042524  020104  052515
12729  052376  052123  041040  020105
12730  052404  043117  026506  044514
12731  052412  042516  006456  005012
12732  052420  047516  042524  020072          .ASCII  /NOTE: 2ND AND SUBSEQUENT PASS RUN TIME IS/<15><12>
12733  052426  047062  020104  047101
12734  052434  020104  052523  051502
12735  052442  050505  042525  052116
12736  052450  050040  051501  020123
12737  052456  052522  020116  044524
12738  052464  042515  044440  006523
12739  052472     012
12740  052473     040  020040  020040          .ASCIZ  /      APPROX 2 MIN 30 SEC FOR EACH DRIVE./<15><12>
12741  052500  040440  050120  047522
12742  052506  020130  020062  044515
12743  052514  020116  030063  051440
12744  052522  041505  043040  051117
12745  052530  042440  041501  020110
12746  052536  051104  053111  027105
12747  052544  005015     000
12748  052547     015  043012  051111  OPR017: .ASCII  <15><12>/FIRST 256 SECTORS NOT BSE ERROR FREE./
12749  052554  052123  031040  033065
12750  052562  051440  041505  047524
12751  052570  051522  047040  052117
12752  052576  041040  042523  042440
12753  052604  051122  051117  043040
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12754  052612  042522  027105
12755  052616  040515  044530  052515          .ASCIZ  /MAXIMUM DATA TRANSFER TEST BYPASSED/<15><12>
12756  052624  020115  040504  040524
12757  052632  052040  040522  051516
12758  052640  042506  020122  042524
12759  052646  052123  041040  050131
12760  052654  051501  042523  006504
12761  052662  000012
12762  052664  020040  020040  006440  OPR018: .ASCIZ  /     /<15><12>/ONLY 1 DRIVE. OVERLAPPED OPERATIONS BYPASSED/<15><12>
12763  052672  047412  046116  020131
12764  052700  020061  051104  053111
12765  052706  027105  047440  042526
12766  052714  046122  050101  042520
12767  052722  020104  050117  051105
12768  052730  052101  047511  051516
12769  052736  041040  050131  051501
12770  052744  042523  006504  000012
12771  052752  005015  041523  050117  OPR019: .ASCII  <15><12>@SCOPE: CH1 (TRIG), E53-8; CH2, E49-2 (AC COUPLE, .2V/CM)@
12772  052760  035105  041440  030510
12773  052766  024040  051124  043511
12774  052774  026051  042440  031465
12775  053002  034055  020073  044103
12776  053010  026062  042440  034464
12777  053016  031055  024040  041501
12778  053024  041440  052517  046120
12779  053032  026105  027040  053062
12780  053040  041457  024515
12781  053044  005015  042101  052512          .ASCIZ  <15><12>/ADJUST R72 FOR CONSTANT LEVEL ON CH2/<15><12>
12782  053052  052123  051040  031067
12783  053060  043040  051117  041440
12784  053066  047117  052123  047101
12785  053074  020124  042514  042526
12786  053102  020114  047117  041440
12787  053110  031110  005015     000
12788  053115     015  050012  047522  OPR020: .ASCIZ  <15><12>/PROGRAM HALT PENDING - CARTRIDGE FORMAT BEING CORRECTED/<15><12
12789  053122  051107  046501  044040
12790  053130  046101  020124  042520
12791  053136  042116  047111  020107
12792  053144  020055  040503  052122
12793  053152  044522  043504  020105
12794  053160  047506  046522  052101
12795  053166  041040  044505  043516
12796  053174  041440  051117  042522
12797  053202  052103  042105  005015
12798  053210     000
12799  053211     015  025012  025052  OPR021: .ASCIZ  <15><12>/*****  PROGRAM HALTED  *****/<15><12>
12800  053216  025052  020040  051120
12801  053224  043517  040522  020115
12802  053232  040510  052114  042105
12803  053240  020040  025052  025052
12804  053246  006452  000012
12805  053252  040503  052122  044522  OPR022: .ASCIZ  /CARTRIDGE FORMAT CORRECTION FAILED/<15><12>
12806  053260  043504  020105  047506
12807  053266  046522  052101  041440
12808  053274  051117  042522  052103
12809  053302  047511  020116  040506
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12810  053310  046111  042105  005015
12811  053316     000
12812  053317     015  050012  047522  ABORT:  .ASCIZ  <15><12>/PROGRAM ABORTING BECAUSE ERROR THRESHOLD EXCEEDED/<15><12>
12813  053324  051107  046501  040440
12814  053332  047502  052122  047111
12815  053340  020107  042502  040503
12816  053346  051525  020105  051105
12817  053354  047522  020122  044124
12818  053362  042522  044123  046117
12819  053370  020104  054105  042503
12820  053376  042105  042105  00501E
12821  053404     000
12822
12823                          .SBTTL ERROR MESSAGES
12824  053405     106  052101  046101  EM1:    .ASCIZ  /FATAL-NON EXISTANT MEMORY AT RK611 BASE ADDRESS/
12825  053412  047055  047117  042440
12826  053420  044530  052123  047101
12827  053426  020124  042515  047515
12828  053434  054522  040440  020124
12829  053442  045522  030466  020061
12830  053450  040502  042523  040440
12831  053456  042104  042522  051523
12832  053464     000
12833  053465     106  052101  046101  EM2:    .ASCIZ  /FATAL-WRITE READY AND IE DID NOT CAUSE INTERRUPT/
12834  053472  053455  044522  042524
12835  053500  051040  040505  054504
12836  053506  040440  042116  044440
12837  053514  020105  044504  020104
12838  053522  047516  020124  040503
12839  053530  051525  020105  047111
12840  053536  042524  051122  050125
12841  053544  000124
12842  053546  040506  040524  026514  EM3:    .ASCIZ  /FATAL-PARITY ERROR TRAP. PC AT ERROR = /
12843  053554  040520  044522  054524
12844  053562  042440  051122  051117
12845  053570  052040  040522  027120
12846  053576  050040  020103  052101
12847  053604  042440  051122  051117
12848  053612  036440  000040
12849  053616  054105  042520  052103  EM4:    .ASCIZ  /EXPECTED INTERRUPT DID NOT OCCUR OR WAS LATE. COMMAND WAS:/
12850  053624  042105  044440  052116
12851  053632  051105  052522  052120
12852  053640  042040  042111  047040
12853  053646  052117  047440  041503
12854  053654  051125  047440  020122
12855  053662  040527  020123  040514
12856  053670  042524  020056  047503
12857  053676  046515  047101  020104
12858  053704  040527  035123     000
12859  053711     123  041125  054523  EM5:    .ASCIZ  /SUBSYSTEM CLEAR DID NOT RESET ERROR/
12860  053716  052123  046505  041440
12861  053724  042514  051101  042040
12862  053732  042111  047040  052117
12863  053740  051040  051505  052105
12864  053746  042440  051122  051117
12865  053754     000
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12866  053755     123  041125  054523  EM6:    .ASCIZ  /SUBSYSTEM CLEAR DID NOT RESET DEVICE INTERRUPT/
12867  053762  052123  046505  041440
12868  053770  042514  051101  042040
12869  053776  042111  047040  052117
12870  054004  051040  051505  052105
12871  054012  042040  053105  041511
12872  054020  020105  047111  042524
12873  054026  051122  050125  000124
12874  054034  052523  051502  051531  EM7:    .ASCIZ  /SUBSYSTEM CLEAR DID NOT SET READY/
12875  054042  042524  020115  046103
12876  054050  040505  020122  044504
12877  054056  020104  047516  020124
12878  054064  042523  020124  042522
12879  054072  042101  000131
12880  054076  047527  042122  041440  EM10:   .ASCIZ  /WORD COUNT INCORRECT/
12881  054104  052517  052116  044440
12882  054112  041516  051117  042522
12883  054120  052103     000
12884  054123     102  051525  040440  EM11:   .ASCIZ  /BUS ADDRESS INCORRECT/
12885  054130  042104  042522  051523
12886  054136  044440  041516  051117
12887  054144  042522  052103     000
12888  054151     125  050120  051105  EM11A:  .ASCIZ  /UPPER BUS ADDRESS BITS INCORRECT (BA16, 17)/
12889  054156  041040  051525  040440
12890  054164  042104  042522  051523
12891  054172  041040  052111  020123
12892  054200  047111  047503  051122
12893  054206  041505  020124  041050
12894  054214  030501  026066  030440
12895  054222  024467     000
12896  054225     103  046131  047111  EM12:   .ASCIZ  /CYLINDER ADDRESS INCORRECT/
12897  054232  042504  020122  042101
12898  054240  051104  051505  020123
12899  054246  047111  047503  051122
12900  054254  041505  000124
12901  054260  051124  041501  020113  EM13:   .ASCIZ  /TRACK ADDRESS INCORRECT/
12902  054266  042101  051104  051505
12903  054274  020123  047111  047503
12904  054302  051122  041505  000124
12905  054310  042523  052103  051117  EM14:   .ASCIZ  /SECTOR ADDRESS INCORRECT./
12906  054316  040440  042104  042522
12907  054324  051523  044440  041516
12908  054332  051117  042522  052103
12909  054340  000056
12910  054342  047516  026516  054105  EM15:   .ASCIZ  /NON-EXISTANT DRIVE/
12911  054350  051511  040524  052116
12912  054356  042040  044522  042526
12913  054364     000
12914  054365     103  047117  051124  EM16:   .ASCIZ  /CONTROLLER TIMEOUT/
12915  054372  046117  042514  020122
12916  054400  044524  042515  052517
12917  054406  000124
12918  054410  047125  052111  043040  EM17:   .ASCIZ  /UNIT FIELD ERROR/
12919  054416  042511  042114  042440
12920  054424  051122  051117     000
12921  054431     115  046125  050111  EM18:   .ASCIZ  /MULIPLE DRIVE SELECT/
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12922  054436  042514  042040  044522
12923  054444  042526  051440  046105
12924  054452  041505  000124
12925  054456  051120  043517  040522  EM19:   .ASCIZ  /PROGRAMMING ERROR/
12926  054464  046515  047111  020107
12927  054472  051105  047522  000122
12928  054500  047516  026516  054105  EM20:   .ASCIZ  /NON-EXISTANT MEMORY/
12929  054506  051511  040524  052116
12930  054514  046440  046505  051117
12931  054522  000131
12932  054524  047125  041111  051525  EM21:   .ASCIZ  /UNIBUS PARITY ERROR/
12933  054532  050040  051101  052101
12934  054540  020131  051105  047522
12935  054546  000122
12936  054550  046111  042514  040507  EM22:   .ASCIZ  /ILLEGAL FUNCTION/
12937  054556  020114  052506  041516
12938  054564  044524  047117     000
12939  054571     105  041503  044040  EM23:   .ASCIZ  /ECC HARD/
12940  054576  051101  000104
12941  054602  040504  040524  041440  EM24:   .ASCIZ  /DATA CHECK/
12942  054610  042510  045503     000
12943  054615     127  044522  042524  EM25:   .ASCIZ  /WRITE CHECK/
12944  054622  041440  042510  045503
12945  054630     000
12946  054631     104  052101  020101  EM26:   .ASCIZ  /DATA LATE/
12947  054636  040514  042524     000
12948  054643     117  042520  040522  EM27:   .ASCIZ  /OPERATION INCOMPLETE/
12949  054650  044524  047117  044440
12950  054656  041516  046517  046120
12951  054664  052105  000105
12952  054670  042510  042101  051105  EM28:   .ASCIZ  /HEADER VRC/
12953  054676  053040  041522     000
12954  054703     102  042101  051440  EM29:   .ASCIZ  /BAD SECTOR ERROR/
12955  054710  041505  047524  020122
12956  054716  051105  047522  000122
12957  054724  047503  052116  047522  EM30:   .ASCIZ  /CONTROLLER DETECTED DRIVE BUS PARITY ERROR/
12958  054732  046114  051105  042040
12959  054740  052105  041505  042524
12960  054746  020104  051104  053111
12961  054754  020105  052502  020123
12962  054762  040520  044522  054524
12963  054770  042440  051122  051117
12964  054776     000
12965  054777     123  042505  020113  EM31:   .ASCIZ  /SEEK INCOMPLETE/
12966  055004  047111  047503  050115
12967  055012  042514  042524     000
12968  055017     116  047117  042455  EM32:   .ASCIZ  /NON-EXECUTABLE DRIVE FUNCTION/
12969  055024  042530  052503  040524
12970  055032  046102  020105  051104
12971  055040  053111  020105  052506
12972  055046  041516  044524  047117
12973  055054     000
12974  055055     104  044522  042526  EM33:   .ASCIZ  /DRIVE DETECTED DRIVE BUS PARITY ERROR/
12975  055062  042040  052105  041505
12976  055070  042524  020104  051104
12977  055076  053111  020105  052502
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12978  055104  020123  040520  044522
12979  055112  054524  042440  051122
12980  055120  051117     000
12981  055123     106  051117  040515  EM34:   .ASCIZ  /FORMAT ERROR/
12982  055130  020124  051105  047522
12983  055136  000122
12984  055140  051104  053111  020105  EM35:   .ASCIZ  /DRIVE TYPE ERROR/
12985  055146  054524  042520  042440
12986  055154  051122  051117     000
12987  055161     101  020103  047514  EM36:   .ASCIZ  /AC LOW/
12988  055166  000127
12989  055170  050123  047111  046104  EM37:   .ASCIZ  /SPINDLE SPEED LOSS/
12990  055176  020105  050123  042505
12991  055204  020104  047514  051523
12992  055212     000
12993  055213     104  044522  042526  EM38:   .ASCIZ  /DRIVE OFF TRACK/
12994  055220  047440  043106  052040
12995  055226  040522  045503     000
12996  055233     103  046131  047111  EM39:   .ASCIZ  /CYLINDER OVERFLOW/
12997  055240  042504  020122  053117
12998  055246  051105  046106  053517
12999  055254     000
13000  055255     111  046114  043505  EM40:   .ASCIZ  /ILLEGAL DISK PACK ADDRESS/
13001  055262  046101  042040  051511
13002  055270  020113  040520  045503
13003  055276  040440  042104  042522
13004  055304  051523     000
13005  055307     127  044522  042524  EM41:   .ASCIZ  /WRITE LOCK ERROR/
13006  055314  046040  041517  020113
13007  055322  051105  047522  000122
13008  055330  051104  053111  020105  EM42:   .ASCIZ  /DRIVE TIMING ERROR/
13009  055336  044524  044515  043516
13010  055344  042440  051122  051117
13011  055352     000
13012  055353     116  020117  042503  EM43:   .ASCIZ  /NO CERR WITH SOME OTHER ERROR SET/
13013  055360  051122  053440  052111
13014  055366  020110  047523  042515
13015  055374  047440  044124  051105
13016  055402  042440  051122  051117
13017  055410  051440  052105     000
13018  055415     104  044522  042526  EM44:   .ASCIZ  /DRIVE UNSAFE/
13019  055422  052440  051516  043101
13020  055430  000105
13021  055432  042503  051122  051440  EM45:   .ASCIZ  /CERR SET BUT NO OTHER ERROR SET/
13022  055440  052105  041040  052125
13023  055446  047040  020117  052117
13024  055454  042510  020122  051105
13025  055462  047522  020122  042523
13026  055470  000124
13027
13028  055472  053126  042040  042111  EM46:   .ASCIZ  /VV DID NOT SET WITH PACK ACK/
13029  055500  047040  052117  051440
13030  055506  052105  053440  052111
13031  055514  020110  040520  045503
13032  055522  040440  045503     000
13033  055527     123  040524  052524  EM47:   .ASCIZ  /STATUS VALID SET ON SELECT TO NON-EXISTANT DRIVE/
```

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13034  055534  020123  040526  044514
13035  055542  020104  042523  020124
13036  055550  047117  051440  046105
13037  055556  041505  020124  047524
13038  055564  047040  047117  042455
13039  055572  044530  052123  047101
13040  055600  020124  051104  053111
13041  055606  000105
13042  055610  052123  052101  051525  EM48:   .ASCIZ  /STATUS VALID RESET ON SELECT TO EXISTANT DRIVE/
13043  055616  053040  046101  042111
13044  055624  051040  051505  052105
13045  055632  047440  020116  042523
13046  055640  042514  052103  052040
13047  055646  020117  054105  051511
13048  055654  040524  052116  042040
13049  055662  044522  042526     000
13050  055667     123  040524  052524  EM49:   .ASCIZ  /STATUS VALID NOT RESET ON DRIVE RELEASE/
13051  055674  020123  040526  044514
13052  055702  020104  047516  020124
13053  055710  042522  042523  020124
13054  055716  047117  042040  044522
13055  055724  042526  051040  046105
13056  055732  040505  042523     000
13057  055737     105  050130  041505  EM50:   .ASCIZ  /EXPECTED 2ND INTERRUPT DID NOT OCCUR OR WAS LATE. COMMAND WAS:/
13058  055744  042524  020104  047062
13059  055752  020104  047111  042524
13060  055760  051122  050125  020124
13061  055766  044504  020104  047516
13062  055774  020124  041517  052503
13063  056002  020122  051117  053440
13064  056010  051501  046040  052101
13065  056016  027105  041440  046517
13066  056024  040515  042116  053440
13067  056032  051501  000072
13068  056036  040503  047116  052117  EM51:   .ASCII  /CANNOT READ BAD SECTOR FILE/<15><12>
13069  056044  051040  040505  020104
13070  056052  040502  020104  042523
13071  056060  052103  051117  043040
13072  056066  046111  006505     012
13073  056073     124  051505  044524          .ASCIZ  /TESTING ABORTED ON THIS DRIVE/
13074  056100  043516  040440  047502
13075  056106  052122  042105  047440
13076  056114  020116  044124  051511
13077  056122  042040  044522  042526
13078  056130     000
13079  056131     101  044514  047107  EM52:   .ASCII  /ALIGNMENT PACK ON THIS DRIVE./<15><12>
13080  056136  042515  052116  050040
13081  056144  041501  020113  047117
13082  056152  052040  044510  020123
13083  056160  051104  053111  027105
13084  056166  005015
13085  056170  042524  052123  047111          .ASCIZ  /TESTING ABORTED ON THIS DRIVE./
13086  056176  020107  041101  051117
13087  056204  042524  020104  047117
13088  056212  052040  044510  020123
13089  056220  051104  053111  027105
```

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13090  056226     000
13091  056227     124  020117  040515  EM53:   .ASCIZ  /TO MANY BAD SECTORS. TESTING ABORTED ON THIS DRIVE/
13092  056234  054516  041040  042101
13093  056242  051440  041505  047524
13094  056250  051522  020056  042524
13095  056256  052123  047111  020107
13096  056264  041101  051117  042524
13097  056272  020104  047117  052040
13098  056300  044510  020123  051104
13099  056306  053111  000105
13100  056312  042510  042101  051105  EM54:   .ASCIZ  /HEADER WORD MISCOMPARE/
13101  056320  053440  051117  020104
13102  056326  044515  041523  046517
13103  056334  040520  042522     000
13104  056341     104  052101  020101  EM55:   .ASCIZ  /DATA WORD MISCOMPARE/
13105  056346  047527  042122  046440
13106  056354  051511  047503  050115
13107  056362  051101  000105
13108
13109  056366  040503  047116  052117  EM56:   .ASCIZ  /CANNOT FIND HEADER 0 IN READ AND SORT HEADERS/
13110  056374  043040  047111  020104
13111  056402  042510  042101  051105
13112  056410  030040  044440  020116
13113  056416  042522  042101  040440
13114  056424  042116  051440  051117
13115  056432  020124  042510  042101
13116  056440  051105  000123
13117  056444  052123  052101  051525  EMSVAL: .ASCIZ  /STATUS VALID/
13118  056452  053040  046101  042111
13119  056460     000
13120  056461     123  046105  041505  EMNZPR: .ASCIZ  /SELECT WITH NON-ZERO STATUS PAIR/
13121  056466  020124  044527  044124
13122  056474  047040  047117  055055
13123  056502  051105  020117  052123
13124  056510  052101  051525  050040
13125  056516  044501  000122
13126  056522  051127  052111  047111  EMWCS2: .ASCIZ  /WRITING COMMAND STATUS REGISTER 2/
13127  056530  020107  047503  046515
13128  056536  047101  020104  052123
13129  056544  052101  051525  051040
13130  056552  043505  051511  042524
13131  056560  020122  000062
13132          055140          EMDTPE= EM35            ;DRIVE TYPE ERROR
13133  056564  051104  053111  020105  EMDI:   .ASCIZ  /DRIVE INTERRUPT/
13134  056572  047111  042524  051122
13135  056600  050125  000124
13136          055055          EMDPAR= EM33                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
13137  056604  051104  053111  020105  EMDSC:  .ASCIZ  /DRIVE STATUS CHANGE/
13138  056612  052123  052101  051525
13139  056620  041440  040510  043516
13140  056626  000105
13141  056630  051104  053111  020105  EMDA:   .ASCIZ  /DRIVE ATTENTION/
13142  056636  052101  042524  052116
13143  056644  047511  000116
13144  056650  047503  052116  047522  EMCCLR: .ASCIZ  /CONTROLLER CLEAR/
13145  056656  046114  051105  041440
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13146  056664  042514  051101     000
13147          050250                  EMSELD= OPER00          ;DRIVE SELECT
13148          050276                  EMDCLR= OPER04                  ;DRIVE CLEAR
13149          050337                  EMRCAL= OPER12                  ;RECALIBRATE
13150  056671     123  041505  047117  EM2INT: .ASCIZ  /SECOND INTERRUPT/
13151  056676  020104  047111  042524
13152  056704  051122  050125  000124
13153  056712  042523  045505  052040  EMSKSF: .ASCIZ  /SEEK TO SELF/
13154  056720  020117  042523  043114
13155  056726     000
13156          050362                  EMSK=   OPER16                  ;SEEK
13157  056727     125  042516  050130  EMUXIT: .ASCIZ  /UNEXPECTED INTERRUPT/
13158  056734  041505  042524  020104
13159  056742  047111  042524  051122
13160  056750  050125  000124
13161  056754  047125  041111  051525  EMUR:   .ASCIZ  /UNIBUS RESET/
13162  056762  051040  051505  052105
13163  056770     000
13164  056771     122  051505  052105  EMRSET: .ASCIZ  /RESET/
13165  056776     000
13166          054631                  EMDLT=  EM26                    ;DATA LATE
13167  056777     122  040505  044504  EMRDB:  .ASCIZ  /READING DATA BUFFER/
13168  057004  043516  042040  052101
13169  057012  020101  052502  043106
13170  057020  051105     000
13171  057023     103  047117  051124  EMCERR: .ASCIZ  /CONTROLLER ERROR/
13172  057030  046117  042514  020122
13173  057036  051105  047522  000122
13174  057044  052523  051502  051531  EMSC_R: .ASCIZ  /SUBSYSTEM CLEAR/
13175  057052  042524  020115  046103
13176  057060  040505  000122
13177  057064  052515  052114  050111  EMMI:   .ASCIZ  /MULTIPLE INTERRUPTS/
13178  057072  042514  044440  052116
13179  057100  051105  052522  052120
13180  057106  000123
13181  057110  040502  020104  042523  DRVABT: .ASCII  /BAD SECTORS ON PACK IN AREAS USED BY TEST (CYL 312(8))/<15><12>
13182  057116  052103  051117  020123
13183  057124  047117  050040  041501
13184  057132  020113  047111  040440
13185  057140  042522  051501  052440
13186  057146  042523  020104  054502
13187  057154  052040  051505  020124
13188  057162  041450  046131  031440
13189  057170  031061  034050  024451
13190  057176  005015
13191  057200  042524  052123  047111          .ASCIZ  /TESTING ABORTED ON THIS DRIVE/
13192  057206  020107  041101  051117
13193  057214  042524  020104  047117
13194  057222  052040  044510  020123
13195  057230  051104  053111  000105
13196
13197                                  .SBTTL  DATA HEADERS FOR ERROR REPORTS
13198  057236  051524  020124  052516  DH001:  .ASCIZ  /TST NUM ERR PC  DRIVE/
13199  057244  020115  051105  020122
13200  057252  041520  020040  051104
13201  057260  053111  000105
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13202  057264  051524  020124  052516  DH002A: .ASCIZ  /TST NUM ERR PC  DRIVE/
13203  057272  020115  051105  020122
13204  057300  041520  020040  051104
13205  057306  053111  000105
13206  057312  045522  051503  020061  DH002B: .ASCIZ  /RKCS1   RKCS2   RKDS    RKER    RKASOF  RKDCYL  RKDA/
13207  057320  020040  045522  051503
13208  057326  020062  020040  045522
13209  057334  051504  020040  020040
13210  057342  045522  051105  020040
13211  057350  020040  045522  051501
13212  057356  043117  020040  045522
13213  057364  041504  046131  020040
13214  057372  045522  040504     000
13215  057377     122  041113  020101  DH002C: .ASCIZ  /RKBA    RKWC/
13216  057404  020040  051040  053513
13217  057412  000103
13218  057414  030101  020060  020040  DH002D: .ASCIZ  /A00     B00     A01     B01     A02     B02     A03     B03/
13219  057422  020040  030102  020060
13220  057430  020040  020040  030101
13221  057436  020061  020040  020040
13222  057444  030102  020061  020040
13223  057452  020040  030101  020062
13224  057460  020040  020040  030102
13225  057466  020062  020040  020040
13226  057474  030101  020063  020040
13227  057502  020040  030102  000063
13228  057510  045522  051503  020061  DH003B: .ASCIZ  /RKCS1   RKCS2   RKDS    RKER    RKASOF  RKMR1/
13229  057516  020040  045522  051503
13230  057524  020062  020040  045522
13231  057532  051504  020040  020040
13232  057540  045522  051105  020040
13233  057546  020040  045522  051501
13234  057554  043117  020040  045522
13235  057562  051115  000061
13236  057566  044124  020105  041101  DH005:  .ASCIZ  /THE ABOVE ARE EXPECTED ERRORS THAT DID NOT SET IN OPERATION:/
13237  057574  053117  020105  051101
13238  057602  020105  054105  042520
13239  057610  052103  042105  042440
13240  057616  051122  051117  020123
13241  057624  044124  052101  042040
13242  057632  042111  047040  052117
13243  057640  051440  052105  044440
13244  057646  020116  050117  051105
13245  057654  052101  047511  035116
13246  057662     000
13247  057663     124  042510  040440  DH006:  .ASCIZ  /THE ABOVF ARE UNEXPECTED ERRORS SET IN OPERATION:/
13248  057670  047502  042526  040440
13249  057676  042522  052440  042516
13250  057704  050130  041505  042524
13251  057712  020104  051105  047522
13252  057720  051522  051440  052105
13253  057726  044440  020116  050117
13254  057734  051105  052101  047511
13255  057742  035116     000
13256  057745     124  042510  040440  DH007:  .ASCIZ  /THE ABOVE ARE ERRORS SET IN OPERATION:/
13257  057752  047502  042526  040440
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13258  057760  042522  042440  051122
13259  057766  051117  020123  042523
13260  057774  020124  047111  047440
13261  060002  042520  040522  044524
13262  060010  047117  000072
13263  060014  047101  020131  044506  DH005A: .ASCIZ  /ANY FIELD WITH ALL ONES MUST BE CONSIDERED INVALID/
13264  060022  046105  020104  044527
13265  060030  044124  040440  046114
13266  060036  047440  042516  020123
13267  060044  052515  052123  041040
13268  060052  020105  047503  051516
13269  060060  042111  051105  042105
13270  060066  044440  053116  046101
13271  060074  042111     000
13272  060077     105  051122  051117  DH010:  .ASCIZ  /ERROR AT COMPLETION OF OPERATION/
13273  060104  040440  020124  047503
13274  060112  050115  042514  044524
13275  060120  047117  047440  020106
13276  060126  050117  051105  052101
13277  060134  047511  000116
13278  060140  054105  052120  020104  DH010A: .ASCIZ  /EXPTD   IS/
13279  060146  020040  051511     000
13280  060153     122  040505  020104  DH010B: .ASCIZ  /READ DATA WITH FORCED CYLINDER OVERFLOW/
13281  060160  040504  040524  053440
13282  060166  052111  020110  047506
13283  060174  041522  042105  041440
13284  060202  046131  047111  042504
13285  060210  020122  053117  051105
13286  060216  046106  053517     000
13287  060223     116  052117  051440  DH011:  .ASCIZ  /NOT SET AS A RESULT OF/
13288  060230  052105  040440  020123
13289  060236  020101  042522  052523
13290  060244  052114  047440  000106
13291  060252  047516  020124  042522  DH012:  .ASCIZ  /NOT RESET AS A RESULT OF/
13292  060260  042523  020124  051501
13293  060266  040440  051040  051505
13294  060274  046125  020124  043117
13295  060302     000
13296  060303     123  052105  040440  DH013:  .ASCIZ  /SET AS A RESULT OF/
13297  060310  020123  020101  042522
13298  060316  052523  052114  047440
13299  060324  000106
13300  060326  042522  042523  020124  DH014:  .ASCIZ  /RESET AS A RESULT OF/
13301  060334  051501  040440  051040
13302  060342  051505  046125  020124
13303  060350  043117     000
13304  060353     107  047517  020104  DH015:  .ASCIZ  /GOOD    BAD     WORD NUM/
13305  060360  020040  041040  042101
13306  060366  020040  020040  053440
13307  060374  05[illegible]  020104  052516
13308  060402  000[illegible]
13309  060404  052523  051502  051531  DH016:  .ASCIZ  /SUBSYSTEM CLEAR TO RESET SEEK LIMIT ALLOWING HEADS TO RELOAD/
13310  060412  042524  020115  046103
13311  060420  040505  020122  047524
13312  060426  051040  051505  052105
13313  060434  051440  042505  020113
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13314  060442  044514  044515  020124
13315  060450  046101  047514  044527
13316  060456  043516  044040  040505
13317  060464  051504  052040  020117
13318  060472  042522  047514  042101
13319  060500     000
13320  060501     123  046105  041505  DH017:  .ASCIZ  /SELECT AFTER RECAL/
13321  060506  020124  043101  042524
13322  060514  020122  042522  040503
13323  060522  000114
13324  060524  042522  040503  020114  DH018:  .ASCIZ  /RECAL COMPLETE ATTN AFTER SELECT/
13325  060532  047503  050115  042514
13326  060540  042524  040440  052124
13327  060546  020116  043101  042524
13328  060554  020122  042523  042514
13329  060562  052103     000
13330
13331                                  .SBTTL  DATA TABLES FOR ERROR REPORTS
13332          060566                  .EVEN
13333  060566  001302  001116  001626  DT003:  .WORD   $TESTN,$ERRPC,DRVNUM,T.CS1,T.CS2,T.DS,T.ER,T.ASOF,T.MR1
13334  060574  001540  001550  001552
13335  060602  001554  001556  001566
13336  060610  001302  001116  001626  DT001:  .WORD   $TESTN,$ERRPC,DRVNUM
13337  060616                          DT002:
13338  060616                          DT004:
13339  060616                          DT005:
13340  060616                          DT006:
13341  060616                          DT007:
13342  060616  001302  001116  001626  DT010:  .WORD   $TESTN,$ERRPC,DRVNUM
13343  060624  001540  001550  001552          .WORD   T.CS1,T.CS2,T.DS,T.ER,T.ASOF
13344  060632  001554  001556
13345  060636  001560  001546          .WORD   T.DCYL,T.DA
13346  060642  001544  001542          .WORD   T.BA,T.WC
13347  060646  001202  001204  001206  .WORD   $REG10,$REG11,$REG12,$REG13,$REG14,$REG15,$REG16,$REG17
13348  060654  001210  001212  001214
13349  060662  001216  001220
13350  060666  001302  001116  001626  DT015:  .WORD   $TESTN,$ERRPC,DRVNUM
13351  060674  001202  001204  001206  DT015A: .WORD   $REG10,$REG11,$REG12
13352                                  .SBTTL  DATA FORMATS FOR ERROR REPORTS
13353  060702  000001                  DF001:  .WORD   1
13354  060704     003     000                  .BYTE   3,0
13355
13356  060706  000004                  DF002:  .WORD   4
13357  060710     000     000                  .BYTE   0,0
13358  060712  057264                  .WORD   DH002A
13359  060714     003     000                  .BYTE   3,0
13360  060716  057312                  .WORD   DH002B
13361  060720     007     000                  .BYTE   7,0
13362  060722  057377                  .WORD   DH002C
13363  060724     002     000                  .BYTE   2,0
13364
13365
13366  060726  000002                  DF003:  .WORD   2
13367  060730     003     000                  .BYTE   3,0
13368  060732  057510                  .WORD   DH003B
13369  060734     006     000                  .BYTE   6,0
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13370
13371  060736  000006              DF004:  .WORD   6
13372  060740     000      000             .BYTE   0,0
13373  060742  000000              DF004A: .WORD   0
13374  060744     000      000             .BYTE   0,0
13375  060746  057264                      .WORD   DH002A
13376  060750     003      000             .BYTE   3,0
13377  060752  057312                      .WORD   DH002B
13378  060754     007      000             .BYTE   7,0
13379  060756  057377                      .WORD   DH002C
13380  060760     002      000             .BYTE   2,0
13381  060762  057414                      .WORD   DH002D
13382  060764     010      000             .BYTE   10,0
13383
13384  060766  000007              DF005:  .WORD   7
13385  060770     000      000             .BYTE   0,0
13386  060772  000000              DF005A: .WORD   0
13387  060774     000      000             .BYTE   0,0
13388  060776  057264                      .WORD   DH002A
13389  061000     003      000             .BYTE   3,0
13390  061002  057312                      .WORD   DH002B
13391  061004     007      000             .BYTE   7,0
13392  061006  057377                      .WORD   DH002C
13393  061010     002      000             .BYTE   2,0
13394  061012  057414                      .WORD   DH002D
13395  061014     010      000             .BYTE   10,0
13396  061016  060014                      .WORD   DH005A
13397  061020     000      000             .BYTE   0,0
13398
13399  061022  000005              DF006:  .WORD   5
13400  061024     000      000             .BYTE   0,0
13401  061026  000000              DF006A: .WORD   0
13402  061030     000      000             .BYTE   0,0
13403  061032  057264                      .WORD   DH002A
13404  061034     003      000             .BYTE   3,0
13405  061036  057312                      .WORD   DH002B
13406  061040     007      000             .BYTE   7,0
13407  061042  057377                      .WORD   DH002C
13408  061044     002      000             .BYTE   2,0
13409
13410  061046  000004              DF007:  .WORD   4
13411  061050     000      000             .BYTE   0,0
13412  061052  000000              DF007A: .WORD   0
13413  061054     000      000             .BYTE   0,0
13414  061056  057264                      .WORD   DH002A
13415  061060     003      000             .BYTE   3,0
13416  061062  057510                      .WORD   DH003B
13417  061064     006      000             .BYTE   6,0
13418
13419  061066  000004              DF010:  .WORD   4
13420  061070     000      000             .BYTE   0,0
13421  061072  000000              DF010A: .WORD   0
13422  061074     000      000             .BYTE   0,0
13423  061076  057264                      .WORD   DH002A
13424  061100     003      000             .BYTE   3,0
13425  061102  060140                      .WORD   DH010A
```

```
13426  061104  002  000                .BYTE   2,0
13427
13428  061106  000004                DF011:  .WORD   4
13429  061110  000  000                        .BYTE   0,0
13430  061112  000000              DF011A: .WORD   0
13431  061114  000  000                        .BYTE   0,0
13432  061116  057264                        .WORD   DH002A
13433  061120  003  000                        .BYTE   3,0
13434  061122  057510                        .WORD   DH003B
13435  061124  000006  000000               .WORD   6,0
13436
13437  061130  000002                DF015:  .WORD   2
13438  061132  003  000                        .BYTE   3,0
13439  061134  060353                        .WORD   DH015
13440  061136  003  000                        .BYTE   3,0
13441
13442  061140  000001                DF016:  .WORD   1
13443  061142  003  000                        .BYTE   3,0
13444
13445  061144  000052                BS26:   .BLKW   52
13446  061270  000052                BS24:   .BLKW   52
13447          070376                        .=70376
13448  070376  000240                        NOP
13449  070400  005014                SPCHLR: CLR     (R4)            ;CLEAR MEM MAINT REG
13450  070402  005237  001662               INC     INTSET          ;COUNT THE INTERRUPT
13451  070406  000240                        NOP
13452  070410  000002                SPCPAR: RTI                     ;RETURN
13453  070412  000240                        NOP
13454  070414  001000                IBUFF:  .BLKW   1000
13455  072414  001000                OBUFF:  .BLKW   1000
13456          000001                .END
```

```
ABASE = 177440          1963#   2285    2326
ABORT   053317          9586   12812#
ABTFAI  044170          9381   11408#
ACDW1 = 000000          2285    2328
ACDW2 = 000000          2285
ACLO  = 000010          2058#  10502
ACLOER= 000100         10504   12396#
ACPUOP= 000000          2285    2300
ADDW0 = 000000          2285
ADDW1 = 000000          2285
ADDW10= 000000          2285
ADDW11= 000000          2285
ADDW12= 000000          2285
ADDW13= 000000          2285
ADDW14= 000000          2285
ADDW15= 000000          2285
ADDW2 = 000000          2285
ADDW3 = 000000          2285
ADDW4 = 000000          2285
ADDW5 = 000000          2285
ADDW6 = 000000          2285
ADDW7 = 000000          2285
ADDW8 = 000000          2285
ADDW9 = 000000          2285
ADEVCT= 000000          2285    2291
ADEVM = 000000          2285    2327
ADJCLK  043614          3264   11301#
AENV  = 000000          2285    2296
AENVM = 000000          2285    2297
AFATAL= 000000          2285    2288
AMADR1= 000000          2285    2313
AMADR2= 000000          2285    2317
AMADR3= 000000          2285    2320
AMADR4= 000000          2285    2323
AMAMS1= 000000          2285    2307
AMAMS2= 000000          2285    2315
AMAMS3= 000000          2285    2318
AMAMS4= 000000          2285    2321
AMSGAD= 000000          2285    2293
AMSGLG= 000000          2285    2294
AMSGTY= 000000          2285    2287
AMTYP1= 000000          2285    2308
AMTYP2= 000000          2285    2316
AMTYP3= 000000          2285    2319
AMTYP4= 000000          2285    2322
APASS = 000000          2285    2290
APRIOR= 000240          1962#   2285
APTCSU= 000040          9439#  11441
APTENV= 000001          9138    9395    9437#   9494   11434
APTSIZ= 000200          2799    9436#
APTSPO= 000100          9397    9438#  11436
ASWREG= 000000          2285    2298
ATESTN= 000000          2285    2289
AUNIT = 000000          2285    2292
AUSWR = 000000          2285    2299
AVECT1= 000210          1961#   2285    2324
```

```
AVECT2= 000000  2285  2325
BAERR = 000004  10305  12429#
BAI   = 000020  2021#  4835  7485  7500  7586  7659  7716  10273
BA16  = 000400  2006#  5069  5155  5495  5548
BA17  = 001000  2007#  5215  5306  5495  5548
BDSRCK  042160  10876#  11045
BITCNT  036242  8756  9998#  10647  10657  10665  10677  10687  10698
BIT0  = 000001  1911#  2003  2036  2055  2697  3057  3089  3693  3932  4438  4626  4628  4630
                5645  7041  8868  9052  10157  12390  12408  12417  12427  12476
BIT00 = 000001  1901#  1911
BIT01 = 000002  1900#  1910
BIT02 = 000004  1899#  1909
BIT03 = 000010  1898#  1908
BIT04 = 000020  1897#  1907
BIT05 = 000040  1896#  1906
BIT06 = 000100  1895#  1905
BIT07 = 000200  1894#  1904
BIT08 = 000400  1893#  1903  9263
BIT09 = 001000  1892#  1902  9281  9505
BIT1  = 000002  1910#  2037  2698  3693  3934  4684  8879  9063  9660  9661  12391  12409  12418
                12428  12477
BIT10 = 002000  1891#  2008  2027  2046  2079  2093  2106  2120  2134  2704  9459  11169  12400
BIT11 = 004000  1890#  2009  2028  2047  2064  2080  2094  2107  2121  2135  2705  9288  11251
                12401
BIT12 = 010000  1889#  2011  2029  2048  2081  2095  2108  2122  2136  11088  11096  11114  11138
                11142  11166  11276  12402
BIT13 = 020000  1888#  2012  2030  2049  2065  2082  2096  2109  2123  2137  9466  9617  11088
                11096  11114  11138  11166  11276  12403
BIT14 = 040000  1887#  2013  2031  2050  2066  2083  2097  2110  2124  2138  4366  4367  6770
                6771  9249  11018  11063  11079  11131  12404  12482
BIT15 = 100000  1886#  2014  2015  2032  2051  2067  2084  2143  2706  4363  4364  4516  7151
                7289  11018  11040  11061  12405  12483
BIT2  = 000004  1909#  2038  2057  2699  5643  9671  12392  12410  12419  12429  12478
BIT3  = 000010  1908#  2020  2039  2058  2700  12393  12411  12420  12430  12479
BIT4  = 000020  1907#  2021  2040  2059  2073  2114  2128  3175  12394  12412  12421  12431  12480
BIT5  = 000040  1906#  2022  2041  2060  2074  2088  2101  2115  2129  3175  12395  12413  12422
                12432  12481
BIT6  = 000100  1905#  2004  2023  2042  2061  2075  2089  2102  2116  2130  2701  5676  9720
                10100  12396  12414  12423
BIT7    000200  1904#  2005  2024  2043  2062  2076  2090  2103  2117  2131  2702  2824  3044
                3161  8584  9630  10995  12397  12424
BIT8  = 000400  1903#  2006  2025  2044  2063  2077  2091  2104  2118  2132  2703  3137  3215
                3471  8591  8620  8690  8852  8862  8885  8893  9036  9046  9069  9077  11001
                12398
BIT9  = 001000  1902#  2007  2026  2045  2078  2092  2105  2119  2133  4568  4569  4623  4624
                11001  11016  11033  12399
BPTVEC= 000014  1918#
BSE   = 000200  2043#  7437  7596  10496  10543
BSERPT= 000200  2702#  7439  7441  7599  7601
BSERR = 000100  6802  6878  10545  12414#
BSF24P  001636  2679#  4158  11043
BSF26P  001640  2681#  4060  11039
BSS24P  001642  2683#  4164*  4198  11067
BSS26P  001644  2685#  4149*  4190  11064
BS24    061270  2679  4194  13446#
BS24CT  001650  2688#  4169*
```

```
BS26    061144          2681    4172    13445#
BS26CT  001646          2687#   4156*
CCLR  = 100000          2015#   3505    3559    8022    8298    10146   10173
CDT   = 002000          2008#   3078    3147    9944
CERNER= 100000          10441   12405#
CERR  = 100000          2014#   3071    3121    4281    10161   10217   10221   10439   10514
CFMT  = 010000          2011#   6530    6559    6617    6632    6690    6705    8379    10055   10356   11013   11041   11065
                        11072
CHKBA   037430          10270#  10464
CHKCTS  037642          6806    10332#  10465
CHKOP   040162          10422#  12103
CHKST   040170          10420   10425#
CHKWC   037376          10251#  10462
CHKWE   040130          10413#  12104
CKSWR = 104407          9243    9455    9504    12093#
CLEAR = 000105          1988#   3593    7635    7695    7771    8125    8229    8268    8364    8498    8947    8967
CLKCAL  035246          9757#   9852
CMNDLB  050210          9863    10468   10760   12489#
COE   = 001000          2045#
COERR = 001000          6505    12399#
CP1170= 002000          2704#   5627    5641    5657    5680    5687    9652    9708
CR    = 000015          1826#   11497   11507   12615   12618
CRLF  = 000200          1827#   2823    11451   11507
CSRPTR  001672          2710#   5629*   5643*   5645*   5650    5682*   5684*   5689*   5691*   9651*   9692*
CS1ERB- 024000          10431   12368#
CS2ERB- 177400          10433   12369#
CTO   = 004000          2009#   10163   10553
CTOERR= 000002          7812    10555   12418#
CTRHLT  043724          2953    2982    3159    11329#  11699   11782
CYLERR= 000010          10382   12430#
DCK   = 100000          2051#   10496   10524
DCKERR= 000002          8038    10526   12409#
DDISP = 177570          1833#   2232    2787
DDT   = 000400          2063#
DESHLD  001700          2717#   11081   11105*  11157*  11281
DF001   060702          2379    13353#
DF002   060706          2394    13356#
DF003   060726          2405    13366#
DF004   060736          2486    13371#
DF004A  060742          10692   10703   13373#
DF005   060766          2500    13384#
DF005A  060772          10712   13386#
DF006   061022          2525    13399#
DF006A  061026          10670   10682   13401#
DF007   061046          2551    13410#
DF007A  061052          10644   13412#
DF010   061066          2574    13419#
DF010A  061072          5511*   5564*   5701*   6812*   6819*   7120*   7127*   7138*   7144*   7258*   7265*   7276*   7282*
                        10468*  13421#
DF011   061106          2588    2597    2606    2614    13428#
DF011A  061112          3246*   3333*   3349*   3384*   3395*   3431*   3482*   3487*   3493*   3499*   3515*   3521*   3538*
                        3544*   3550*   3556*   3578*   3584*   3610*   3616*   3746*   3761*   3768*   3785*   3814*   3826*
                        3855*   3875*   3882*   4277*   4284*   8667*   8734*   8806*   8823*   9007*   10124*  13430#
DF015   061130          2626    13437#
DF016   061140          2634    13442#
DH001   057236          2377    13198#
```

```
DH002A  057264          2403   2624   13202#  13358  13375  13388  13403  13414  13423  13432
DH002B  057312         13206#  13360  13377  13390  13405
DH002C  057377         13215#  13362  13379  13392  13407
DH002D  057414         13218#  13381  13394
DH003B  057510         13228#  13368  13416  13434
DH005   057566         10753   13236#
DH005A  060014         13263#  13396
DH006   057663         10756   10813  13247#
DH007   057745         10751   13256#
DH010   060077          2572   13272#
DH010A  060140         13278#  13425
DH010B  060153         13280#
DH011   060223          2586   13287#
DH012   060252          2595   13291#
DH013   060303          2604   13296#
DH014   060326          2612   13300#
DH015   060353         13304#  13439
DH016   060404          7927   13309#
DH017   060501          8815   13320#
DH018   060524          8823   13324#
DH2N    001372          2392#   7927*  8815*  9863*  10082*  10110*
DH4N    001412          2484#  10693  10704
DH5N    001422          2498#  10713
DH6N    001432          2523#  10671  10683
DH7N    001442          2549#  10645
DI    - 040000          2013#   3484   3518   3541   3581   3613   3811   3852   3879   8954   8974  10217
DISPLA  001142          2232#   2787*  2795*  9303*  9458*
DISPRE  000174          2173#   2795
DLT   = 100000          2032#   4274  10531
DLTERR= 000010         10533   12411#
DMD   = 000040          2074#   3646   3654   3693   3702   8099   8181   8189   8289   8412  11312
DRA   = 000001          2055#
DRDY  = 000200          2062#   3093   3098   3123   8553
DROT  = 000040          2060#  10510
DROTER= 000400          8317   8451  10512  12398#
DRPAR = 000010          2039#
DRPARE= 000010          3466  12393#
DRSTER= 040000         10708  10714  10848  12482#
DRVABT  057110          4202  13181#
DRVBIT  001630          2675#   3184*  3250   3252*  4091   4092   4141   4142   8584   8588*  8589   8591   8599*
DRVDRP  001666          2708#   2911*  3057*  3089*  3127*  3186   3217   4092*  4142*
DRVMSK= 000007          2019#
DRVNUM  001626          2674#   3193*  3258*  3259   3280   3320   3370   3387   3413   3457   3473   3635   3683
                        3735   3801   3843   3907   3924   3970   3987   6532   6560   6916   7429   8548   8587*
                        8596   8600*  8779*  8792*  8814*  8934*  8956*  8977*  8987*  9003*  9896  10063  11304
                       13333  13336  13342  13350
DRVRPT- 004000          2705#   2912   3048   3153   3171
DSC   = 040000          2066#   3243   3490   3547   3765
DSERBI= 000070         10435  12372#
DSWR  = 177570          1832#   2231   2786
DTE   = 010000          2048#
DTERR = 010000          8110  12402#
DTYE  = 000040          2041#   3075   3144   9939
DTYERR= 000040         12395#
DTYPE   001720          2726#   3032*  3078*  3105*  3132   3139*  3147*  3989   6531   6918   7431   855'   9925
                        9934   9959*  9964*  10070
```

```
DT001   060610          2378  13336#
DT002   060616          2393  13337#
DT003   060566          2404  13333#
DT004   060616          2485  13338#
DT005   060616          2499  13339#
DT006   060616          2524  13340#
DT007   060616          2550  13341#
DT010   060616          2587   2596   2605   2613  13342#
DT015   060666          2573   2625  13350#
DT015A  060674          2633  13351#
DOTST = 000001          2697#  3058   3088   3100   3107
ECCW  = 020000          2082#
ECH   = 000100          2042#  10496  10520
ECHERR= 000001          8038   10522  12408#
EMCCLR  056650          3515   3521  13144#
EMCERR  057023          4283  13171#
EMDA    056630          3481   3514   3537   3577   3609   8666   8733   9006  13141#
EMDCLR= 050276          3610   3616  13148#
EMDI    056564          3486   3520   3543   3583   3615   3813   3854   3881  13133#
EMDLT = 054631          4276  10123  13166#
EMDPAR= 055055          3482   3487   3493   3499   3538   3544   3550   3556  13136#
EMDSC   056604          3245   3492   3549   3767  13137#
EMDTPE= 055140          3431  13132#
EMMI    057064          3825  13177#
EMNZPR  056461          3349   3578   3584  13120#
EMRCAL- 050337          3746  13149#
EMRDB   056777          4277   4284  10124  13167#
EMRSET  056771          3875   3882  13164#
EMSCLR  057044          3246   8734  13174#
EMSELD= 050250          3333   3384   3785  13147#
EMSK  = 050362          9007  13156#
EMSKSF  056712          3814   3826   3855  13153#
EMSVAL  056444          3332   3348   3383   3394   3430   3498   3555   3745   3760   3784   8805   8822  13117#
EMTVEC= 000030          1921#  2770*  2771*
EMUR    056754          8667  13161#
EMUXIT  056727          3874  13157#
EMWCS2  056522          3395  13126#
EM1     053405          2951   2980  12824#
EM1N    001360          2376#  2951*  2980*  4089*  4100*  4110*  4117*  4126*  4139*  4202*  7442*  7602*
EM10    054076          5528   5582   5716   7126   7143   7264   7281  12434  12880#
EM10N   001450          2571#  5510*  5521*  5528*  5563*  5575*  5582*  5702*  5716*  6809*  6818*  7117*  7126*
                        7135*  7143*  7255*  7264*  7273*  7281*  10475*
EM11    054123          5521   5575   5702   7117   7135   7255   7273  12436  12884#
EM11A   054151          5510   5563  12435  12888#
EM11N   001460          2585#  3332*  3383*  3430*  3481*  3486*  3492*  3498*  3537*  3543*  3549*  3555*  3745*
                        3767*  3784*  3813*  3854*  8805*  9006*
EM12    054225         12437  12896#
EM12N   001470          2594#  3245*  3348*  3394*  3609*  3615*  3760*  3881*  8666*  8733*
EM13    054260          4276*  6809  12438  12901#
EM13N   001500          2603#  3825*  3874*  4283*  10123*
EM14    054310          6818  12439  12905#
EM14N   001510          2611#  3514*  3520*  3583*  8822*
EM15    054342         12441  12910#
EM15N   001520          2623#  10994*  10997*
EM16    054365         12442  12914#
EM17    054410         12443  12918#
```

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EM18    054431          12444   12921#
EM19    054456          12445   12925#
EM2     053465          12833#
EM2INT  056671           3761    3768   13150#
EM2N    001370           2391#   3754*   9864*  10081*  10109*
EM20    054500          12446   12928#
EM21    054524          12447   12932#
EM22    054550          12448   12936#
EM23    054571          12450   12939#
EM24    054602          12451   12941#
EM25    054615          12452   12943#
EM26    054631          12453   12946#  13166
EM27    054643          12454   12948#
EM28    054670          12455   12952#
EM29    054703          12456   12954#
EM3     053546           9619   12842#
EM3N    001400           2402#   3211*   3225*   3239*   3300*  10223*  10225*  10236*
EM30    054724          12458   12957#
EM31    054777          12459   12965#
EM32    055017          12460   12968#
EM33    055055          12461   12974#  13136
EM34    055123          12462   12981#
EM35    055140          12463   12984#  13132
EM36    055161          12464   12987#
EM37    055170          12465   12989#
EM38    055213          12466   12993#
EM39    055233          12467   12996#
EM4     053616           9864   10081   12849#
EM4N    001410           2483#   3577*
EM40    055255          12468   13000#
EM41    055307          12469   13005#
EM42    055330          12470   13008#
EM43    055353          12471   13012#
EM44    055415          12472   13018#
EM45    055432          12473   13021#
EM46    055472           3239   13028#
EM47    055527           3211   13033#
EM48    055610           3225   13042#
EM49    055667           3300   13050#
EM5     053711          10223   12859#
EM5N    001420           2497#
EM50    055737           3754   13057#
EM51    056036           4089    4100    4110    4117   13068#
EM52    056131           4126   13079#
EM53    056227           4139   13091#
EM54    056312          10994   13100#
EM55    056341          10997   13104#
EM56    056366          10109   13109#
EM6     053755          10225   12866#
EM6N    001430           2522#
EM7     054034          10236   12874#
EM7N    001440           2548#
ERRCNT  001632           2676#   9581*   9584
ERRLMT  001634           2678#   4306    4802    4875    4956    5025    5106    5175    5255    5326    5400    5471    5812
                         5900    5983    6068    6153    6212    6269    6327    6383    6439    6577    6652    6725    6850
                         6888    7528
```

```
ERRVEC= 000004   1914#  2784   2785*  2796*  9169   9170   9174*  9179*  9191*  9196*  9205*  9215*  9216*
                 9254   9255*  9257*  9260*  9639   9640   9641*  9642*  9688*  9715*  9730*  9731*
EXPBA   050040  10275*  10302*  12377#
EXPCYL  050042  10361*  10375*  10380   12378#
EXPSEC  050044   6820   10379*  12379#
EXPTRK  050046   6810   10378*  12380#
EXPUBA  050036  10301*  10309   12376#
EXPWC   050034  10251*  10253   10476   12375#
FMTE  = 000020   2040#
FMTERR= 000020  12394#
FPFMT = 000400   2703#  7369
GENCOM  042260   4233   4301   4309   4359   4434   4513   4565   4619   4680   4741   4770   4796   4805
                 4836   4870   4878   4921   4934   4950   4959   4996   5019   5028   5063   5082   5099
                 5109   5144   5168   5178   5221   5248   5258   5295   5319   5329   5358   5378   5394
                 5403   5432   5450   5465   5474   5631   5761   5772   5806   5815   5845   5868   5894
                 5903   5931   5947   5977   5986   6016   6028   6062   6071   6101   6113   6147   6156
                 6183   6187   6206   6215   6241   6245   6263   6272   6298   6302   6321   6330   6354
                 6358   6377   6386   6410   6414   6433   6442   6538   6572   6580   6608   6612   6646
                 6655   6681   6685   6719   6728   6767   6780   6784   6844   6853   6860   6882   6891
                 6924   6996   7045   7181   7310   7383   7470   7522   7531   7984   8003   8512   8563
                10988#  11378
GETDRS  036762  10145#  10709
GETRK   036164   9974#  12102
GNS   = ****** U  2172   2822   9112   9119   12085  12086  12087  12088  12089  12091  12093  12094  12095
                12096  12097  12098  12099  12100  12101  12102  12103  12104  12105  12106  12107  12108
                12109  12110  12111  12112  12113  12114  12115  12116  12117  12118
GO    = 000001   2003#
GPSUMF  050206  10430*  10643   10814*  12475#
GP1NR = 000010  10701   10706   10754   10808   10845   12479#
GP2NR = 000020  10680   10754   10808   10841   12480#
GP3NR = 000040  10660   10754   10808   12481#
GRP1ER  050064  10426*  10441*  10488   10594   10686   10796   12389#
GRP1MS  050146  10797   10828   12458#
GRP1ST= 000001  10690   10706   10762   10810   10845   12476#
GRP2ER  050066  10427*  10518   10664   10790   12407#
GRP2MS  050130  10791   10822   12450#
GRP2ST= 000002  10668   10762   10810   10841   12477#
GRP3ER  050070  10428*  10547   10646   10767   12416#
GRP3MS  050110  10768   10817   12441#
GRP3ST= 000004  10651   10762   10810   12478#
GRP4ER  050072   6805*   6807    6816   10255*  10305*  10311*  10382*  10385*  10388*  10429*  10466  10469  12426#
GRP4MS  050074  10475   12434#
GTSWR = 104406   2817   12091#
GTYP0   036134   3194   8625   8695   8780   8936   8979   9958#
GTYP1   036150   3260   8597   8793   8958   8989   9963#
HOLD    036124   7430*  7431*  7432   8550*  8551*  8552   9950#
HOLD1   036126   8549*  8555*  9951#
HOLD2   036130   3415   9938*  9944*  9952#
HOLD3   036132   3707   9939*  9945*  9953#
HT    = 000011   1824#  11449  11507
HVRC  = 000400   2044#  10496  10539
HVRCER= 000040  10541   12413#
IBUFF   070414   2833   4070   4124   4130   4252   4784   4850   4941   5089   5236   5373   5446   5779
                 5794   5863   5882   5954   5968   6035   6050   6120   6135   6194   6251   6309   6365
                 6421   6467   6495   6634   6707   6832   6867   6950   7508   7949   8027  10058  10113
                11076  11137  13454#
```

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IDAE   = 002000  2046#
IDAERR= 002000  3938  3946  4007  12400#
IE     = 000100  2004#  2970  3868  7817  7920  8118  8490
ILF    = 000001  2036#  10496  10577
ILFERR= 000200  10579  12424#
INTHLR  034442  2917  3041  5731  9609#
INTR   = 000300  1999#
INTSET  001662  2693#  2944*  2949  2969*  2974  3741*  3823  3859*  3914*  3977*  5652  7428*  7465*
                7623*  7684*  7764*  7816*  7853*  7922*  8017  8076*  8119*  8223*  8259*  8356*  8483*
                8632*  8701*  8789*  8809*  8942*  8964*  9600*  9610*  9716*  9724  9729*  9762  9785
                9853  9908*  10068*  10073  11353*  13450*
IOTVEC= 000020  1919#  2768*  2769*
IR     = 000100  2023#
IWAT1M  035370  9809#  12118
IWAT1S  035410  9815#  12115
IWAT11  035450  9827#  12111
IWAT12  035440  9824#  12112
IWAT14  035430  9821#  12113
IWAT15  035420  9818#  12114
IWAT16  035530  9845#  12105
IWAT2S  035400  9812#  12116
IWAT32  035520  9842#  12106
IWAT48  035510  9839#  12107
IWAT64  035500  9836#  12108
IWAT8S  035360  9806#  12117
IWAT80  035470  9833#  12109
IWAT96  035460  9830#  12110
KIPAR0= 172340  1952#  9151  9183
KIPAR1= 172342  1953#
KIPAR2= 172344  1954#
KIPAR3= 172346  1955#
KIPAR4= 172350  1956#
KIPAR5= 172352  1957#
KIPAR6= 172354  1958#  11141*
KIPAR7= 172356  1959#  9199
KIPDR0= 172300  1941#
KIPDR1= 172302  1942#
KIPDR2= 172304  1943#
KIPDR3= 172306  1944#
KIPDR4= 172310  1945#
KIPDR5= 172312  1946#
KIPDR6= 172314  1947#
KIPDR7= 172316  1948#
KWLADD  001710  2721#  5660*  5676*  9630*  9720*  10053*  10100*  11310*
KWLVEC  001712  2722#  9717
LCKHLR  034506  9629#  9718
LCLKPR= 100000  2706#  9727  9758  9855  10051  10098  11308
LCLKTK  001674  2712#  3863*  3865  9629*  9757*  9764  9766*  9791*  9858  10069*  10076
LDCON   036034  3304  9934#
LF     = 000012  1825#  11501  11507  12615  12618
LOADRK  035734  9908#  12101
LRLOAD  035674  4067  4225  4253  4350  4378  4426  4459  4505  4525  4557  4578  4611  4639
                4672  4698  4733  4762  4781  4827  4847  4914  4938  4989  5006  5068  5086
                5137  5154  5214  5233  5288  5305  5350  5369  5425  5443  5494  5547  5619
                5753  5776  5791  5837  5860  5879  5923  5951  5965  6008  6032  6047  6093
                6117  6132  6191  6248  6306  6362  6418  6464  6492  6616  6631  6689  6704
```

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                    6759   6788   6829   6864   6947   6988   7007   7049   7064   7084   7185   7200   7222
                    7314   7331   7375   7409   7454   7477   7505   7579   7612   7634   7649   7674   7694
                    7709   7749   7770   7785   7797   7841   7860   7875   7898   7946   7988   8007   8024
                    8065   8080   8092   8124   8156   8174   8212   8228   8243   8267   8282   8303   8341
                    8363   8378   8393   8405   8436   8459   8497   8515   8566   9888#  11338  11367
LSTCYL  036120      4065   6463   6491   7609   7610   7747   9936*  9942*  9948#
L.ASOF  001612      2663#  8250*
L.BA    001604      2658#  6535*  6920*  8992*  10275  10290
L.CS1   001600      2656#  3063*  3114*  3195*  3228*  3281*  3321*  3371*  3414*  3415*  3458*  3505*  3524*
                    3559*  3565*  3593*  3636*  3684*  3736*  3772*  3802*  3844*  3906*  3925*  3969*  3988*
                    6530*  6531*  6559*  6917*  6918*  8626*  8696*  8781*  8794*  8937*  8947*  8959*  8967*
                    8981*  8993*  9891   9925*  9926   10055  10070*  10071  10209  10279  10356  11013  11041
                   11065  11072
L.CS2   001610      2662#  3061*  3113*  3192*  3280*  3290*  3320*  3370*  3413*  3457*  3635*  3645*  3683*
                    3694*  3735*  3801*  3843*  3907*  3924*  3970*  3987*  4835*  6532*  6560*  6916*  7485*
                    7500*  7586*  7659*  7716*  8182*  8624*  8694*  8778*  8791*  8935*  8957*  8978*  8988*
                   10155  10273
L.DA    001606      2659#  10065
L.DCYL  001614      2664#  3999*  6536*  6562*  6922*  8980*  8990*  10064  10361  10882  11005  11377*
L.DS    001606      2660#  6955*  10364
L.DT    001607      2661#  3926*  4317   6534*  6561*  6919*  10362  10885  11004  11388  11390*
L.MR1   001616      2665#  3322*  3336*  3459*  3503*  3567*  3591*  3646*  3693*  7867*  7906*  8099*  8181*
                    8289*  8310*  8412*  8444*  8467*  8495*
L.WC    001602      2657#  6533*  6921*  8991*  9911   10277  10333
MCLK   = 000400     2077#  10029  10030
MCLOCK  036316      3650   3698   8102   8186   8293   8415   8420   8425   10020#
MDS    = 001000     2026#  10561
MDSERR= 000010      10563  12420#
MEMBAS  001714      2723#  9656
MEMPAR  001670      2709#  9643*  9663*  9701*  9706
MEMPYB= 000004      2699#  5612   5615
MEMSZB= 000002      2698#  4901   4906   5049   5055   5200   5206
MERD   = 001000     2078#
MESMSK= 000017      2071#
MEWD   = 002000     2079#
MILCNT  001652      2689#  9784
MIND   = 000200     2076#  8418   8423
MMVEC  = 000250     1930#
MMVECA  001716      2724#  5654*  9666   9705
MSP    = 000100     2075#
MYTIME  035314      3864   9783#  9857   10075
M.CADD= 017760      2146#
M.CDIF= 017760      2145#
M.DRV  = 000007     2142#
M.HEAD= 007000      2149#
M.ID   = 000003     2144#
M.PAR  = 100000     2143#
M.SECT= 000760      2148#
M.SER  = 077770     2147#
NCERWE= 020000      10516  12403#
NED    = 010000     2029#  3073   3142   10549
NEDERR= 000001      10551  12417#
NEM    = 004000     2028#  10569
NEMERR= 000040      5508   5561   10571  12422#
NEWDRV  027716      4093   4143   8582#
NEWPAS  003150      2921#  9144
```

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NEXINT  034434   2941  9600#  9715
NXF   = 000004   2038#
NXFERR= 000004  12392#
OBUFF   072414   4228  4353  4362  4381  4429  4437  4462  4508  4516*  4528  4560  4568*  4569*
                 4581  4614  4622  4642  4675  4683  4701  4736  4765   4830  4856  4857   4992
                 5140  5291  5353  5389  5428  5460  5622  5640* 5644*  5683* 5690* 5703   5705
                 5710  5712  5756  5840  5926  5942  6011  6096  6535   6619  6692  6762   6770*
                 6771* 6791  6920  6991  7010  7052  7067  7081* 7087   7114  7118  7133   7136
                 7188  7203  7218* 7225  7252  7256  7271  7274  7317   7329* 7334  7378   7412
                 7426  7480  7577* 7582  7652  7657* 7712  7878  7991   8010  8205  8408   8518
                 8569  8992  9669  11019 11056* 11057* 11077 11136 11370 13455#
OFFSET= 00C115   1992#  8244
OFST  = 000004   2057#
OPER00  050250   8806  12489  12507#  13147
OPER02  050265  12490  12510#
OPER04  050276  12491  12512#  13148
OPER06  050312  12492  12514#
OPER10  050321  12493  12516#
OPER12  050337  12494  12519#  13149
OPER14  050353  12495  12522#
OPER16  050362  12496  12524#  13156
OPER20  050367  12497  12525#
OPER22  050401  12498  12527#
OPER24  050414  10082  12499   12529#
OPER26  050431  12500  12532#
OPER30  050447  12501  12535#
OPER32  050463  12502  12538#
OPER34  050507  12503  12542#
OPER36  050533  12504  12546#
OPER37  050557   6812   6819  12550#
OPER40  050613  12555#
OPER41  050613   7120   7127   7138   7144   7258   7265   7276   7282  12556#
OPER42  050650   5511  12561#
OPER43  050724   5564  12569#
OPER44  050777   5701  12577#
OPI   = 020000   2049#  10496  10535
OPIERR= 000020  10537  12412#
OPR001  051056   2864  12589#
OPR002  051105   2867   2878   2895  12593#
OPR003  051113   2874  12595#
OPR004  051143   2886  12600#
OPR005  051165   2829  12604#
OPR006  051236   3060  12611#
OPR007  051236   2840   3056   3087  12614#
OPR008  051317   3158  12626#
OPR009  051402   3163  12635#
OPR010  051452   5614  12642#
OPR011  051573   4904   5052   5203  12657#
OPR012  051736   4905  12675#
OPR013  051742   5053  12676#
OPR014  051746   5204  12677#
OPR015  051752   4907   5054   5205  12678#
OPR016  051766   2859  12680#
OPR017  052547   7443   7602  12748#
OPR018  052664   8762  12762#
OPR019  052752   9301  12771#
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OPR020  053115          11365   12788#
OPR021  053211          11393   12799#
OPR022  053252          11409   12805#
OPTFLG  001664           2695#   2857    2860*   2912*   3048    3058*   3088*   3100*   3107    3153    3171*   4901    4906*
                         5049    5055*   5200    5206*   5610    5612    5615*   5627    5641    5657    5680    5687    7369
                         7439    7441*   7599    7601*   9644*   9652*   9653*   9675*   9693*   9700*   9708    9727*   9758
                         9855   10051   10098   11308
OPTTST  034522           2913    3869    5732    6677    8659    9638#
OR      = 000200         2024#
PACK    = 000103         1987#   3228
PARM    001752           2179    2745#
PARPRE= 000100           2701#   5610    9644    9653    9675    9693    9700
PAT     = 000020         2073#   3459    7867
PAT02   047234          11191   12126#
PAT03   047274          11196   12146#
PAT04   047334          11201   12166#
PAT05   047374          11206   12186#
PAT06   047434          11211   12206#
PAT10   047474          11216   12229#
PAT11   047534          11221   12249#
PAT12   047574          11226   12269#
PAT13   047634          11231   12289#
PAT14   047674          11236   12309#
PAT15   047734          11241   12329#
PAT16   047774          11246   11249   12349#
PCA     = 004000         2080#
PCD     = 010000         2081#
PERHLR  034452           9617#   9710
PGE     = 002000         2027#  10565
PGERR   = 000020         7964   10567   12421#
PIP     = 020000         2065#
PIRQ    = 177772         1831#
PIRQVE= 000240           1925#
PROGEN  044124          11337   11364   11389   11393#  11410
PR0     = 000000         1848#   2921    3036    9732    9847
PR1     = 000040         1849#
PR2     = 000100         1850#
PR3     = 000140         1851#
PR4     = 000200         1852#
PR5     = 000240         1853#   1962
PR6     = 000300         1854#
PR7     = 000340         1855#   2754    2942    3042    5635    9642    9668    9711    9719
PS      = 177776         1828#   1829
PSW     = 177776         1829#
PWRVEC= 000024           1920#   2774*   2775*  12015*  12016*  12025*  12031*  12043*  12044*
RDCHR   = 104410        11858   12094#
RDDATA= 000121           1994#   4068    4782    4848    4939    5007    5087    5155    5234    5306    5371    5444    5548
                         5777    5792    5861    5880    5952    5966    6033    6048    6118    6133    6192    6249    6307
                         6363    6419    6465    6493    6632    6705    6830    6865    6948    7506    7947    8025
RDGATE= 100000           2084#
RDHEAD= 000125           1996#   4254    6559    7798    8093    8379
RDLIN   = 104411        11932   12095#
RDOCT   = 104412         2868    2879    2896   12096#
RDSTHD  036362           4294    6564   10050#
RDY     - 000200         2005#   2970   10234   11306
REALBA  050054          10306*  12384#
```

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REALCY  050056          12385#
REALSE  050062           6821   12387#
REALTR  050060           6811   12386#
REALUB  050052          10312*  12383#
REALWC  050050          10256*  10389   10477   12382#
RECAL = 000113           1991#   3736    3906    3969    7786    7842    8081    8213    8342    8626    8696    8781    8937
                         8959   11339
REFMT   001676           2713#   2759*   4219*   4346*   4422*   4501*   4553*   4607*   4667*   4726*   4810*   6524*   6604*
                         6676*   6755*   6971*   8337*   8580*  11363   11375
REPNR = 100000          10814   12483#
RESREG= 104414           9580    9736    9871   10132   10182   10396   10478   10482   10836   10858   12098#
RESTRT  001762           2177    2748#
RESVEC= 000010           1915#
RKASOF= 000016           1974#   8635    8704
RKBA  = 000004           1969#   7426*
RKCS1 = 000000           1967#   2945*   2970*   3868*   7432*   7817*   7920*   8022*   8118*   8298*   8490*   8552*   8634*
                         8703*  10071*  10085   10146*  10157*  10161   10163   10173*  10216   11305*  11306
RKCS2 = 000010           1971#   2967*   3387*   7429*   8548*   8723*  10063*  10092   10155*  10165   10214*  11303*  11304*
RKDA  = 000006           1970#  10065*
RKDB  = 000024           1976#   4251   10062
RKDCYL= 000020           1975#  10064*
RKDS  = 000012           1972#   8553
RKECPS= 000030           1980#
RKECPT= 000032           1981#
RKER  = 000014           1973#   7437    7596
RKMR1 - 000026           1977#   3654*   3702*   8105*   8189*   8296*   8418*   8423*   8428*  10029*  10030*  10156*  11312*
                        11316*
RKMR2 = 000034           1978#  10171
RKMR3 = 000036           1979#  10172
RKPRI   001622           2669#   2918*   5647
RKSPAR= 000022           1982#   7956*
RKVEC   001620           2668#   2916*   3040    5653*   5731*
RKWC  = 000002           1968#   7427*   8010
RLS   = 000010           2020#   3290    3645
SAVREG= 104413           9527    9638    9806    9809    9812    9815    9818    9821    9824    9827    9830    9833    9836
                         9839    9842    9845   10050   10145   10332   10413   10422   12097#
SCLR  = 000040           2022#   8723   10214   11303
SCOP1 = 104415           3942    3950    4080    4247    4279    4286    4315    4399    4480    4932    6548    6571    6587
                         6824    6934    6964    7079    7102    7149    7215    7240    7287    7424    7449    7495    7520
                         7538    8826    9010   12099#
SCOP1$  035222           9745#  12099
SECERR= 000040           6816   10388   12432#
SEEK  = 000117           1993#   3802    3844    3925    3988    7455    7613    7675    7750    7861    8066    8981
SELDRV= 000101           1986#   3063    3114    3195    3281    3321    3371    3414    3458    3524    3565    3636    3684
                         3772    7899    8157    8175    8304    8394    8437    8460    8794
SETCLK  001742           2181    2742#
SKI   = 000002           2037#
SKIERR= 000002           3946    7888   12391#
SPACE2  051053           3178    9563    9575   12588#
SPAR  = 020000           2012#  10163   10498
SPARER= 000001           3466   10500   12390#
SPCHLR  070400           5653   13449#
SPCPAR  070410           5654   13452#
SPDERR= 000200          10508   12397#
SPDLSS= 000020           2059#  10506
SRCHLD  001702           2718#  11082   11106*  11158*  11282
```

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SRTFLG  001624          2670#  2742*  2745*  2748*  2751*  2862   3054   3262
SRTINS= 000010          2700#  2857   2860
SRTSPL= 000111          1990#
SR0   = 177572          1934#  9180   9195*  9202*  11090* 11098* 11116* 11168* 11278*
SR1   = 177574          1935#
SR2   = 177576          1936#
SR3   = 172516          1937#  9192*
SSINIT  037176         10205#  12100
STACK = 001100          1819#  2753   2766   2936   9590   9622   11394
START   001772          2170   2176   2751#
START1  001776          2743   2746   2749   2752#  11403
STKLMT= 177774          1830#
SVAL  = 100000          2067#  3209   3223   3298   3329   3345   3380   3391   3427   3496   3553   3743   3758
                        3782   8803   8819
SWR     001140          2231#  2764   2786*  2788   2794*  2801*  2815   9249   9263   9266   9281   9288   9459
                        9466   9501   9505   9582   9617   9745   10743  11702  11741  11796* 12023  12036*
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SW0   = 000001          1883#
SW00  = 000001          1873#  1883
SW01  = 000002          1872#  1882
SW02  = 000004          1871#  1881
SW03  = 000010          1870#  1880
SW04  = 000020          1869#  1879
SW05  = 000040          1868#  1878
SW06  = 000100          1867#  1877
SW07  = 000200          1866#  1876
SW08  = 000400          1865#  1875
SW09  = 001000          1864#  1874
SW1   = 000002          1882#
SW10  = 002000          1863#
SW11  = 004000          1862#
SW12  = 010000          1861#  9582
SW13  = 020000          1860#  10743
SW14  = 040000          1859#
SW15  = 100000          1858#
SW2   = 000004          1881#
SW3   = 000010          1880#
SW4   = 000020          1879#
SW5   = 000040          1878#
SW6   = 000100          1877#
SW7   = 000200          1876#
SW8   = 000400          1875#
SW9   = 001000          1874#  9745
S.ACLO= 000100          2102#
S.BRHM= 000100          2116#
S.BRKE= 040000          2138#
S.CART= 000400          2118#
S.DIB = 002000          2134#
S.DOOR= 000200          2117#
S.DRA = 000040          2088#
S.DROT= 020000          2109#
S.DRY = 000200          2090#
S.DSC = 040000          2097#
S.FLT = 000200          2103#
S.FORM= 001000          2092#
S.FWD - 002000          2120#
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S.HDFL= 000200          2131#
S.HDHM= 000040          2115#   7914    8477
S.ICYL= 000040          2101#
S.ILF = 000400          2104#
S.LIMD= 020000          2137#
S.LOAD= 010000          2122#
S.MHD = 000400          2132#
S.NMOV= 010000          2136#
S.OFF = 002000          2093#
S.PAR = 001000          2105#
S.PIP = 020000          2096#
S.PLO = 004000          2135#
S.REV = 004000          2121#
S.RTZ = 020000          2123#
S.SECT= 000020          2128#
S.SKI = 002000          2106#
S.SPIN= 010000          2095#
S.SPLS= 010000          2108#
S.SPOK= 001000          2119#
S.TYPE= 000400          2091#
S.UNLD= 040000          2124#
S.UNS = 040000          2110#
S.VV  = 000100          2089#
S.WCLK= 000040          2129#
S.WGAT= 000100          2130#
S.WLE = 004000          2107#
S.WRL = 004000          2094#
S.XDOK= 000020          2114#
S.XERR= 001000          2133#
TBITVE= 000014          1916#
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                        5097    5152    5166    5230    5245    5303    5317    5366    5386    5440    5457    5769    5788
                        5803    5853    5876    5891    5939    5963    6024    6044    6059    6110    6129    6144    6203
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                        6931    6961    7004    7019    7061    7076    7197    7212    7326    7343    7390    7421    7447
                        7466    7492    7517    7607    7625    7631    7646    7671    7686    7691    7706    7729    7761
                        7767    7782    7857    7911    8000    8044    8135    8168    8194    8240    8256    8264    8279
                        8353    8360    8375    8390    8433    8474    8509    8527    8578    8649    8718    8786    8800
                        8952    8972    9000    11350   11357   11385   12103#
TCHKWE= 104422          3203    3421    3465    3530    3659    3709    3937    3945    4006    4393    4474    4537    4590
                        4651    5505    5558    5694    6504    6800    6876    7096    7234    7809    7887    7961    8036
                        8109    8316    8450    12104#
TGETRK= 104420          3070    3120    3389    3606    3742    3757    3809    3850    3878    4273    8661    8728    8818
                        9860    10080   10126   10226   10425   12102#
TIMCNT  001654          2690#   9760*   9789*   9792*   9851*   10067*
TKVEC = 000060          1923#   11673*  11674*
TLOADR= 104417          3065    3115    3197    3229    3283    3292    3323    3338    3373    3417    3461    3506    3526
                        3561    3568    3595    3638    3648    3686    3696    3738    3774    3804    3846    3909    3928
                        3972    4002    4075    4240    4265    4369    4386    4449    4467    4518    4533    4571    4586
                        4632    4647    4691    4705    4744    4774    4789    4840    4863    4926    4945    5000    5014
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                        5555    5656    5765    5784    5799    5849    5872    5887    5935    5959    5973    6020    6040
                        6055    6105    6125    6140    6199    6256    6314    6370    6426    6472    6500    6541    6624
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		7642	7661	7681	7702	7719	7757	7778	7793	7805	7849	7868	7883	7907
		7954	7996	8015	8032	8073	8088	8100	8132	8164	8184	8220	8236	8252
		8275	8291	8312	8349	8371	8386	8401	8414	8446	8470	8505	8523	8574
		8628	8697	8783	8796	8939	8948	8961	8968	8983	8995	11346	11381	12101#
TPVEC = 000064		1924#												
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TRKERR= 000020		6807	10385	12431#										
TRTVEC= 000014		1917#												
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		4423	4456	4502	4554	4608	4669	4727	4824	4911	4987	5061	5135	5212
		5285	5347	5422	5491	5544	5607	5750	5834	5920	6005	6090	6177	6236
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		7872	7893	7917	7943	7981	8062	8116	8153	8171	8209	8338	8456	8480
		8487	8545	8560	8614	8684	8775	8931	11331	11360	12100#			
TSTAPT 032202		9135	9138#											
TSTCYL 036122		9937*	9943*	9949#										
TSTLUP 004720		3304#	8598											
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TST10 005334		3452#	9315											
TST100 026132		8059#	9371											
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TST102 026504		8207#	9373											
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TST105 030022		8609#	9376											
TST106 030246		8679#	9377											
TST107 030466		8753#	9378											
TST11 006260		3630#	9316											
TST110 031174		8919#	9379											
TST12 006376		3678#	9317											
TST13 006514		3730#	9318											
TST14 006756		3796#	9319											
TST15 007110		3838#	9320											
TST16 007320		3899#	9321											
TST17 007510		3964#	9322											
TST2 003300		2965#	9309											
TST20 007644		3994	4038#	9323										
TST21 010512		4217#	9324											
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TST51   017360          6088#  9348
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TST6    005102          3365#  9313
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TWAT14= 104433         12113#
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T.BA    001544       2640#  5519   5523   5573   5577   5703   5706   5710   5713   7114   7119   7133   7137
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T.CS1   001540       2638#  3071   3121   3484   3518   3541   3581   3613   3811   3852   3879   4281   5512
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T.CS2   001550       2642#  3073   3142   4274  10433  10490  13333  13343
T.DA    001546       2641#  10383  10386  10393  10395  13345
T.DB    001564       2648#
T.DCYL  001560       2646#  10380  10392  13345
T.DS    001552       2643#  3093   3098   3123   3125   3209   3223   3237   3243   3298   3329   3345   3380
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T.ECPS  001570       2650#
T.ECPT  001572       2651#
T.ER    001554       2644#  3075   3144  10437  10492  13333  13343
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T.MR2   001574       2652#  7914   8477
T.MR3   001576       2653#
T.SPAR  001562       2647#
T.WC    001542       2639#  5526   5530   5580   5584   5717   5720   5723   5726   7123   7129   7141   7146
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UFE   - 000400       2025#  10557
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UNLOAD= 000107       1989#
UNS   = 040000       2050#
UNSERR  040000       8451  12404#
UPE   = 020000       2030#  10573
UPERR = 000100       5697  10575  12423#
VV    = 000100       2061#  3237
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                     9847#
WCE   = 040000       2031#  10528
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WLE   - 004000       2047#
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                         6789   6989   7050   7186   7315   7410   7430   7478   7580   7650   7876   7989   8008
                         8993
WRDCNT  001706           2720#  11084  11112* 11160* 11284
WRDNUM  001704           2719#  11083  11113* 11159* 11283
WRHEAD= 000127           1997#  4226   4351   4427   4506   4558   4612   4673   4734   6530   6760   6917   7376
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WRL     = 004000         2064#  3125
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$ATY1   033346           9386#
$ATY3   033354           9387#  11439
$ATY4   033364           9389#  9497
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$BASE   001352           2326#  2865   2873*  2919   2943
$BDADR  001122           2223#
$BDDAT  001126           2225#
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$CDW1   001356           2328#
$CHARC  044532          11456*  11466* 11473  11499* 11504#
$CKSWR  045524          11741#  12093
$CMTAG  001100           2211#  2761   2762   2770   2776   2777   2778
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                         2256#  2257#  2258#  2259#
$CM2    - 000040         2243#  2244#  2245#  2246#  2247#  2248#  2249#  2250#  2251#  2252#  2253#  2254#  2255#
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$CM3    = 000020         2241#  2243
$CM4    = 000020         2259#  2260#  2261#  2262#  2263#  2264#  2265#  2266#  2267#  2268#  2269#  2270#  2271#
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$CNTLG  046434          11762   11907#
$CNTLU  046427          11787   11880  11906#
$CORE   032466           9178   9205#
$CPUOP  001324           2300#
$CRLF   001273           2279#  9124   9481   9492   9517   9539   9544   9552   9565   9578   10779  10812  11455
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$FILLS  001155          2238#  11507
$GDADR  001120          2222#
$GDDAT  001124          2224#
$GET42  032152          9126#
$GTSWR  045614          11763# 12091
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$HIBTS  000224          2198#
$HIOCT  046622          11954* 11965#
$ICNT   001104          2215#  9292*  9293   9295*  9306
$ILLUP  047060          12015  12031  12048#
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$LFLG   033611          9427*  9433#
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                        3889#  3891   3955#  3957   4014#  4016   4208#  4210   4328#  4330   4410#  4412   4490#
                        4492   4543#  4545   4595#  4597   4656#  4658   4715#  4717   4812#  4814   4886#  4888
                        4967#  4969   5035#  5037   5116#  5118   5186#  5188   5266#  5268   5337#  5339   5410#
                        5412   5482#  5484   5535#  5537   5589#  5591   5740#  5742   5823#  5825   5910#  5912
                        5994#  5996   6079#  6081   6164#  6166   6223#  6225   6280#  6282   6337#  6339   6393#
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                        6899#  6901   6975#  6977   7021#  7023   7157#  7159   7295#  7297   7348#  7350   7555#
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$RTNAD  032174          9135#
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                        9128    9134    9136    9234    9235    9236    9237    9238    9244    9261    9263    9264    9277
                        9278    9279    9286    9287    9288    9300    9303    9306    9446    9447    9448    9449    9450
                        9459    9466    9501    9505    9517    12047
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$SWRMK= 000000          1815    1816    9238    9239    9267
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                        6675*   6754*   6908*   6984*   7040*   7176*   7306*   7368*   7573*   7744*   7836*   7942*   7980*
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.$X   - 000224          2187#   2192
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        3436   3620#  3622   3667#  3669   3717#  3719   3788#  3790   3831#  3833   3889#  3891   3955#  3957
        4014#  4016   4208#  4210   4328#  4330   4410#  4412   4490#  4492   4543#  4545   4595#  4597   4656#
        4658   4715#  4717   4812#  4814   4886#  4888   4967#  4969   5035#  5037   5116#  5118   5186#  5188
        5266#  5268   5337#  5339   5410#  5412   5482#  5484   5535#  5537   5589#  5591   5740#  5742   5823#
        5825   5910#  5912   5994#  5996   6079#  6081   6164#  6166   6223#  6225   6280#  6282   6337#  6339
        6393#  6395   6449#  6451   6478#  6480   6513#  6515   6594#  6596   6665#  6667   6739#  6741   6899#
        6901   6975#  6977   7021#  7023   7157#  7159   7295#  7297   7348#  7350   7555#  7557   7733#  7735
        7825#  7828   7933#  7935   7967#  7970   8048#  8051   8140#  8142   8196#  8198   8321#  8323   8530#
        8532   8602#  8604   8671#  8673   8738#  8740   8904#  8906
MULT       1#  1926#
NEWTST     1#  1926#  2927   2958   2988   3268   3305   3357   3401   3434   3620   3667   3717   3788   3831
        3889   3955   4014   4208   4328   4410   4490   4543   4595   4656   4715   4812   4886   4967   5035
        5116   5186   5266   5337   5410   5482   5535   5589   5740   5823   5910   5994   6079   6164   6223
        6280   6337   6393   6449   6478   6513   6594   6665   6739   6899   6975   7021   7157   7295   7348
        7555   7733   7826   7933   7968   8049   8140   8196   8321   8530   8602   8671   8738   8904
OPCHK   2740#  4844   4867   4930   4948   5004   5017   5080   5097   5152   5166   5230   5245   5303   5317
        5440   5457   5769   5788   5803   5853   5876   5891   5939   5963   6024   6044   6059   6110   6129
        6144   6203   6260   6318   6374   6430   6476   6545   6628   6643   6701   6716   6777   6841   6931
        6961   7004   7019   7061   7076   7197   7212   7326   7343   7390   7421   7446   7466   7491   7517
        7606   7625   7631   7646   7670   7686   7691   7706   7728   7761   7767   7782   7857   7911   8000
        8043   8135   8168   8194   8240   8256   8264   8279   8353   8360   8375   8390   8433   8474   8509
        8527   8578   8648   8717   8786   8800   8951   8971   9000   11350  11357  11385
POP        1#  1926#  9429   9430   9899   10033  10231  11099  11118  11122  11286  11560  11955  12004  12036
        12037
PUSH       1#  1926#  9390   9392   9413   9888   10020  10205  10988  10999  11519  11929  11984  12017  12023
REPORT     1#  1926#
RESDC   2737#  4875   4956   5025   5106   5175   5255   5326   5471   5812   5900   5983   6068   6153   6212
        6269   6327   6383   6439   6577   6652   6725   6850   6888   7528
RKLOAD  2739#  4840   4863   4926   4945   5000   5014   5076   5093   5148   5162   5226   5241   5299   5313
        5436   5454   5502   5555   5765   5784   5799   5849   5872   5887   5935   5959   5973   6020   6040
        6055   6105   6125   6140   6199   6256   6314   6370   6426   6472   6500   6624   6639   6697   6712
        6773   6796   6837   6872   6927   6957   7000   7015   7057   7072   7092   7193   7208   7230   7322
        7339   7386   7417   7462   7513   7620   7642   7681   7702   7757   7778   7793   7805   7849   7868
        7883   7907   7996   8032   8073   8088   8132   8164   8220   8236   8252   8275   8312   8349   8371
        8386   8401   8446   8469   8505   8523   8574   8628   8697   8783   8796   8939   8948   8961   8968
        8983   11346  11381
SCOPE   1821#  2934   2965   3030   3275   3315   3365   3408   3452   3630   3678   3730   3796   3838   3899
        3964   4038   4217   4344   4420   4499   4551   4605   4665   4724   4821   4896   4977   5045   5126
        5196   5276   5345   5420   5489   5542   5605   5748   5832   5918   6003   6088   6175   6234   6291
        6348   6404   6458   6487   6522   6602   6674   6753   6907   6983   7039   7175   7305   7367   7572
        7743   7835   7941   7979   8059   8151   8207   8335   8542   8582   8609   8679   8753   8919   9099
SETPRI     1#  1926#  11833
SETTRA  12077#  12086  12087  12088  12089  12091  12093  12094  12095  12096  12097  12098  12099  12100  12101
        12102  12103  12104  12105  12106  12107  12108  12109  12110  12111  12112  12113  12114  12115  12116
        12117  12118
SETUP      1#  1926#  2760
SKIP       1#  1926#
SLASH      1#  1926#
SPACE   1926#
STARS      1#  1926#  2184   2186   2193   2206   2281   2284   2927   2933   2958   2964   2988   3029   3268
        3274   3305   3314   3357   3364   3401   3407   3434   3451   3620   3629   3667   3677   3717   3729
        3788   3795   3831   3837   3889   3898   3955   3963   4014   4037   4208   4216   4328   4343   4410
        4419   4490   4498   4543   4550   4595   4604   4656   4664   4715   4723   4812   4820   4886   4895
        4967   4976   5035   5044   5116   5125   5186   5195   5266   5275   5337   5344   5410   5419   5482
        5488   5535   5541   5589   5604   5740   5747   5823   5831   5910   5917   5994   6002   6079   6087
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                6164    6174    6223    6233    6280    6290    6337    6347    6393    6403    6449    6457    6478    6486    6513
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                7295    7304    7348    7366    7555    7571    7733    7742    7826    7834    7933    7940    7968    7978    8049
                8058    8140    8150    8196    8206    8321    8334    8530    8541    8602    8608    8671    8678    8738    8752
                8904    8918    9091    9147    9230    9385    9442    9517    9526    9633    9739   10861   10874   10902   11290
               11413   11509   11576   11653   11736   11751   11822   11846   11915   11968   12013   12029   12056
SWRSU             1#   1926#   2782#
TRMTRP        12077#  12119
TYPBIN            1#   1926#
TYPDEC            1#   1926#   9114    9121
TYPNAM            1#   1793#   1926#   2803
TYPNUM            1#   1926#
TYPOCS            1#   1926#
TYPOCT            1#   1926#   2865    9474    9479   11764
TYPTXT            1#   1926#   9110    9117
$$CMRE         2204#   2243    2244    2245    2246    2247    2248    2249    2250    2251    2252    2253    2254    2255    2256
               2257    2258
$$CMTM         2204#   2259    2260    2261    2262    2263    2264    2265    2266    2267    2268    2269    2270    2271    2272
               2273    2274
$$ESCA            1#   1926#
$$NEWT            1#   1926#   2927    2958    2988    3268    3305    3357    3401    3434    3620    3667    3717    3788    3831
               3889    3955    4014    4208    4328    4410    4490    4543    4595    4656    4715    4812    4886    4967    5035
               5116    5186    5266    5337    5410    5482    5535    5589    5740    5823    5910    5994    6079    6164    6223
               6280    6337    6393    6449    6478    6513    6594    6665    6739    6899    6975    7021    7157    7295    7348
               7555    7733    7826    7933    7968    8049    8140    8196    8321    8530    8602    8671    8738    8904
$$SET         12077#  12086   12087   12088   12089   12091   12093   12094   12095   12096   12097   12098   12099   12100   12101
              12102   12103   12104   12105   12106   12107   12108   12109   12110   12111   12112   12113   12114   12115   12116
              12117   12118
$$SETM         2798#
$$SKIP            1#   1926#
.EQUAT            1#   1793#   1816
.HEADE            1#   1793#   1795
.KI11             1#   1793#   1926
.SETUP            1#   1793#   2740
.SWRHI            1#   1793#   1804
.SWRLO         1793#   1816#
.$ACT1            1#   1793#
.$APIB            1#   2282#
.$APTH            1#   1793#   2182
.$APTY            1#   1793#   9383
.$ASTA            1#
.$CATC            1#
.$CMTA            1#   1793#   2204
.$DB2D            1#
.$DB2O            1#
.$DIV             1#
.$EOP             1#   1793#   9089
.$ERRO            1#   1793#   9440
.$ERRT            1#   1793#
.$MULT            1#
.$POWE            1#   1793#  12011
.$RAND            1#
.$RDDE            1#
.$RDOC            1#   1793#  11913
.$READ            1#   1793#  11651
.$R2AZ            1#
```

```
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.$SB2D      1#
.$SB2O      1#
.$SCOP      1#   1793#   9228
.$SIZE      1#   1793#   9145
.$SUPR      1#
.$TRAP      1#   1793#  12054
.$TYPB      1#
.$TYPD      1#   1793#  11507
.$TYPE      1#   1793#  11411
.$TYPO      1#   1793#  11574
.$40CA      1#   1793#   2150
.1170       1#


. ABS.  074414     000


 ERRORS DETECTED:  0

 CZR6KG,CZR6KG.LST/SOL/CRF/NL:TOC=CZR6KG.SML,CZR6KG.P11
 RUN-TIME: 35 44 3 SECONDS
 RUN-TIME RATIO: 130/82=1.5
 CORE USED:  38K  (76 PAGES)
```