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000001                      TITLE CDUS1,'REV 7'
000002          *           CARTRIDGE DISC TEST
000003          *           PART NO.
000004          *  CDUX1    60131898-007
000005          *  CDUS1    60133734-007
000006          *  CDUL1    60133735-007
000007          *
000008          *  DESCRIPTION
000009          *  -----------
000010          *     THIS T & V PROGRAM VERIFIES PROPER OPERATION OF THE  LEVEL-6  TOP LOADING
000011          *   CARTRIDGE DISC SUBSYSTEM.  PROVIDES A FIRST LEVEL OF DIAGNOSIS WHEN FAILURES
000012          *   ARE DETECTED, AND MAKES FACILITIES AVAILABLE TO SUPPORT EXTENSIVE PROBLEM IN-
000013          *   VESTIGATIONS.
000014          *
000015          *     THE SUBSYSTEM OPTIONS SUPPORTED BY THIS PROGRAM ARE:
000016          *
000017          *     MSC9101   CARTRIDGE DISC CONTROLLER
000018          *     CDM9101   CARTRIDGE DISC PAC (ADAPTER)
000019          *
000020          *     CDU9101   1.25MW  100-TPI  CARTRIDGE DISC ONLY
000021          *     CDU9102   2.5 MW  200-TPI  CARTRIDGE DISC ONLY
000022          *     CDU9103   2.5 MW  100-TPI  CARTRIDGE + FIXED DISC
000023          *     CDU9104   5.0 MW  200-TPI  CARTRIDGE + FIXED DISC
000024          *     CDU9114   2.5 MW  100-TPI  CARTRIDGE + FIXED DISC
000025          *     CDU9116   5.0 MW  200-TPI  CARTRIDGE + FIXED DISC
000026          *
000027          *  REVISION HISTORY
000028          *  -------- -------
000029          *     001     AUG  1976     CDUT1 E   ORIGINAL RELEASE
000030          *     002     OCT  1976     CDUT1
000031          *     003     DEC  1976     CDUS1 E   SAF
000032          *     004     FEB  1977     CDUS1
000033          *     005     APR  1977     CDUS1-CDUL1       LAF
000034          *     006     MAY  1977     CDUS1-CDUL1
000035          *     007     JUL  1977     CDUS1-CDUL1       W/ MLCP LIBRARY
000036          *
000037          *     THIS DOCUMENT AND THE INFORMATION CONTAINED THEREIN IS CONFIDENTIAL AND
000038          *   PROPRIETARY TO AND THE EXCLUSIVE PROPERTY OF HONEYWELL INFORMATION SYSTEMS
000039          *   INC.   IT  IS MADE AVAILABLE ONLY  TO  HONEYWELL AUTHORIZED RECIPIENTS FOR
000040          *   THEIR USE SOLELY  IN  THE MAINTENANCE AND OPERATION OF HONEYWELL PRODUCTS.
000041          *   THIS DOCUMENT AND INFORMATION MUST BE MAINTAINED  IN STRICTEST CONFIDENCE;
000042          *   IT MUST NOT BE REPRODUCED IN  WHOLE OR IN PART;   AND IT SHALL NOT BE DIS-
000043          *   CLOSED TO ANY OTHER PARTY WITHOUT THE PRIOR WRITTEN CONSENT OF HONEYWELL.
000044          ************************************************************************
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000045                  / PROGRAM PREPARATION:
000046                  * -------- -----------
000047                  *     THE ROOT SOURCE OF THIS PROGRAM, AFTER THE ADDITION OF THE APPROPRIATE
000048                  *     TITLE AND END STATEMENTS, WAS PROCESSED BY THE HOST RESIDENT ASSEMBLER
000049                  *     TO CREATE EITHER SHORT OR LONG ADDRESS FORM ( SAF OR LAF ) OBJECT TEXT
000050                  *     AND LISTING.   THE  OBJECT TEXT  WAS  FURTHER PROCESSED  BY  THE  HOST
000051                  *     RESIDENT LINKER USING THE APPROPRIATE CONSOLE ZV$LIB LIBRARY TO CREATE
000052                  *     A PUNCH SEGMENT CONTAINING AN EXECUTABLE MODULE.   THE ASSEMBLY LISTING
000053                  *     WAS AUGMENTED WITH CROSS REFERENCE DATA,  PLUS  THE LOAD MAP FROM  THE
000054                  *     LINKER TO CREATE A LIST SEGMENT.
000055                  *              ROOT            SAF             LAF
000056                  *              ----            ---             ---
000057                  *     NAME     CDUX1           CDUS1           CDUL1
000058                  *     DOCUMENT 60131898-007    60133734-007    60133735-007
000059                  *
000060                  * DISTRIBUTION
000061                  * ------------
000062                  *     THE ELEMENTARY ITEMS SUBMITTED TO THE T & V PROGRAM DISTRIBUTION CENTER
000063                  *     WERE THE EXECUTABLE LINKED IMAGES, ON DISKETTE, OF CDUS1 AND CDUL1, AND
000064                  *     MAGNETIC TAPE IMAGES OF THE AUGMENTED LISTINGS.
000065                  *
000066                  *     REPRODUCTIONS OF THE EXECUTABLE LINKED IMAGES MAY BE  AS DUPLICATE CARD
000067                  *     DECKS OR  AS A MEMBER OF A MULTIPLE MEMBER FILE.   IN THE MOST FREQUENT
000068                  *     CASE, IT WILL BE FOUND  AS  MEMBER "SN" (SAF) OR "LN" (LAF) WITHIN FILE
000069                  *     "PROGFILE" OF A DISKETTE VOLUME ENTITLED "DIAGS".
000070                  *
000071                  *     DISTRIBUTION OF THE LISTINGS,  WHICH SHOULD BE AVAILABLE IF ANY COMPLEX
000072                  *     MAINTENANCE OR REPAIR IS TO BE PERFORMED, IS NORMALLY AS A PRINTED COPY.
000073                  *
000074                  * ROUTINE DEMONSTRATION
000075                  * ------- -------------
000076                  *        A MINIMUM SATISFACTORY TEST FOR NORMAL OPERATION MAY BE OBTAINED  BY
000077                  *     SELECTING "A" MODE OF OPERATION FOR EACH DEVICE PRESENT AND  PERMIT THE
000078                  *     PROGRAM TO RUN AS MANY PASSES AS THERE ARE DEVICES.
000079                  *     (ONE PASS ON EACH DEVICE.)
000080                  *
000081                  * STORAGE
000082                  * -------
000083                  *     THIS PROGRAM REQUIRES AT LEAST  16K  WORDS OF MAIN MEMORY AND  WILL  USE
000084                  *     ALL AVAILABLE MEMORY UP THROUGH 32K WORDS.  CERTAIN TESTS WILL NOT BE EX-
000085                  *     ECUTED IN A 16K SYSTEM.
000086                  *
000087                  * OPERATION
000088                  * ---------
000089                  *     LOAD AND START (OR RESTART) THE PROGRAM. THE PROGRAM IDENTIFICATION WILL
000090                  *     BE DISPLAYED ON THE CONSOLE.  THE INITIAL START WILL ALSO DISPLAY:
000091                  *
000092                  *       THE ZV$LIB REVISION NUMBER
000093                  *       THE ADDRESS FORM (SAF OR LAF)
000094                  *       I/O  EQUIPMENT DETECTED IN THE SYSTEM
000095                  *       MEMORY SIZE
000096                  *
000097                  *     THIS DISPLAY MUST BE VERIFIED BY THE OPERATOR.   THIS DISPLAY IS OMITTED
000098                  *     ON RESTARTS.
000099                  *
000100                  *     THE CONSOLE SEARCH RULES ARE:  FIND THE CONSOLE WITH THE LOWEST  CHANNEL
000101                  *     NUMBER CONNECTED THRU AN  MDC  CONTROLLER.  IF THERE IS NO CONSOLE ON AN
000102                  *     MDC, THEN SEARCH FOR A TERMINAL WITH THE HIGHEST CHANNEL NUMBER ASSIGNED
000103                  *     TO AN ACLA ADAPTER ON AN MLC CONTROLLER.  IF NO ASYNC ADAPTER  IS FOUND,
000104                  *     THEN GO TO THE FULL CONTROL PANEL.
000105                  *
000106                  *     THERE ARE THREE CONSOLE CHANNEL OPTIONS DETERMINED BY THE VALUE  OF  LO-
000107                  *     CATION "ZV$TTY".
000108                  *
000109                  *     IF ZV$TTY EQUALS (0000), SEARCH FOR A CONSOLE.
000110                  *     IF ZV$TTY EQUALS (FFFF), ASSUME THERE IS NO CONSOLE.
000111                  *     IF ZV$TTY EQUALS NEITHER (0000), NOR (FFFF), THEN IT IS THE CONSOLE CHAN-
000112                  *     NEL NUMBER.   NOTE:  DEFAULT IS TO SEARCH FOR A CONSOLE.
000113                  *
000114                  *     ALL CONSOLE I/O IS EVEN PARITY.  IF CONSOLE IS ON MLC,  IT MUST BE ASYNC
000115                  *     AND THE BAUD RATE SET AT 1200 TO MATCH THE PROGRAM SUPPLIED RATE.  IF IT
000116                  *     IS NECESSARY TO CHANGE THE PROGRAM BAUD RATE,  THEN THE  NEW  BAUD RATE
000117                  *     CODE SHOULD BE PUT INTO LOCATION "ZV$BUD" IN HEX.  THE TERMINAL BAUD RATE
000118                  *     MUST BE  SET  TO MATCH THIS NEW BAUD RATE.  THE CORRECT HEX VALUE MAY BE
000119                  *     OBTAINED FROM THE FOLLOWING TABLE.
000120                  *
000121                  *-----------------------------------------*
000122                  *                                         *
000123                  *        BAUD  RATE  TABLE                *
000124                  *                                         *
000125                  *-----------------------------------------*
000126                  * ACLA I.D.E(2118)(2110) E(2108)
000127                  * BAUD-RATE
000128                  *    50    E   0 EE   1
000129                  *    75    E   1  EE   2
000130                  *   110    E   2 EE   3
000131                  *   134    E   3 EE   4
000132                  *   150    E   4 EE   5
000133                  *   200    E   5 EE  ---
000134                  *   300    E   6 EE   6
000135                  *   600    E   7 EE   7
000136                  *   900    E  --- EE   8
000137                  *  1050    E   8 EE  ---
000138                  *  1200    E   9 EE   9
000139                  *  1800    E  10 (A) EE  10 (A)
000140                  *  2000    E  11 (B) EE  ---
000141                  *  2400    E  12 (C)  E  11 (B)
000142                  *  3600    E  --- EE  12 (C)
000143                  *  4800    E  13 (D) EE  13 (D)
000144                  *  7200    E  --- EE  14 (E)
000145                  *  9600    E  14 (E) EE  15 (F)
000146                  * 19200    E  15 (F) EE  ---
000147                  *
000148                  *     TO MAKE ANY OF THE ABOVE CHANGES,  LOAD AND HALT THE PROGRAM BEFORE EX-
000149                  *     ECUTION.   INSERT CHANGE THEN EXECUTE.  MEMORY LOCATIONS OF "ZV$TTY" AND
000150                  *     "ZV$BUD" MAY BE FOUND IN MAP AT END OF LISTING.
000151                  *     CONSULT LEVEL-6 T&V MANUAL "AW94" FOR DETAILS ON HOW TO LOAD THE TESTS.
000152                  *
000153                  *     THE FOLLOWING IS A TYPICAL RESULT OF LOADING  AND  STARTING TO  RUN THE
000154                  *     PROGRAM.
000155                  *
000156                  *     CART DISC TEST <PGM NAME> <PGM DATE> <PGM REV>
000157                  *     ZV$LIB REV. 6.0
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000158                          *     ZV$AF= 1  <2>
000159                          *     WDT
000160                          *     CHAN  DEVC  ID
000161                          *     0400  DSKT  2010
000162                          *     0480  DSKT  2010
000163                          *     0580  CDR   2008
000164                          *     1200  DISC  2330
000165                          *     1280  DISC  2330
000166                          *     1300  LPT   2000
000167                          *     1380  CONS  2019
000168                          *     MEMORY LOW  00002C79
000169                          *     MEMORY HIGH 00003FFF  16K
000170                          *
000171                          *  THE PROGRAM WILL THEN ASK;
000172                          *
000173                          *           CHAN ?:
000174                          *
000175                          *  RESPOND WITH THE FOUR DIGIT HEX CHANNEL NUMBER THAT IS ASSIGNED TO A DEVICE
000176                          *  IN THE SUBSYSTEM.  THE PROGRAM WILL USE THE CONTROLLER PORTION OF THE CHAN-
000177                          *  NEL NUMBER TO ADDRESS ALL DEVICES.   IN THE EXAMPLE ABOVE,  EITHER 1200  OR
000178                          *  1280 WOULD BE CORRECT . . . AS LONG . AS IT IS THE INTENDED CHANNEL SET.
000179                          *     THE ABOVE SEQUENCE WILL OCCUR ON THE FIRST START.  AFTER A FRESH LOAD OF
000180                          *  THE PROGRAM.  RESTARTS PICK UP AT THE QUESTION "NEXT ?: " WHICH IS EXPLAIN-
000181                          *  ED BELOW.
000182                          *     THE BASIC QUESTION IS "NEXT ?: "WHICH GIVES CONTROL  TO THE OPERATOR.
000183                          *
000184                          *           L0  L1  L2  L3  NEXT ?:
000185                          *
000186                          *  EACH "L" IS THE CURRENT TEST REQUESTED FOR DEVICES 0, 1, 2, 3.   A DASH "-"
000187                          *  IS USED WHEN THERE IS NO REQUEST PRESENT.   THE OPERATOR MAY REQUEST A PRO-
000188                          *  CEDURE BY SELECTING FROM THE FOLLOWING:
000189                          *
000190                          *     NOTE - MOST ENTRIES REQUIRE ONE LETTER AND A DEVICE NUMBER (0 TO 3).
000191                          *
000192                          *           AN - AUTOMATIC TEST MODE, DEVICE N
000193                          *           E  - ENABLE ERROR REPORTS (NORMALLY ENABLED = DEFAULT)
000194                          *           GN - DATA DISCRIMINATOR ADJUSTMENT AID
000195                          *           HN - HEAD ALIGNMENT AID
000196                          *           I  - I.O. CHANNEL NUMBER RECONFIGURATION MADE
000197                          *        STOP  - DELETE ALL UNITS FROM THE TEST LIST
000198                          *           TN - TURNAROUND (CONTROLLER AND ADAPTER ONLY)  (NO DRIVES TESTED)
000199                          *           VN - SEEK VELOCITY ADJUSTMENT AID
000200                          *           X  - SUPPRESS ERROR REPORTS
000201                          *           -N - DELETE UNIT N FROM TEST LIST
000202                          *
000203                          *
000204                          * ERROR REPORTING
000205                          * ----- ---------
000206                          *  DETECTED ERRORS ARE REPORTED AS FOLLOWS;
000207                          *
000208                          *           ERR CODE AT AAAA
000209                          *
000210                          *  WHERE;
000211                          *     CODE = ERROR CODE WITH UNIQUE FIRST FOUR CHARACTERS
000212                          *     AAAA = LOCATION OF TEST IN PROGRAM WHERE ERROR WAS.
000213                          *
000214                          *     NOTE:  THIS PROGRAM CAN BE OPERATED WITHOUT  A  CONSOLE.  ERROR-DATA  IS
000215                          *  LIMITED TO "CODE" IN REGISTERS "R1" AND "R2", AND "AAAA" IN REGISTER  "B2".
000216                          *  ALL ENTRIES MUST BE MADE VIA REGISTER "R1". THE PROCESS IS FURTHER EXPLAIN-
000217                          *  ED IN MANUAL  "AW94"   ENTITLED  "LEVEL-6 SYSTEM CHECKOUT AND T&V MANUAL".
000218                          *  "B2" REGISTER ADDRESS IS TO BE LOOKED UP IN THE LISTING  TO DETERMINE WHICH
000219                          *   TEST FAILED.
000220                          *
000221                          *
000222                          *  IF THE ERROR INVOLVES ERRONEOUS DATA, THE REPORT WILL BE FOLLOWED BY 1 TO 8
000223                          *  LINES OF THE FOLLOWING;
000224                          *
000225                          *           BYTE XXXX  IS  00YY  SB  00ZZ
000226                          *
000227                          *  WHERE;
000228                          *     XXXX = RELATIVE BYTE LOCATION IN DATA BUFFER (0-3FFF)
000229                          *       YY = ACTUAL DATA IN READ BUFFER AT THAT LOCATION
000230                          *       ZZ = DATA IN SHOULD-BE BUFFER
000231                          *
000232                          *     NOTE:  BEFORE ATTEMPTING TO READ,  THE READ BUFFER IS FILLED WITH 33 HEX
000233                          *  (00110011)   IN ALL BYTES.   A FAILURE TO TRANSFER DATA  IS INDICATED BY  YY
000234                          *  BEING 33 HEX.
000235                          *     IF, AT ANY TIME, THE OPERATOR WISHES TO SUPPRESS THE ERROR REPORTING, HE
000236                          *  MAY DO SO BY SELECTING MODE "X".    IN THIS STATE, THE PROGRAM WILL INDICATE
000237                          *  AN ERROR BY OUTPUTING A SINGLE "NULL" CHARACTER TO THE CONSOLE AND CONTINUE
000238                          *  IMMEDIATELY.
000239                          *     RESTORATION OF ERROR REPORTING IS DONE BY SELECTING MODE "E".    (DEFAULT
000240                          *  IS TO DISPLAY ERRORS)
000241                          *
000242                          * END OF PASS REPORT
000243                          * --- -- ---- ------
000244                          *     AN END-OF-PASS  MESSAGE WILL BE DISPLAYED AT THE COMPLETION OF A TEST OF
000245                          *  ONE PORT.
000246                          *
000247                          *
000248                          * MODE- "A" USE
000249                          *  DURING THE OPERATION OF MODE  "A",  THE FOLLOWING SUBTESTS  ARE  PERFORMED.
000250                          *  THIS GROUP OF TESTS IS PERFORMED ONLY  ONCE  PER PASS  THROUGH THE PROGRAM.
000251                          *  THESE ARE  SPECIAL  TESTS DESIGNED TO INTRODUCE ERRORS TO DETERMINE IF  THE
000252                          *  TO DETERMINE IF THE SUBSYSTEM IS FUNCTIONING PROPERLY.
000253                          *
000254                          *           IO-BUS TEST
000255                          *           WRITE-READ SCRATCHPAD
000256                          *           DATA WRAPAROUND TEST
000257                          *           I.O. TEST
000258                          *           STATUS AND ATTENTION TEST
000259                          *
000260                          *           NOTE:  THE SPINDLE SHOULD BE CYCLED-UP TO CREATE AN ATTENTION.
000261                          *
000262                          *           BASIC (FUNCTIONAL) TESTS
000263                          *           FORMAT TESTS 256-BYTE SECTORS
000264                          *           SEARCH + UPDATE TESTS 256-BYTE SECTORS
000265                          *           HEAD SELECT TESTS
000266                          *           PROTECT-SWITCH TESTS
000267                          *           CHECK-BYTE ERROR TESTS
000268                          *           716-MODE TEST
000269                          *           FORMAT TESTS  576-BYTE SECTORS
000270                          *           SEARCH + UPDATE TESTS 576-BYTE SECTORS
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000271                  *          SIMPLE SEEKS
000272                  *          IMPLIED SEEKS
000273                  *          FORMAT THE  PACK
000274                  *          SEEK ALL CYLINDERS
000275                  *          DATA UPDATE WITH TRACK CHANGE
000276                  *          DATA UPDATE WITH CYLINDER CHANGE
000277                  *          MAXIMUM OFFSET RANGE TEST
000278                  *          WORST CASE DATA-PATTERN TESTS
000279                  *          MAXIMUM RANGE TESTS
000280                  *          BOOTSTRAP TEST
000281                  *          INTERRUPT TESTS
000282                  *
000283                  *     A PASS TAKES ABOUT FOUR MINUTES.
000284                  *
000285                  *  DURING THE PROGRAM,  THE DRIVE TYPE  WILL BE TYPED OUT.  THE OPERATOR MUST
000286                  *  INDEPENDENTLY CHECK THE RESULTS AGAINST THE EXPECTED.  I.E.,  HE MUST KNOW
000287                  *  IF THE DEVICE HAS REMOVEABLE ONLY,  FIXED AND REMOVEABLE,  AND 100/200 TPI
000288                  *  DENSITY.
000289                  *  THE OPERATOR MUST THEN  CYCLE-UP THE DRIVE TO CREATE AN  ATTENTION  BIT IN
000290                  *  STATUS.  THE OPERATOR MUST ALSO OPERATE THE FOLLOWING CONTROLS, AS REQUEST-
000291                  *  ED BY THE PROGRAM.
000292                  *     PERMIT / PROTECT REMOVABLE CARTRIDGE
000293                  *     PERMIT / PROTECT NON-REMOVEABLE PLATTER
000294                  *
000295                  *  MODE- "E" USE
000296                  *   THE RESPONSE OF  "E"  TO THE QUESTION  "NEXT ?: "  ENABLES THE REPORTING OF
000297                  *   ERRORS ON THE CONSOLE.  THE ONLY WAY THAT THE REPORTS COULD HAVE BEEN SUP-
000298                  *   PRESSED,  WAS BY USE OF THE "X" MODE.  THERE ARE NO OTHER EFFECTS,  AND THE
000299                  *   QUESTION "NEXT ?:  " IS ASKED.
000300                  *
000301                  *  MODE- "G" USE
000302                  *   DATA DISCRIMINATOR ADJUSTMENT IS AIDED BY SELECTING A PARTICULAR TRACK, AND
000303                  *   WRITING ID IF DESIRED, THEN HANGING IN A CONTINOUS READ.  THE OPERATOR MUST
000304                  *   RESPOND TO:
000305                  *          CYL,HEAD,PLAT ?: 0-197,0-1,0-1  OR PRIOR VALUE
000306                  *          WRITE (Y OR N) ?:               DEFAULT N
000307                  *          DATA ?: 0-FFFF                  DEFAULT AAAA OR PRIOR VALUE
000308                  *
000309                  *   THE CARTRIDGE IS PLATTER 0 AND THE FIXED DISC (IF PRESENT) PLATTER 1.
000310                  *
000311                  *   OPERATION WILL CONTINUE UNTIL A CONSOLE-BREAK!
000312                  *
000313                  *   IF A WRITE IS SELECTED, A FORMAT OF 12 X 576 BYTES WILL BE LAID DOWN, FOL-
000314                  *   LOWED BY A DATA WRITE.  IF THE DISCRIMINATOR IS TOO BAD FOR THE DATA WRITE
000315                  *   AN INITIAL ADJUSTMENT MUST BE MADE USING AN EXISTING TRACK CONTENT.
000316                  *
000317                  *  MODE-"H" USE
000318                  *   HEAD ALIGNMENT EXPECTS A "CE-CARTRIDGE" IS MOUNTED ON THE DRIVE.  THE OPER-
000319                  *   ATOR MUST RESPOND TO:
000320                  *
000321                  *          CYL,HEAD ?: 0-197,0-1           OR PRIOR VALUE
000322                  *
000323                  *   THE USUAL CYLINDER SELECTIONS ARE:
000324                  *
000325                  *          ALIGNMENT            200 TPI, CYL 92 (HEX)
000326                  *          ALIGNMENT            100 TPI, CYL 49 (HEX)
000327                  *
000328                  *          INDEX-TO-BURST       200 TPI, CYL A (HEX)
000329                  *          INDEX-TO-BURST       100 TPI, CYL 5 (HEX)
000330                  *
000331                  *   A SEEK WILL BE MADE TO THE SELECTED CYLINDER AND THE CONTROLLER WILL BE IN
000332                  *   A CONTINUOUS READ UNTIL A CONSOLE BREAK IS DETECTED.
000333                  *
000334                  *  MODE- "I" USE
000335                  *   THE CHANNEL NUMBERS USED BY THE PROGRAM BECAME AVAILABLE TO IT VIA THE RES-
000336                  *   PONCE TO THE QUESTION "CHANNEL ?: "  WHEN THE PROGRAM IS INITIALLY STARTED.
000337                  *   RESPONDING TO "NEXT ?: ", WITH "I" RETURNS THE PROGRAM TO THE "CHANNEL ?: "
000338                  *   QUESTION.
000339                  *      AFTER  A  HEX VALUE IS RECEIVED,  THE PROGRAM RETURNS TO  THE "NEXT ?: "
000340                  *   QUESTION.
000341                  *
000342                  *
000343                  *  MODE- "T" USE
000344                  *   SELECTION OF MODE "T"  WILL EXECUTE THE PORTION OF THE "A"  MODE TEST WHICH
000345                  *   PERTAINS TO THE CONTROLLER (MOTHERBOARD)  AND ADAPTER (DAUGHTERBOARD).  THE
000346                  *   PRESENCE OF ANY DEVICES IS  NOT MATERIAL TO THIS MODE.  EXCEPTING THAT THEY
000347                  *   MUST NOT  DISRUPT  THE  ADAPTER-DEVICE INTERFACE  TO  THE  EXTENT THAT  THE
000348                  *   CONTROLLER CAN'T GAIN ACCESS TO THE ADAPTER.  IF THE DEVICES ARE SUSPECTED,
000349                  *   AND "T" WILL NOT RUN, DISCONNECTING THE DEVICES IS RECOMMENDED.
000350                  *
000351                  *   ONCE STARTED, "T" RUNS INDEFINITELY.  TO RETURN TO THE "NEXT ?: "  QUESTION
000352                  *   STRIKE THE CONSOLE BREAK-KEY!
000353                  *
000354                  *  MODE- "V" USE
000355                  *   ADJUSTMENT OF THE SEEKING SERVO SYSTEM IS AIDED BY RAPID SEEKS BETWEEN TWO
000356                  *   CYLINDERS, AS SELECTED BY  THE OPERATOR:
000357                  *
000358                  *          CYL,CYL ?: 0-197,0-197          OR PRIOR VALUE
000359                  *
000360                  *   THE USUAL CYLINDER SELECTIONS ARE ZERO AND:
000361                  *
000362                  *          100-TPI    3,87,CB (HEX)
000363                  *          200-TPI    3,87,192(HEX)
000364                  *
000365                  *   THE SEEK OPERATIONS WILL BE AS RAPID AS THE DRIVE PERMITS, UNTIL A CONSOLE
000366                  *   BREAK-KEY IS DETECTED.  NO ERROR CHECKS ARE MADE.
000367                  *
000368                  *
000369                  *  MODE- "X" USE
000370                  *   SELECTION OF MODE "X" SUPRESSES FUTURE ERROR REPORTS, UNTIL UNSUPPRESSED BY
000371                  *   MODE "E".  THE FIRST 10 ERROR REPORTS, IF ANY, WILL CONTINUE TO BE  ENTERED
000372                  *   INTO THE ERROR HISTORY BUFFER.
000373                  *
000374                  *  MODE- "STOP" USE
000375                  *      THIS MODE WILL DELETE ALL MODES AND DRIVES FROM THE TEST LIST.
000376                  *
000377                  *  MODE- "-N" USE
000378                  *      THIS MODE WILL DELETE A SINGLE DRIVE FROM THE TEST LIST.
000379                  *
000380                  *
000381                  *
000382                  *  CONTROLLER ASSOCIATED WORD FORMATS
000383                  *  ---------- ---------- ---- -------
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```
000384                          *
000385                          *       CWA  = CONFIGURATION WORD A
000386                          *         0  =  0
000387                          *         1  =  0
000388                          *         2  =  0
000389                          *         3  =  0
000390                          *         4  =  0 = CARTRIDGE;  1 = NON-REMOVABLE DISC
000391                          *         5  =  0
000392                          *         6  =  0
000393                          *         7  =  C
000394                          *         8  =  C
000395                          *         9  =  C  CYLINDER 0000 TO 00CB / 0197 HEX.
000396                          *        10  =  C  (CYLINDER 0000 TO 0203 / 0407 DECIMAL)
000397                          *        11  =  C
000398                          *        12  =  C
000399                          *        13  =  C
000400                          *        14  =  C
000401                          *        15  =  C
000402                          *
000403                          *
000404                          *       CWB = CONFIGURATION WORD B
000405                          *         0  =  0
000406                          *         1  =  0
000407                          *         2  =  0
000408                          *         3  =  0
000409                          *         4  =  0
000410                          *         5  =  0
000411                          *         6  =  0
000412                          *         7  =  0 = TRACK;  0=UPPER SURFACE, 1=LOWER SURFACE
000413                          *         8  =  S
000414                          *         9  =  S
000415                          *        10  =  S   SECTOR;  00 TO 17 HEX.
000416                          *        11  =  S
000417                          *        12  =  S
000418                          *        13  =  S
000419                          *        14  =  S
000420                          *        15  =  S
000421                          *
000422                          *
000423                          *       TSK = TASK WORD
000424                          *       0000 = RECALIBRATE
000425                          *       0100 = SEEK CYLINDER
000426                          *       8000 = FORMAT READ-WRITE, 256 BYTE SECTOR, 24 SECTORS
000427                          *       9000 = FORMAT READ-WRITE, 576 BYTE SECTOR, 12 SECTORS
000428                          *       A000 = FORMAT READ-WRITE WITH SEEK, 24 SECTORS
000429                          *       B000 = FORMAT READ-WRITE WITH SEEK, 12 SECTORS
000430                          *       8100 = DATA READ-WRITE, 256 BYTE SECTORS
000431                          *       9100 = DATA READ-WRITE, 576 BYTE SECTORS
000432                          *       A100 = DATA READ-WRITE WITH SEEK, 256 BYTE SECTORS
000433                          *       B100 = DATA READ-WRITE WITH SEEK, 576 BYTE SECTORS
000434                          *       8300 = DIAGNOSTIC READ-WRITE, 256 BYTE SECTOR
000435                          *       9300 = DIAGNOSTIC READ-WRITE, 576 BYTE SECTOR
000436                          *       8400 = I.D. FORMAT READ, 256 BYTE SECTOR, 24 SECTORS
000437                          *       9400 = I.D. FORMAT READ, 576 BYTE SECTOR, 24 SECTORS
000438                          *       A400 = I.D. FORMAT READ WITH SEEK, 24 SECTORS
000439                          *       B400 = I.D. FORMAT READ WITH SEEK, 12 SECTORS
000440                          *       8200 = FORMAT DIAGNOSTIC READ-WRITE, 256 BYTE SECTORS
000441                          *       9200 = FORMAT DIAGNOSTIC READ-WRITE, 576 BYTE SECTORS
000442                          *       8800 = FORMAT DIAGNOSTIC READ WITH CONTROLLER HANG
000443                          *       C000 = DATA WRAPAROUND AT ADAPTER
000444                          *       C100 = DATA WRAPAROUND AT CONTROLLER
000445                          *
000446                          *
000447                          *       STATUS  =  STATUS WORD FROM MOST RECENT OPERATION
000448                          *         0  -  DEVICE READY
000449                          *         1  -  ATTENTION
000450                          *         2  -  DATA OVERRUN - UNDERRUN
000451                          *         3  -  WRITE OPERATION DENIED DUE TO WRITE-PROTECT
000452                          *         4  -  ERROR DETECTION CODE ERROR ON READ
000453                          *         5  -  ILLEGAL SEEK REQUESTED
000454                          *         6  -  MISSED DATA SYNC - MARK
000455                          *         7  -  UNSUCESSFUL SEARCH FOR SECTOR - ID
000456                          *         8  -  CLOCK - PULSE MISSING
000457                          *         9  -  MISSED SECTOR PULSE
000458                          *        10  -  SEEK REQUESTED BEYOND CYLINDER LIMITS
000459                          *        11  -  0   NOT ASSIGNED
000460                          *        12  -  MAIN MEMORY ERROR (CORRECTED - YELLOW)
000461                          *        13  -  NON - EXISTANT RESOURCE
000462                          *        14  -  BUS PARITY ERROR
000463                          *        15  -  MAIN MEMORY ERROR (NOT CORRECTABLE - RED)
000464                          *
000465                          *
000466  0000                    ZERO    ORG     ZERO
000467                                  XLOC    ZV$ARG,ZV$ER,ZV$RDT,ZV$BKF,ZV$HR,ZV$SV1,ZV$SV2
000468                                  XLOC    ZHPFR,ZV$Q,ZV$QC
000469                                  CTRL    LINK ZV$ER
000470                                  CTRL    LINK ZV$T
000471                                  XLOC    ZHISAZ,ZHIAFB,ZHNRES
000472  00FF                            ORG     ZERO+X'FF'
000473  00FF  0000              NEND    HLT
000474  0100  0F00 0000        START   NOP     <ZERO                   CHECK PROGRAM IS IN CORRECT
000475  0102  0F00 0000                NOP     <ZERO                   ADDRESS FORM.  (SAF OR LAF)
000476  0104  0F80 1791        FIRSTM  B       <WRIBFR                 BRANCH ONLY AFTER FIRST LOAD
000477  0106  0F91                      B       >RESTRT
000478  0107  434F 5059 5249            TEXT    'COPYRIGHT1976,1977BYHONEYWELLINC'
              010A  4748 5431 3937
                    362C 3139 3737
                    4259 484F 4E45
                    5957 454C 4C49
                    4E43
000479                          ***********************************
000480                          *                                 *
000481                          *   SELECT DRIVES AND TESTS       *
000482                          *   TO BE PERFORMED ON THEM       *
000483                          *                                 *
000484                          ***********************************
000485                          *
000486                          *       RESTART  -  (ALSO "STOP" MODE)
000487                          *
000488        0117              RESTRT EQU    $
000489  0117  9870 2D30                LDR     $R1,='-0'               SET MODES TO -0 -1 -2 -3
000490  0119  2CFC                    LDV     $R2,=-4
000491  011A  9F20 0210        $A      STR     $R1,<MODE+4,$R2
```

```
000492  011C  8AD1                    INC   =$R1
000493  011D  27FD                    BINC  $R2,>-$A
000494                          *
000495                          *  SET UP DEFAULT CONDITIONS
000496                          *
000497  011E  8700 0826               CL    <PRTFLG
000498  0120  CB80 02C6               LAB   $B4,<PORTO
000499  0122  8700 0215               CL    <SEQN+$AF-1          CLEAR
000500  0124  8700 0216               CL    <SEQN1+$AF-1         THE
000501  0126  8700 0217               CL    <SEQN2+$AF-1         SEQUENCE
000502  0128  8700 0218               CL    <SEQN3+$AF-1         TABLE
000503  012A  DB80 01B8               LAB   $B5,<NEXTG           PRESET "BREAK-KEY" EXIT
000504  012C  DF80 0867               STB   $B5,<SENSB5+1
000505                          *
000506                          *  REPORT CURRENT MODES AND ASK "NEXT ?: "
000507                          *
000508  012E  D380 0436          NEXT LNJ   $B5,<ZVCRLF            DO CR-LF
000509  0130  2CFC                    LDV   $R2,=-4
000510  0131  9820 0210          $B   LDR   $R1,<MODE+4,$R2
000511  0133  D380 044B               LNJ   $B5,<VDTR              PRINT 2 ASCII CHARS + SPACE
000512  0135  27FC                    BINC  $R2,>-$B
000513                          NEXTA CALL   ZV$T,ZV$Q,MSNEXT      ASK THE QUESTION "NEXT ?: "
        0136  FBC0 0003
        0138  D380 0000       X
        013A  0F80
        013B  0209
000514  013C  8752                    CL    =$R2
000515  013D  8700 0213               CL    <MFLAG               PORT MODIFIED FLAG
000516  013F  8700 0214               CL    <RTRFLG              ROTOR FLAG
000517                          *
000518                          *       INPUT MODES DESIRED
000519                          *
000520  0141  D380 0411          NEXTB LNJ   $B5,<ZVIA            CALL ZV$IA
000521  0143  8753                    CL    =$R3
000522  0144  9B80 0000       X        LAB   $B1,<RDBUFR          SET POINTER TO INPUT
000523  0146  8880 0000       X        DEC   <ZV$ARG              DECREMENT FOR COMMA, CR
000524                          *
000525                          *       DECODE MODES AND
000526                          *       CHECK VALIDITY
000527                          *
000528        0148              NEXTE EQU   $
000529  0148  8980 0000       X        CMZ   <ZV$ARG
000530  014A  0900 01AE               BE    <NEXTF               INPUT EXHAUSTED?
000531  014C  D380 018C               LNJ   $B5,<CUPAK           GET NEXT BYTE
000532  014E  C856                    LDR   $R4,=$R6
000533  014F  6D20                    CMV   $R6,=' '
000534  0150  097B                    BE    >NEXTE
000535  0151  6D53                    CMV   $R6,='S'
000536  0152  0900 0117               BE    <RESTRT              RESTART
000537  0154  6D41                    CMV   $R6,='A'             MODE "A"
000538  0155  EB80 0885               LAB   $B6,<MODEA
000539  0157  0926                    BE    >CMNA
000540  0158  6D44                    CMV   $R6,='D'
000541  0159  6D45                    CMV   $R6,='E'
000542  015A  0900 01E9               BE    <SETE                ENABLE ERROR REPORTS
000543  015C  6D46                    CMV   $R6,='F'
000544  015D  6D47                    CMV   $R6,='G'
000545  015E  EBC0 1564               LAB   $B6,MODEG            DATA DISCRIMINATOR ADJUSTMENT AID
000546  0160  091D                    BE    >CMNA
000547  0161  6D48                    CMV   $R6,='H'
000548  0162  EB80 171D               LAB   $B6,<MODEH           HEAD ALIGNMENT ROUTINE
000549  0164  0919                    BE    >CMNA
000550  0165  6D49                    CMV   $R6,='I'
000551  0166  0900 01ED               BE    <SETI                GET NEW CHANNEL + RESTART
000552  0168  6D54                    CMV   $R6,='T'
000553  0169  EB80 087B               LAB   $B6,<MODET           WRAPAROUND
000554  016B  0912                    BE    >CMNA
000555  016C  6D56                    CMV   $R6,='V'
000556  016D  EBC0 15F7               LAB   $B6,MODEV            SEEK SERVO VELOCITY ADJUSTMENT
000557  016F  090E                    BE    >CMNA
000558  0170  6D58                    CMV   $R6,='X'
000559  0171  0900 01F1               BE    <SETX                DISABLE ERROR REPORTS
000560  0173  6D2D                    CMV   $R6,='-'
000561  0174  EB80 012E               LAB   $B6,<NEXT            CLEAR $B6
000562  0176  0907                    BE    >CMNA
000563  0177  9B80 01FF          INVLID LAB   $B1,<MSINVD         INVALID RESPONSE!
000564  0179  D380 043B               LNJ   $B5,<ZVTC            PRINTOUT
000565  017B  0F80 012E               B     <NEXT
000566                          *
000567                          *  SET VALID MODES
000568                          *
000569  017D  D380 019C          CMNA LNJ   $B5,<CKVLDN           GET A VALID PORT
000570  017F  9853                    LDR   $R1,=$R3             SET INDEX
000571  0180  EF90 0215               STB   $B6,<SEQN,$R1        STORE TEST-ADDRESS IN SEQUENCE TABLE
000572  0182  B944 0000               CMR   $R3,$B4,PORTNO       EQUAL PRESENT PORT?
000573  0184  0980               T        BNE   >+$A
000574  0185  8A80 0213                    INC   <MFLAG           SET FLAG - PRESENT MODE CHANGED
000575  0187  3F02                $A   MLV   $R3,=2             SET INDEX
000576  0188  C7B0 020C               STH   $R4,<MODE,$R3        STORE MODE IN CORRECT PORT
000577  018A  0F80 0148               B     <NEXTE
000578                          *
000579                          *  GET WORD FROM $B1
000580                          *  UNPACK WORD IN R7 --> BYTE IN R6
000581                          *
000582  018C  8880 0000       X  CUPAK DEC   <ZV$ARG
000583  018E  8980 0211               CMZ   <BYTSW               GET A NEW WORD?
000584  0190  0900               T        BE    >+$A
000585  0191  7090                    DOL   $R7,16
000586  0192  8700 0211               CL    <BYTSW
000587  0194  8385                    JMP   $B5
000588  0195  F871                $A   LDR   $R7,+$B1            INPUT WORD
000589  0196  8756                    CL    =$R6
000590  0197  7088                    DOL   $R7,8
000591  0198  7048                    SOR   $R7,8
000592  0199  8600 0211               CPL   <BYTSW               SET SWITCH
000593  019B  838F                    JMP   $B5
000594                          *
000595                          *       CHECK FOR A VALID PORT NUMBER
000596                          *
000597  019C  DF80 01AD          CKVLDN STB   $B5,<CKVLDX+1       STORE WHERE FROM
000598  019E  D380 018C               LNJ   $B5,<CUPAK           GET BYTE
000599  01A0  6D30                    CMV   $R6,='0'
000600  01A1  0908                    BE    >VLDNO
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000601  01A2  6D31                        CMV   $R6,='1'
000602  01A3  0906                        BE    >VLDNO
000603  01A4  6D32                        CMV   $R6,='2'
000604  01A5  0904                        BE    >VLDNO
000605  01A6  6D33                        CMV   $R6,='3'
000606  01A7  0980 0177                    BNE   <INVLID                 PORT NOT VALID
000607  01A9  B856                  VLDNO LDR   $R3,=$R6                R6 --> R3
000608  01AA  300C                        SUL   $R3,12
000609  01AB  304C                        SUR   $R3,12                  ASCII --> HEX
000610  01AC  0F80 0000             CKVLDX B     <RETURN                  EXIT
000611                              *
000612                              *
000613        01AE                  NEXTF EQU   $
000614  01AE  8980 0212                    CMZ   <FCOMMA
000615  01B0  0980 0141                    BNE   <NEXTB                  COMMA DETECTED
000616  01B2  8980 0213                    CMZ   <MFLAG                  CK IF PRESENT PORT MODIFIED
000617  01B4  0900 0866                    BE    <SENSB5                 BCH IF NO,RETURN TO WHATEVER WAS RUNNING
000618  01B6  8700 0213                    CL    <MFLAG
000619                              *
000620                              *     DETERMINE WHAT TO DO FIRST?
000621                              *
000622        01B8                  NEXTG EQU   $
000623  01B8  BB44 0000                    LDR   $R3,$B4.PORTNO
000624  01BA  3F02                        MLV   $R3,=2
000625  01BD  8740 0058                    CL    RTRFLG
000626  01BD  F0B0 020C             $A     LDH   $R7,<MODE.$R3           CK PORT FOR ASSIGNMENT
000627  01BF  7D2D                        CMV   $R7,='-'                NOTHING ASSIGNED?
000628  01C0  0980                  T     BNE   >+$B
000629  01C1  BA70 0002                    ADD   $R3,=2
000630  01C3  3D08                        CMV   $R3,=8                  END OF PORT-TABLE?
000631  01C4  0279                        BL    >-$A                    NO
000632  01C5  8753                        CL    =$R3
000633  01C6  8980 0214                    CMZ   <RTRFLG                 ROTOR FLAG
000634  01C8  8AC0 004B                    INC   RTRFLG                  SET PASS COMPLETE
000635  01CA  0973                        BE    >-$A                    FIRST PASS
000636  01CD  8740 0048                    CL    RTRFLG
000637  01CD  0F81 FF60                    B     NEXT      2-PASSES + NOTHING ASSIGNED
000638  01CF  8AD3                  $B     INC   =$R3
000639  01D0  90B0 020C                    LDH   $R1,<MODE.$R3           GET PORT
000640  01D2  100C                        SOL   $R1,12                  STRIP ASCII BITS
000641  01D3  104C                        SOR   $R1,12
000642  01D4  8390 01D6                    JMP   <LDPORT.$R1             LOAD $B4 WITH PORT-NO.
000643                              *
000644                              *  GET SOMETHING RUNNING
000645                              *
000646  01D6  0F87                  LDPORT B     >LPORT0
000647  01D7  0F8A                        B     >LPORT1
000648  01D8  0F8D                        B     >LPORT2
000649  01D9  CB80 0317             LPORT3 LAB   $B4,<PORT3
000650  01DB  8388 0218                    JMP   *<SEQN3
000651  01DD  CB80 02C6             LPORT0 LAB   $B4,<PORT0
000652  01DF  8388 0215                    JMP   *<SEQN
000653  01E1  CB80 02E1             LPORT1 LAB   $B4,<PORT1
000654  01E3  8388 0216                    JMP   *<SEQN1
000655  01E5  CB80 02FC             LPORT2 LAB   $B4,<PORT2
000656  01E7  8388 0217                    JMP   *<SEQN2
000657                              *
000658                              *
000659        01E9                  SETE  EQU   $
000660  01E9  8700 0826                    CL    <PRTFLG                 CLEAR INHIBIT ERROR-PRINT
000661  01EB  0F80 0148                    B     <NEXTE
000662  01ED  D380 021A             SETI  LNJ   $B5,<MODPCU             GET NEW CHANNEL + RESTART
000663  01EF  0F81 FF27                    B     RESTRT
000664  01F1  F800 02A8             SETX  LDR   $R7,<ONES               SET INHIBIT
000665  01F3  FF00 0826                    STR   $R7,<PRTFLG             ERROR-PRINT
000666  01F5  0F81 FF52                    B     NEXTE
000667                              *----------------------------*
000668                              *  TEST COMPLETE, DELETE IT  *
000669                              *----------------------------*
000670        01F7                  DONE  EQU   $
000671  01F7  9844 0000                    LDR   $R1,$B4.PORTNO          GET PORT NO
000672  01F9  1F02                        MLV   $R1,=2
000673  01FA  7C2D                        LDV   $R7,='-'
000674  01FB  F790 020C                    STH   $R7,<MODE.$R1           DELETE MODE FROM TABLE
000675  01FD  0F80 01B8                    B     <NEXTG
000676  01FF  494E 5641 4C49        MSINVD TEXT   'INVALID RESPONSE!',Z'0D0A',+'$'
        0202  4420 5245 5350
        0205  4F4E 5345 210D
        0208  0A24
000677  0209  204E 4558 5424        MSNEXT TEXT   ' NEXT$'
000678  020C  0000                  MODE   RESV   4,0                   PRESENT MODE FOR EACH PORT
000679  0210  0000                  CNSTAT RESV   1,0                   CONSOLE STATUS
000680  0211  0000                  BYTSW  RESV   1,0
000681  0212  0000                  FCOMMA RESV   1,0                   FLAG THAT COMMA WAS DETECTED
000682  0213  0000                  MFLAG  RESV   1,0                   FLAG THAT PRESENT DRIVE HAS BEEN MODIFIED
000683  0214  0000                  RTRFLG RESV   1,0                   ROTOR FLAG
000684  0215  0000                  SEQN   DC     <ZERO
000685  0216  0000                  SEQN1  DC     <ZERO
000686  0217  0000                  SEQN2  DC     <ZERO
000687  0218  0000                  SEQN3  DC     <ZERO
000688  0219  0000                  PASS1  RESV   1,0                   PASS COUNTER
000689                              **------------------------*
000690                              *    MODPCU  SUBROUTINE    *
000691                              *------------------------*
000692  021A  DF80 0253             MODPCU STB    $B5,<MODB5+1            STORE WHERE CAME FROM
000693        021C  FBC0 0003               CALL   ZV$T.ZV$QC,MSCHAN      ASK QUESTION CHAN ?:
              021E  D380 0000         X
              0220  0F80
              0221  02BC
000694        0222  FBC0 0003               CALL   ZV$1H,CHANEL           GET CHANNEL
              0224  D380 0000         X
              0226  0F80
              0227  02A7
000695  0228  9B80 0458                    LAB   $B1,<MSNULL
000696  022A  D380 043B                    LNJ   $B5,<ZVTC               CR - LF
000697  022C  CB80 02C6                    LAB   $B4,<PORT0
000698  022E  DB70 FE00                    LDR   $R5,=Z'FE00'
000699  0230  D500 02A7                    AND   $R5,<CHANEL             STRIP PORTS FROM CHANNEL
000700  0232  DF00 02A7                    STR   $R5,<CHANEL
000701  0234  8751                        CL    =$R1
000702  0235  9BC0 001E                    LAB   $B1,INCMD
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000703  0237  DA70 0002        $A      ADD     $R5,=X'0002'
000704  0239  DF5D                      STR     $R5,$B1,+$R1
000705  023A  1D1F                      CMV     $R1,=X'1F'
000706  023B  027C                      BL      >-$A
000707  023C  8751                      CL      =$R1
000708  023D  D800 02A7                 LDR     $R5,<CHANEL         GIVEN CHANNEL
000709  023F  DF40 0033                 STR     $R5,RCTL
000710  0241  5E01                      ADV     $R5,=X'01'
000711  0242  DF40 0031                 STR     $R5,WCTL
000712  0244  9BC0 0030                 LAB     $B1,OUTCMD
000713  0246  5E02              $B      ADV     $R5,=X'02'
000714  0247  DF5D                      STR     $R5,$B1,+$R1
000715  0248  1D1F                      CMV     $R1,=X'1F'
000716  0249  027D                      BL      >-$B
000717  024A  D800 02A7                 LDR     $R5,<CHANEL
000718  024C  5E09                      ADV     $R5,=X'09'          RD-IOLD
000719  024D  DF00 0294                 STR     $R5,<RLOAD
000720  024F  5E40                      ADV     $R5,=X'40'          WRT-IOLD
000721  0250  DF00 0278                 STR     $R5,<WRTADD
000722  0252  0F80 0000        MODB5   B       <RETURN             EXIT
000723                        *
000724                        *    TABLE OF COMMANDS
000725                        *
000726          0254          INCMD   EQU     $
000727  0254  0000            RINUPT  RESV    1,0                 INTERRUPT LEVEL
000728  0255  0000                    RESV    1,0                 START-UP FUNCTION CODE
000729  0256  0000            RTASK   RESV    1,0                 TASK
000730  0257  0000            INADD   RESV    1,0                 ADDRESS
000731  0258  0000            INMOD   RESV    1,0                 MODULE
000732  0259  0000            RRANGE  RESV    1,0                 RANGE
000733  025A  0000            ROFRGE  RESV    1,0                 OFFSET RANGE
000734  025B  0000            RCNFGA  RESV    1,0                 CONFIGURATION WORD A
000735  025C  0000            RCNFGB  RESV    1,0                 CONFIGURATION WORD B
000736  025D  0000                    RESV    1,0
000737  025E  0000                    RESV    1,0
000738  025F  0000            RSTUS1  RESV    1,0                 STATUS WORD 1
000739  0260  0000                    RESV    1,0                 STATUS WORD 2
000740  0261  0000                    RESV    1,0
000741  0262  0000                    RESV    1,0
000742  0263  0000                    RESV    1,0                 DATA
000743  0264  0000                    RESV    1,0
000744  0265  0000                    RESV    1,0                 CHANNEL MONITOR
000745  0266  0000            RDIDNT  RESV    1,0                 DEVICE I.D.
000746  0267  0000                    RESV    1,0                 CHANNEL NUMBER
000747  0268  0000                    RESV    1,0                 C.P. ADDRESS
000748  0269  0000            RINPTV  RESV    1,0                 INTERRUPT VECTOR
000749  026A  0000                    RESV    9,0                 WORKING LOCATIONS
000750          0271          FIRMID  EQU     $-2                 LOCATION OF FIRMWARE REVISION NUMBER
000751                        *
000752  0273  0000            RCTL    RESV    1,0                 READ CONTROL WORD
000753  0274  0000            WCTL    RESV    1,0                 WRITE CONTROL WORD
000754                        *
000755          0275          OUTCMD  EQU     $
000756  0275  0000            WINUPT  RESV    1,0                 INTERRUPT LEVEL
000757  0276  0000                    RESV    1,0                 START-UP FUNCTION CODE
000758  0277  0000            WTASK   RESV    1,0                 TASK
000759  0278  0000            WRTADD  RESV    1,0                 ADDRESS
000760  0279  0000                    RESV    1,0                 MODULE
000761  027A  0000            WRANGE  RESV    1,0                 RANGE
000762  027B  0000            WOFRGE  RESV    1,0                 OFFSET RANGE
000763  027C  0000            WCNFGA  RESV    1,0                 WRITE CONFIGURATION WORD A
000764  027D  0000            WCNFGB  RESV    1,0                 WRITE CONFIGURATION WORD B
000765  027E  0000                    RESV    1,0
000766  027F  0000                    RESV    1,0
000767  0280  0000            WSTUS1  RESV    1,0                 STATUS WORD 1
000768  0281  0000                    RESV    1,0                 STATUS WORD 2
000769  0282  0000                    RESV    1,0
000770  0283  0000                    RESV    1,0
000771  0284  0000                    RESV    1,0                 DATA
000772  0285  0000                    RESV    1,0
000773  0286  0000                    RESV    1,0                 DMA CONTROL
000774  0287  0000                    RESV    1,0                 DEVICE I.D.
000775  0288  0000                    RESV    1,0                 CHANNEL NUMBER
000776  0289  0000                    RESV    1,0                 C.P. ADDRESS
000777  028A  0000            WINPTV  RESV    1,0                 INTERRUPT VECTOR
000778  028B  0000                    RESV    9,0                 WORKING LOCATIONS
000779          0278          WLOAD   EQU     WRTADD              IOLD FOR WRITE
000780  0294  0000            RLOAD   RESV    1,0                 IOLD FOR READ
000781          025F          RSTUS   EQU     RSTUS1
000782                        *
000783                        *       TASK-WORDS
000784                        *
000785  0295  0000            RCALBT  DC      =Z'0000'            RECALIBRATE
000786  0296  0100            SEK     DC      =Z'0100'            SEEK CYLINDER
000787  0297  8000            FMT     DC      =Z'8000'            FORMAT READ-WRITE, 256 BYTE SECTOR, 24 SECTOR
000788  0298  9000            FMT12   DC      =Z'9000'            FORMAT READ-WRITE, 576 BYTE SECTOR, 12 SECTOR
000789  0299  A000            FMTSEK  DC      =Z'A000'            FORMAT READ-WRITE WITH SEEK, 24 SECTORS
000790  029A  B000            FMTSK2  DC      =Z'B000'            FORMAT READ-WRITE WITH SEEK, 12 SECTORS
000791  029B  8100            DATA    DC      =Z'8100'            DATA READ-WRITE, 256 BYTE SECTORS
000792  029C  9100            DATA12  DC      =Z'9100'            DATA READ-WRITE, 576 BYTE SECTORS
000793  029D  A100            DATSEK  DC      =Z'A100'            DATA READ-WRITE WITH SEEK, 256 BYTE SECTORS
000794  029E  B100            DATSK2  DC      =Z'B100'            DATA READ-WRITE WITH SEEK, 576 BYTE SECTORS
000795  029F  8300            DIAG    DC      =Z'8300'            DIAGNOSTIC READ-WRITE, 256 BYTE SECTORS
000796  02A0  9300            DIAG12  DC      =Z'9300'            DIAGNOSTIC READ-WRITE, 576 BYTE SECTORS
000797  02A1  8400            RDID    DC      =Z'8400'            I.D. FORMAT READ, 256 BYTE SECTOR, 24 SECTORS
000798  02A2  9400            RDID12  DC      =Z'9400'            I.D. FORMAT READ, 576 BYTE SECTOR, 12 SECTORS
000799  02A3  A400            RDIDSK  DC      =Z'A400'            I.D. FORMAT READ WITH SEEK, 24 SECTORS
000800  02A4  B400            RIDSK2  DC      =Z'B400'            I.D. FORMAT READ WITH SEEK, 12 SECTORS
000801  02A5  8200            FDIAG   DC      =Z'8200'            FMT DIAGNOSTIC READ-WRITE, 256 BYTE SECTORS
000802  02A6  9200            FDIAG2  DC      =Z'9200'            FMT DIAGNOSTIC READ-WRITE, 576 BYTE SECTORS
000803                        *
000804                        *       PARAMETERS
000805                        *
000806  02A7  0000            CHANEL  RESV    1,0
000807                        *
000808                        *       CONSTANTS  +  WORK - LOCATIONS
000809                        *
000810          0000          RETURN  EQU     ZERO
000811          0000          NEXTST  EQU     ZERO
000812  02A8  FFFF            ONES    DC      =Z'FFFF'
000813  02A9  02AA            AZEROS  DC      <ZEROS              ADDRESS OF THE ZERO WORD
000814  02AA  0000            ZEROS   RESV    1,0
000815  02AB  0004            FOUR    DC      =X'0004'
```

```
000816 02AC 0008                EIGHT  DC     =X'0008'
000817 02AD 000C                TWELVE DC     =Z'000C'
000818 02AE 0303                TIRTY3 DC     =Z'0303'
000819 02AF 0060                SIXTY  DC     =X'0060'
000820 02B0 0000                TRKMSK RESV   1,0
000821 02B1 0000                HISTRY RESV   11,0
000822 02BC 4348 414E 2400      MSCHAN TEXT   'CHAN$'
000823 02BF 454E 4420 4F46      MSEOPS TEXT   'END OF PASS$'
       02C2 2050 4153 5324
000824 02C5 0000                MEMSZE RESV   1,0
000825                          *--------------------------*
000826                          *  TABLE OF PARAMETERS     *
000827                          *  FOR EACH PORT           *
000828                          *--------------------------*
000829                          *
000830                          *      INDEX
000831                          *
000832         0000             PORTNO EQU    0                    INDEX OF PORT
000833         0001             CYLNO  EQU    PORTNO+1             ACTIVE CYLINDER
000834         0002             TRKNO  EQU    PORTNO+2             ACTIVE TRACK
000835         0003             SECTR  EQU    PORTNO+3             ACTIVE SECTOR
000836         0004             PLATER EQU    PORTNO+4             ACTIVE PLATTER
000837         0005             MINCYL EQU    PORTNO+5             MINIMUM CYLINDER ALLOWED
000838         0006             MINTRK EQU    PORTNO+6             MINIMUM TRACK ALLOWED
000839         0007             MAXCYL EQU    PORTNO+7             MAXIMUM CYLINDER ALLOWED
000840         0008             MAXTRK EQU    PORTNO+8             MAXIMUM TRACK ALLOWED
000841         0009             MODEIN EQU    PORTNO+9             N.A.
000842         000A             DISCID EQU    PORTNO+10            DEVICE I.D.
000843         000B             STATUS EQU    PORTNO+11            STATUS ON THIS PORT
000844         000C             WCWA   EQU    PORTNO+12            WRITE CONFIGURATION WORD A
000845         000D             WCWB   EQU    PORTNO+13            WRITE CONFIGURATION WORD B
000846         000E             RANGE  EQU    PORTNO+14            RANGE
000847         000F             OFSTRG EQU    PORTNO+15            OFFSET RANGE
000848         0010             PORTCH EQU    PORTNO+16            PORT CHANNEL
000849         0011             SCTRMX EQU    PORTNO+17            NUMBER OF SECTORS
000850                          *
000851 02C6 0000                PORT0  DC     =X'0000'
000852 02C7 0000                       RESV   15,0
000853 02D6 0000                       DC     =X'0000'
000854 02D7 0000                       RESV   10,0
000855 02E1 0001                PORT1  DC     =X'0001'
000856 02E2 0000                       RESV   15,0
000857 02F1 0080                       DC     =X'0080'
000858 02F2 0000                       RESV   10,0
000859 02FC 0002                PORT2  DC     =X'0002'
000860 02FD 0000                       RESV   15,0
000861 030C 0100                       DC     =X'0100'
000862 030D 0000                       RESV   10,0
000863 0317 0003                PORT3  DC     =X'0003'
000864 0318 0000                       RESV   15,0
000865 0327 0180                       DC     =X'0180'
000866 032A 0000                       RESV   10,0
000867                          **********************************
000868                          *                                *
000869                          *      SUB-ROUTINES  USED        *
000870                          *      BY SEVERAL SEGMENTS       *
000871                          *                                *
000872                          **********************************
000873                          *
000874                          *      RECALIBRATE
000875                          *
000876         032C             RECALB EQU    $
000877 032C A800 0277                  LDR    $R2,<WTASK
000878 032E A644 0010                  XOR    $R2,$B4.PORTCH
000879 0330 F3C0 0220                  LNJ    $B7,SIONAK           PRESET NAK TIMEOUT
000880 0332 8000 0295                  IO     <RCALBT,=$R2
       0334 0052
000881 0337 0781 022A                  BIOF   IONAK
000882 0339 8385                       JMP    $B5
000883                          *
000884                          *      STANDARD SEEK
000885                          *
000886         033A             FSEK   EQU    $
000887 033A A800 0277                  LDR    $R2,<WTASK
000888 033C A644 0010                  XOR    $R2,$B4.PORTCH
000889 033E F3C0 0214                  LNJ    $B7,SIONAK           PRESET NAK TIMEOUT
000890 0340 8000 0296                  IO     <SEK,=$R2            SEEK
       0342 0052
000891 0343 0781 021C                  BIOF   IONAK
000892 0345 8385                       JMP    $B5
000893                          *
000894                          *      SEEK AND READ ID
000895                          *
000896 0346 8F40 0022           SEKID  SAVE   SEKSAV,=Z'7F7F'
       0348 7F7F
000897 034A D380 04A2                  LNJ    $B5,<FCWD
000898 034C D380 04CA                  LNJ    $B5,<WRTCWD
000899 034E A800 0294                  LDR    $R2,<RLOAD
000900 0350 A644 0010                  XOR    $R2,$B4.PORTCH
000901 0352 F3C0 0201                  LNJ    $B7,SIONAK           PRESET NAK TIMEOUT
000902 0354 8180 0000       X          IOLD   <RDBUFR,=$R2,=Z'0004' RLOAD
       0356 0052
       0358 0070 0004
000903 035A 0781 0207                  BIOF   IONAK
000904 035C A800 0277                  LDR    $R2,<WTASK
000905 035E A644 0010                  XOR    $R2,$B4.PORTCH
000906 0360 F3C0 01F4                  LNJ    $B7,SIONAK           PRESET NAK TIMEOUT
000907 0362 8000 02A3                  IO     <RDIDSK,=$R2         READ-ID W-SEEK
       0364 0052
000908 0365 0781 01FC                  BIOF   IONAK
000909 0367 8FC0 0003                  RSTR   SEKSAV,=Z'7F7F'
       0369 7F7F
000910 036A 8385                       JMP    $B5
000911 036B 0000                SEKSAV RESV   7*$AF+7,0
000912                          *
000913                          *      IOLD FOR READ
000914                          *
000915 036D 0F80 0392           RIOLD  STB    $B5,<RIOLDX+1        STORE RETURN
000916 036F A800 0294                  LDR    $R2,<RLOAD
000917 0371 A644 0010                  XOR    $R2,$B4.PORTCH
000918 0373 F3C0 01D5                  LNJ    $B7,SIONAK           PRESET NAK TIMEOUT
000919 0375 8180 0000       X  RIOLDB IOLD   <RDBUFR,=$R2,=$R4
       0377 0052
```

```
        0386    0054
        0387    0781 01DC                       BIOF    IONAK
        0389    CF44 000E                       STR     $R4,$B4.RANGE
        038B    8980 0393                       CMZ     <GOFILL            CHECK FOR INHIBIT OF
        038D    0980 0391                       BNE     <RIOLDX            READ-BUFFER PRELOAD
        038F    D380 0464                       LNJ     $B5,<RDBFIL        PRESET RD-BUFR W/ 33'S (RNGE=$R4)
        0391    0F80 0000               RIOLDX  B       <RETURN            EXIT
        0393    0000                    GOFILL  RESV    1,0                RD-BFR PRELD-SW (0=FILL)
                                        *
                                        *       IOLD FOR WRITE
                                        *
        0394    A800 0278               WIOLD   LDR     $R2,<WLOAD
        0396    A644 0010                       XOR     $R2,$B4.PORTCH
        0398    F3C0 01BE                       LNJ     $B7,SIONAK         PRESET NAK TIMEOUT
        039A    8180 1791               WOLDB   IOLD    <WRIBFR,=$R2,=$R4
        039C    0052
        039D    0054
        039E    0781 01C5                       BIOF    IONAK
        03A0    CF44 000E                       STR     $R4,$B4.RANGE
        03A2    8385                            JMP     $B5
                                        *
                                        *       WRITE TASK
                                        *       (TASK=$R2, CMD=$R7)
                03A3                    WRTASK  EQU     $
        03A3    A800 0277                       LDR     $R2,<WTASK
        03A5    A644 0010                       XOR     $R2,$B4.PORTCH
        03A7    F3C0 01AF                       LNJ     $B7,SIONAK         PRESET NAK TIMEOUT
        03A9    8057                            IO      =$R7,=$R2          IO-CMD
        03AA    0052
        03AB    0781 01B8                       BIOF    IONAK
        03AD    8385                            JMP     $B5
                                        *
                                        *       WRITE OFFSET RANGE
                                        *       ($R7 = OFFSET)
                                        *
                03AE                    WTOFRG  EQU     $
        03AE    A800 027B                       LDR     $R2,<WOFRGE
        03B0    A644 0010                       XOR     $R2,$B4.PORTCH
        03B2    F3C0 01A4                       LNJ     $B7,SIONAK         PRESET NAK TIMEOUT
        03B4    8057                            IO      =$R7,=$R2          IO OFFSET RANGE
        03B5    0052
        03B6    0781 01AD                       BIOF    IONAK
        03B8    FF44 000F                       STR     $R7,$B4.OFSTRG     SAVE RANGE-OFFSET
        03BA    8385                            JMP     $B5
                                        *
                                        *       SUBSYSTEM INITIALIZE
                                        *
                03BB                    INITZ   EQU     $
        03BB    8F00 05B6                       SAVE    <SAVTIM,=Z'7F7F'
        03BD    7F7F
        03BE    8070 8000                       IO      =Z'8000',<WCTL
        03C0    0000 0274
        03C2    0700             T              BIOT    >+$A
        03C3    0000                            HLT                        CONTROL-WD INITIALIZE NOT ACCEPTED
        03C4    D3C0 0005               $A      LNJ     $B5,INSTUS         STALL ON INPUT-STATUS WHILE QLT FINISHES
        03C6    8F80 05B6                       RSTR    <SAVTIM,=Z'7F7F'
        03C8    7F7F
        03C9    8385                            JMP     $B5
                                        *
                                        *  READ STATUS
                                        *
                03CA                    INSTUS  EQU     $
        03CA    A800 025F                       LDR     $R2,<RSTUS         STATUS CMD
        03CC    A644 0010                       XOR     $R2,$B4.PORTCH     ADD PORT CHANNEL
        03CE    8044 000B               $S      IO      $B4.STATUS,=$R2    IO READ IN STATUS
        03D0    0052
        03D1    07FD                            BIOF    >-$S
        03D2    8385                            JMP     $B5
                                        * -----------------------------------------------------------------------------
                                        *       APPEND " (Y OR N) ?; " AND ACCEPT EITHER "Y" OR "OTHER" AS A RESPONSE.
                                        *       RETURN WITH I(EQUAL) TRUE IF "Y" AND FALSE OTHERWISE. $R6 HAS THE INPUT.
                                        *
        03D3    9CD5                    YORN    LDB     $B1,=$B5
                                                CALL    ZV$T.ZV$Q,MSGYOR
        03D4    FBC0 0003
        03D6    D380 0000        X
        03D8    0F80
        03D9    03E7
        03DA    8740 0011                       CL      ANSYOR             ERASE THE OLD RESPONSE
                                                CALL    ZV$IA,CNSTAT,ANSYOR  ACCEPT ONE BYTE
        03DC    FBC0 0003
        03DE    D380 0000        X
        03E0    0F80
        03E1    0210
        03E2    03EC
        03E3    E0C0 0008                       LDH     $R6,ANSYOR         AND PLACE IN THE RIGHT OF $R6
        03E5    6D59                            CMV     $R6,='Y'           SET I(EQUAL)
        03E6    8381                            JMP     $B1                AND RETURN
                                        *
        03E7    2028 5920 6F72          MSGYOR  TEXT    ' (Y OR N)$'
        03EA    204E 2924
        03EC    0000                    ANSYOR  RESV    1,0                PLACE TO INPUT INTO
                                        * -----------------------------------------------------------------------------
                                        *       APPEND " HIT 'CARRIAGE-RETURN' WHEN READY ?; " AND ACCEPT
                                        *       ANY KEYSTROKE AS A RESPONSE TO GO ON
                                        *
        03ED    DFC0 0011               OPWAIT  STB     $B5,OPWAIS+1       SAVE THE RETURN ADDRESS
                                                CALL    ZV$T.ZV$Q,MSRDY    DISPLAY MESSAGE AND QUESTION MARK
        03EF    FBC0 0003
        03F1    D380 0000        X
        03F3    0F80
        03F4    0400
                                                CALL    ZV$IA,CNSTAT,RDBUFR  ACCEPT ANY CHARACTER
        03F5    FBC0 0003
        03F7    D380 0000        X
        03F9    0F80
        03FA    0210
        03FB         0000        X
        03FC    D3C0 0039                       LNJ     $B5,ZVCRLF         ACKNOWLEDGE OPERATOR KEYSTROKE
        03FE    8380 0000               OPWAIS  JMP     <RETURN            RETURN TO THE CALLING CODE
                                        *
        0400    2048 4954 2022          MSRDY   TEXT    ' HIT "CARRIAGE-RETURN" WHEN READY$'
        0403    4341 5252 4941
```

```
                  4745 2D52 4554
                  5552 4E22 2057
                  4845 4E20 5245
                  4144 5924
001004                                *----------------------------*
001005                                *   CALL LIBRARY ZV$IA       *
001006                                *   INPUTS INTO READ-BUFFER  *
001007                                *----------------------------*
001008  0411  8F00 0765                ZVIA    SAVE    <CPSAV1,=Z'7F7F'
        0413  7F7F
001009                                $A      CALL    ZV$IA,CNSTAT,RDBUFR,SIXTY INPUT FROM CONSOLE
        0414  FBC0 0003
        0416  D380 0000         X
        0418  0F80
        0419  0210
        041A        0000        X
        041B  02AF
001010  041C  8700 0211                        CL      <BYTSW
001011  041E  5C3F                            LDV     $R5,=X'3F'              PRESET
001012  041F  DF00 0212                        STR     $R5,<FCOMMA             COMMA-FLAG
001013  0421  9800 0210                        LDR     $R1,<CNSTAT             GET TTY-STATUS
001014  0423  8390 042C                        JMP     <STATCN,$R1
001015  0425  9B80 01FF                INVLD   LAB     $B1,<MSINVD             INVALID RESPONSE!
001016  0427  D380 043B                        LNJ     $B5,<ZVTC               PRINT
001017  0429  0FEB                            B       >-$A
001018  042A  8380 012E                GNEXT   JMP     <NEXT
001019  042C  0FF9                    STATCN  B       >INVLD                  CONSOLE STATUS ERROR
001020  042D  0FFD                            B       >GNEXT                  CONSOLE BREAK-KEY
001021  042E  0FE6                            B       >-$A                    RUBOUT
001022  042F  0F80                  T         B       >+$C                    COMMA DETECTED
001023  0430  8700 0212                        CL      <FCOMMA                 CR
001024  0432  8F80 0765                $C      RSTR    <CPSAV1,=Z'7F7F'
        0434  7F7F
001025  0435  8385                            JMP     $B5
001026                                *----------------------------*
001027                                *   CALL LIBRARY ZV$T,ZV$TC  *
001028                                *   TO PRINT SOME TEXT       *
001029                                *   (B1 = ADDRESS OF TEXT)   *
001030                                *----------------------------*
001031  0436  DF80 0449                ZVCRLF  STB     $B5,<ZVTCEX+1
001032  0438  9B80 044A                        LAB     $B1,<MSCRLF
001033  043A  0F80                  T         B       >+$A
001034  043B  DF80 0449                ZVTC    STB     $B5,<ZVTCEX+1           STORE RETURN IN EXIT
001035  043D  9F80 0447                $A      STB     $B1,<MSZVTC             PUT TEXT IN CALL
001036  043F  8980 0826                        CMZ     <PRTFLG                 CK ERROR-PRINT INHIBIT?
001037  0441  0987                            BNE     >ZVTCEX                 BCH IF YES
001038                                        CALL    ZV$T,ZV$TC,MSNULL
        0442  FBC0 0003
        0444  D380 0000         X
        0446  0F80
        0447  0458
001039  0447                          MSZVTC  EQU     $-$AF
001040  0448  0F80 0000               ZVTCEX  B       <RETURN                 EXIT
001041  044A  2024                    MSCRLF  TEXT    ' $'
001042                                *----------------------------*
001043                                *   PRINT 2 ASCII CHARACTERS *
001044                                *   PLUS A SPACE             *
001045                                *----------------------------*
001046  044B  DFC0 000A                VDTR    STB     $B5,VDTRX+1             STORE WHERE FROM
001047  044D  9F40 0009                        STR     $R1,VDTRA
001048                                        CALL    ZV$T,VDTRA
        044F  FBC0 0003
        0451  D380 0000         X
        0453  0F80
        0454  0457
001049  0455  0F80 0000               VDTRX   B       <RETURN                 EXIT
001050  0457  0000                    VDTRA   RESV    1,0
001051  0458  2024                    MSNULL  TEXT    ' ','$'
001052                                *----------------------------*
001053                                *   FILL WRTBFR W/ $R7-VALUE *
001054                                *   $R4=RANGE TO FILL (BYTES)*
001055                                *----------------------------*
001056  0459  8F00 0765                WRTFIL  SAVE    <CPSAV1,=Z'7F7F'
        045B  7F7F
001057  045C  9B80 1791                        LAB     $B1,<WRTBFR
001058  045E  D380 0471                        LNJ     $B5,<FILLIT
001059  0460  8F80 0765                        RSTR    <CPSAV1,=Z'7F7F'
        0462  7F7F
001060  0463  8385                            JMP     $B5
001061                                *----------------------------*
001062                                * FILLS READ BUFFER WITH 33'S*
001063                                * $R4 = RANGE TO FILL (BYTES)*
001064                                *----------------------------*
001065  0464  8F00 0765                RDBFIL  SAVE    <CPSAV1,=Z'7F7F'
        0466  7F7F
001066  0467  9B80 0000         X              LAB     $B1,<RDBUFR
001067  0469  F870 3333                        LDR     $R7,=X'3333'
001068  046B  D380 0471                        LNJ     $B5,<FILLIT
001069  046D  8F80 0765                        RSTR    <CPSAV1,=Z'7F7F'
        046F  7F7F
001070  0470  8385                            JMP     $B5
001071                                *----------------------------*
001072                                *   FILL A BUFFER W/ $R7 DATA*
001073                                *----------------------------*
001074                                *   $B1 = BUFFER ADDRESS
001075                                *   $R4 = RANGE IN BYTES
001076                                *   $R7 =VALUE WORD
001077  0471  8F00 0773                FILLIT  SAVE    <CPSAV2,=Z'7F7F'
        0473  7F7F
001078  0474  8751                            CL      =$R1
001079  0475  C370 0002                        DIV     $R4,=X'0002'            BYTES/WORDS
001080  0477  8AD4                            INC     =$R4
001081  0478  FF5D                    $A      STR     $R7,$B1,+$R1
001082  0479  9954                            CMR     $R1,=$R4
001083  047A  03FE                            BLE     >-$A
001084  047B  8F80 0773                        RSTR    <CPSAV2,=Z'7F7F'
        047D  7F7F
001085  047E  8385                            JMP     $B5
001086                                *----------------------------*
001087                                *   FILL A BUFFER WITH BYTES *
001088                                *   OF INCREMENTING DATA     *
001089                                *----------------------------*
001090                                *  $B1 = BUFFER TO BE FILLED
```

```
001091                                *  $R4 = RANGE IN BYTES
001092                                *  $R7 = STARTING DATA-BYTES
001093                                *  $R7 IS PRELOADED BY THE TEST WITH
001094                                *  A STARTING VALUE BYTE  X  AND  X+1
001095  047F  8F00 0773               INCBFR SAVE   <CPSAV2,=Z'7F7F'
        0481  7F7F
001096  0482  C370 0002                      DIV    $R4,=X'0002'          BYTES --> WORDS
001097  0484  FF71                    $A     STR    $R7,+$B1
001098  0485  FA70 0202                      ADD    $R7,=X'0202'
001099  0487  0680            T             BCF    >+$C
001100  0488  89D7             T             CMZ    =$R7
001101  0489  0980            T             BNE    >+$B
001102  048A  F870 FF00                      LDR    $R7,=Z'FF00'
001103  048C  0FFB            T             B      >+$C
001104  048D  F970 0101        T     $B      CMR    $R7,=X'0101'
001105  048F  09FD             T             BNE    >+$C
001106  0490  F870 0001                      LDR    $R7,=X'0001'
001107  0492  4772                    $C     BDEC   $R4,>-$A
001108  0493  8F80 0773                      RSTR   <CPSAV2,=Z'7F7F'
        0495  7F7F
001109  0496  8385                          JMP    $B5
001110                                *-------------------------------*
001111                                *       MOVE  A  BUFFER         *
001112                                *-------------------------------*
001113                                *  $B1 = INPUT BUFFER
001114                                *  $B2 = OUTPUT BUFFER
001115                                *  $R4 = RANGE IN WORDS
001116  0497  8F00 0773               MOVEWD SAVE   <CPSAV2,=Z'7F7F'
        0499  7F7F
001117  049A  88D4                          DEC    =$R4
001118  049B  F871                    $A     LDR    $R7,+$B1
001119  049C  FF72                          STR    $R7,+$B2
001120  049D  477E                          BDEC   $R4,>-$A
001121  049E  8F80 0773                      RSTR   <CPSAV2,=Z'7F7F'
        04A0  7F7F
001122  04A1  8385                          JMP    $B5
001123                                *-------------------------------------*
001124                                *       FORM CONFIGURATION WORDS      *
001125                                *-------------------------------------*
001126                                *  CONFIGURATION WORDS ARE FORMED FROM:
001127                                *  $B4.PLATER
001128                                *  $B4.CYLNO
001129                                *  $B4.TRKNO
001130                                *  $B4.SECTR
001131                                *  NOTE THAT $B4 IS PORT-NO
001132  04A2  8F40 0019               FCWD   SAVE   CNFGSV,=Z'7F7F'
        04A4  7F7F
001133                                *       CONFIGURATION WORD A
001134  04A5  B844 0001                      LDR    $R3,$B4.CYLNO
001135  04A7  3085                          DOL    $R3,5
001136  04A8  A844 0004                      LDR    $R2,$B4.PLATER
001137  04AA  30C5                          DOR    $R3,5
001138  04AB  BF44 000C                      STR    $R3,$B4.WCWA
001139  04AD  B3C0 0005                      LNJ    $B3,FCWDB
001140  04AF  8FC0 000C                      RSTR   CNFGSV,=Z'7F7F'
        04B1  7F7F
001141  04B2  8385                          JMP    $B5                   EXIT
001142                                *       CONFIGURATION WORD B
001143  04B3  B844 0003               FCWDB  LDR    $R3,$B4.SECTR
001144  04B5  3008                          SOL    $R3,8
001145  04B6  A844 0002                      LDR    $R2,$B4.TRKNO
001146  04B8  30C8                          DOR    $R3,8
001147  04B9  BF44 000D                      STR    $R3,$B4.WCWB
001148  04BB  8383                          JMP    $B3
001149  04BC  0000             CNFGSV RESV   7*$AF+7,0
001150                                *
001151                                *       WRITE CONFIGURATION WORDS
001152                                *
001153        04CA             WRTCWD EQU    $
001154  04CA  8F40 FFF1                      SAVE   CNFGSV,=Z'7F7F'
        04CC  7F7F
001155  04CD  A800 027C                      LDR    $R2,<WCNFGA
001156  04CF  A644 0010                      XOR    $R2,$B4.PORTCH
001157  04D1  F3C0 0085                      LNJ    $B7,SIONAK            PRESET NAK TIMEOUT
001158  04D3  8044 000C                      IO     $B4.WCWA,=$R2         WRITE WORD-A
        04D5  0052
001159  04D6  0781 008D                      BIOF   IONAK
001160  04D8  2E02                          ADV    $R2,=X'02'
001161  04D9  8044 000D                      IO     $B4.WCWB,=$R2         WRITE WORD-B
        04DB  0052
001162  04DC  0781 0087                      BIOF   IONAK
001163  04DE  8FC0 FFDD                      RSTR   CNFGSV,=Z'7F7F'
        04E0  7F7F
001164  04E1  8385                          JMP    $B5
001165                                *-------------------------------*
001166                                *       READ IDENTIFICATION CODE  *
001167                                *-------------------------------*
001168        04E2             GETID  EQU    $
001169  04E2  A800 0266                      LDR    $R2,<RDIDNT
001170  04E4  A644 0010                      XOR    $R2,$B4.PORTCH
001171  04E6  F3C0 0070                      LNJ    $B7,SIONAK            PRESET NAK TIMEOUT
001172  04E8  8057                          IO     =$R7,=$R2             READ I.D.
        04E9  0052
001173  04EA  0781 0079                      BIOF   IONAK
001174  04EC  8756                          CL     =$R6
001175  04ED  F3C0 02FC                      LNJ    $B7,IODELY            DELAY
001176  04EF  7088                          DOL    $R7,8
001177  04F0  7048                          SOR    $R7,8
001178  04F1  FF44 000A                      STR    $R7,$B4.DISCID
001179  04F3  8385                          JMP    $B5
001180                                *       CAELUS IDENTIFICATION CODE
001181                                *    2330  -  100 TPI, NO FIXED DISK
001182                                *    2331  -  100 TPI, WITH FIXED DISK
001183                                *    2332  -  200 TPI, NO FIXED DISK
001184                                *    2333  -  200 TPI, WITH FIXED DISK
001185                                *-------------------------------*
001186                                *  SET PARAMETERS TO LIMITS     *
001187                                *-------------------------------*
001188  04F4  8F00 0773               SETPRM SAVE   <CPSAV2,=Z'7F7F'
        04F6  7F7F
001189  04F7  8756                          CL     =$R6
001190  04F8  8757                          CL     =$R7
001191  04F9  8D44 0001                      SDI    $B4.CYLNO             CLEAR CYL + TRK
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001192  04FB  8D44 0003          SDI   $B4.SECTR          CLEAR SECTOR + PLATER
001193  04FD  8D44 0005          SDI   $B4.MINCYL         CLEAR MIN-CYL + MIN-TRK
001194  04FF  D844 000A          LDR   $R5,$B4.DISCID     GET I.D.
001195  0501  4C01               LDV   $R4,=1
001196  0502  CF44 0008          STR   $R4,$B4.MAXTRK
001197  0504  4C17               LDV   $R4,=X'17'         23 SECTOR
001198  0505  CF44 0011          STR   $R4,$B4.SCTRMX
001199  0507  5D32               CMV   $R5,=X'32'
001200  0508  0200          T    BL    >+$A               BCH IF 100TPI
001201  0509  C870 0197          LDR   $R4,=X'0197'       407-CYL
001202  050B  0F80          T    B     >+$F
001203  050C  C870 00CB     $A   LDR   $R4,=X'00CB'       203-CYL
001204                       *
001205  050E  CF44 0007     $F   STR   $R4,$B4.MAXCYL
001206  0510  8F80 0773          RSTR  <CPSAV2,=Z'7F7F'
        0512  7F7F
001207  0513  8385               JMP   $B5                EXIT
001208                       *------------------*
001209                       *  SET PARAMETERS  *
001210                       * TO MINIMUM LIMITS*
001211                       *------------------*
001212        0514           LDPARM EQU   $
001213  0514  D844 0006          LDR   $R5,$B4.MINTRK
001214  0516  DF44 0002          STR   $R5,$B4.TRKNO
001215  0518  D844 0005          LDR   $R5,$B4.MINCYL
001216  051A  DF44 0001          STR   $R5,$B4.CYLNO
001217  051C  8744 0003          CL    $B4.SECTR
001218  051E  8385               JMP   $B5
001219                       *-------------------------------------*
001220                       *      FILL OUTPUT BUFFER FOR FORMAT  *
001221                       *-------------------------------------*
001222  051F  8F40 001D     LDWBFR SAVE  OBSAVE,=Z'7F7F'
        0521  7F7F
001223  0522  9B80 1791          LAB   $B1,<WRTBFR
001224  0524  8744 0003          CL    $B4.SECTR
001225  0526  C844 000C          LDR   $R4,$B4.WCWA
001226  0528  0F80          T    B     >+$A
001227  0529  8AC4 0003     NXSCTR INC  $B4.SECTR
001228  052B  B380 04B3     $A   LNJ   $B3,<FCWDB
001229  052D  CF71               STR   $R4,+$B1
001230  052E  BF71               STR   $R3,+$B1
001231  052F  D844 0003          LDR   $R5,$B4.SECTR
001232  0531  D944 0011          CMR   $R5,$B4.SCTRMX
001233  0533  0201 FFF5          BL    NXSCTR
001234  0535  8744 0003          CL    $B4.SECTR
001235  0537  B380 04B3          LNJ   $B3,<FCWDB
001236  0539  8FC0 0003          RSTR  OBSAVE,=Z'7F7F'
        053B  7F7F
001237  053C  8385               JMP   $B5
001238  053D  0000         OBSAVE RESV  7*$AF+7,0
001239                       * ***************************** ERROR  ROUTINES **********   *
001240                       *-----------------------------*
001241                       *   CHECK  FOR  ERRORS        *
001242                       *   AFTER FUNCTIONAL TEST     *
001243                       *-----------------------------*
001244        054B           CKERR  EQU   $
001245  054B  DF80 0556          STB   $B5,<CKERRX+1      STORE WHERE FROM IN EXIT
001246  054D  D380 0585          LNJ   $B5,<CKSTUS        CHECK TIMEOUT & STATUS
001247  054F  D380 06DF          LNJ   $B5,<CKRNGE        CHECK END-RANGE
001248  0551  D380 0705          LNJ   $B5,<CKOFRG        CHECK-END OFFSET-RANGE
001249  0553  D380 0723          LNJ   $B5,<CKCWD         CHECK CONFG-WDS
001250  0555  0F80 0000     CKERRX B   <RETURN            EXIT
001251                       *-----------------------------*
001252                       *  IO NAK 'ED SUBROUTINE      *
001253                       *-----------------------------*
001254                       * A LNJ THRU $B7 IS REQ'D PRIOR TO EVERY IO CMD
001255        0557           SIONAK EQU   $
001256  0557  8F40 001F          SAVE  NAKSAV,=Z'7F7F'
        0559  7F7F
001257  055A  FF80 0570          STB   $B7,<NAKEXT+1      SAVE IO-ADDRESS FOR RETRY
001258  055C  E870 FFFF          LDR   $R6,=Z'FFFF'        NO OF RETRY'S ALLOWED
001259  055E  EF00 0571          STR   $R6,<NAKFLG        SET COUNTER
001260  0560  8FC0 0016          RSTR  NAKSAV,=Z'7F7F'
        0562  7F7F
001261  0563  8387               JMP   $B7                RETURN
001262                       *
001263  0564  8880 0571     IONAK  DEC   <NAKFLG          DOWN COUNT NAK'S
001264  0566  8980 0571          CMZ   <NAKFLG            MAX NO OF NAK'S?
001265  0568  0987               BNE   >NAKEXT            RETRY
001266  0569  9B80 0572          LAB   $B1,<MSIONK
001267  056B  D380 043B          LNJ   $B5,<ZVIC          PRINT NAK
001268  056D  0F80 0850          B     <ERROR
001269  056F  0F80 0000     NAKEXT B   <RETURN            RETRY
001270  0571  0000          NAKFLG RESV  1,0
001271  0572  494F 2D4E 414B MSIONK TEXT  'IO-NAKED $'
        0575  4544 2024
001272  0577  0000          NAKSAV RESV  7*$AF+7,0
001273                       *-----------------------------*
001274                       *      CHECK STATUS AND       *
001275                       *      TIME-OUT SUBROUTINE    *
001276                       *-----------------------------*
001277        0585           CKSTUS EQU   $
001278  0585  8F00 05B6          SAVE  <SAVTIM,=Z'7F7F'
        0587  7F7F
001279  0588  8755               CL    =$R5
001280  0589  8756               CL    =$R6
001281  058A  8757               CL    =$R7
001282  058B  A800 025F          LDR   $R2,<RSTUS
001283  058D  A644 0010          XOR   $R2,$B4.PORTCH
001284  058F  8044 000B     RDSTUS IO    $B4.STATUS,=$R2     READ STATUS
        0591  0052
001285  0592  0700          T    BIOT  >+$A
001286  0593  8AD7               INC   =$R7
001287  0594  F900 05C6          CMR   $R7,<TIME1
001288  0596  0981 FFF8          BNE   RDSTUS
001289  0598  8AD6               INC   =$R6
001290  0599  E900 05C5          CMR   $R6,<TIME2
001291  059B  0981 FFF3          BNE   RDSTUS
001292  059D  8AD5               INC   =$R5
001293  059E  D900 05C4          CMR   $R5,<TIME3
001294  05A0  0981 FFEE          BNE   RDSTUS
001295  05A2  8640 0024          CPL   TIMOUT
001296  05A4  9B80 05CA          LAB   $B1,<MSTIMR
```

```
001297 05A6 D380 043B          LNJ   $B5,<ZVTC            PRINT TIMED-OUT
001298 05A8 0F80           T   B     >+$B
001299 05A9 C800 05C9      $A  LDR   $R4,<SBSTUS
001300 05AB C944 000B          CMR   $R4,$B4.STATUS
001301 05AD 097B           T   BE    >+$B
001302 05AE 8600 05C8          CPL   <STATER
001303 05B0 D380 05D0          LNJ   $B5,<STSDMP          DUMP ERRORS
001304 05B2 8F80 05B6      $B  RSTR  <SAVTIM,=Z'7F7F'
       05B4 7F7F
001305 05B5 8385               JMP   $B5
001306 05B6 0000           SAVTIM RESV 7*$AF+7,0
001307 05C4 0000           TIME3  DC   =Z'0000'
001308 05C5 0100           TIME2  DC   =Z'0100'
001309 05C6 0000           TIME1  DC   =Z'0000'
001310 05C7 0000           TIMOUT RESV 1,0
001311 05C8 0000           STATER RESV 1,0            STATUS ERROR
001312 05C9 8000           SBSTUS DC   =Z'8000'       SHOULD-BE STATUS
001313 05CA 494F 2D54 494D MSTIMR TEXT  'IO-TIME-OUT$'
       05CD 452D 4F55 5424
001314                         *-------------------------------------------------*
001315                         *   ROUTINE TO DUMP IF STATUS IS MISCOMPARED      *
001316                         *-------------------------------------------------*
001317 0500 8F00 064B      STSDMP SAVE  <STSTB5,=Z'7F7F'
       0502 7F7F
001318 0503 F844 000B          LDR   $R7,$B4.STATUS       GET STATUS-WORD
001319 0505 9B80 0659          LAB   $B1,<MSSTER
001320 0507 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001321 0509 D380 0648          LNJ   $B5,<STSHFT
001322 050B 6980           T   BNEZ  $R6,>+$B
001323 050C 9B80 0663          LAB   $B1,<MSNDEV          NO DEVICE
001324 050E D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001325 0510 D380 0648      $B  LNJ   $B5,<STSHFT
001326 0512 6900           T   BEZ   $R6,>+$C
001327 0513 9B80 066A          LAB   $B1,<MSSATN          ATTENTION SET
001328 0515 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001329 0517 D380 0648      $C  LNJ   $B5,<STSHFT
001330 0519 6900           T   BEZ   $R6,>+$D
001331 051A 9B80 066F          LAB   $B1,<MSOVUN          OVER-UNDER RUN
001332 051C D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001333 051E D380 0648      $D  LNJ   $B5,<STSHFT
001334 0520 6900           T   BEZ   $R6,>+$E
001335 0521 9B80 0677          LAB   $B1,<MSWRPT          WRITE PROTECT
001336 0523 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001337 0525 D380 0648      $E  LNJ   $B5,<STSHFT
001338 0527 6900           T   BEZ   $R6,>+$F
001339 0528 9B80 067D          LAB   $B1,<MSRDER          READ ERROR
001340 052A D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001341 052C D380 0648      $F  LNJ   $B5,<STSHFT
001342 052E 6900           T   BEZ   $R6,>+$G
001343 052F 9B80 0681          LAB   $B1,<MSILSK          ILLEGAL SEEK
001344 0601 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001345 0603 D380 0648      $G  LNJ   $B5,<STSHFT
001346 0605 6900           T   BEZ   $R6,>+$H
001347 0606 9B80 0688          LAB   $B1,<MSSYNC          MISSED DATA SYNC
001348 0608 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001349 060A D380 0648      $H  LNJ   $B5,<STSHFT
001350 060C 6900           T   BEZ   $R6,>+$J
001351 060D 9B80 0691          LAB   $B1,<MSSCH1          UNSUCCESSFUL SEARCH
001352 060F D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001353 0611 D380 0648      $J  LNJ   $B5,<STSHFT
001354 0613 6900           T   BEZ   $R6,>+$K
001355 0614 9B80 069B          LAB   $B1,<MSNCLK          MISSING CLOCK PULSE
001356 0616 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001357 0618 D380 0648      $K  LNJ   $B5,<STSHFT
001358 061A 6900           T   BEZ   $R6,>+$L
001359 061B 9B80 06A5          LAB   $B1,<MSNSTR          MISSING SECTOR PULSE
001360 061D D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001361 061F D380 0648      $L  LNJ   $B5,<STSHFT
001362 0621 6900           T   BEZ   $R6,>+$M
001363 0622 9B80 06B0          LAB   $B1,<MSSKER          SEEK ERROR
001364 0624 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001365 0626 D380 0648      $M  LNJ   $B5,<STSHFT
001366 0628 D380 0648          LNJ   $B5,<STSHFT          RFU
001367 062A 6900           T   BEZ   $R6,>+$N
001368 062B 9B80 06B5          LAB   $B1,<MSCMER          CORRECTED MEMORY ERROR
001369 062D D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001370 062F D380 0648      $N  LNJ   $B5,<STSHFT
001371 0631 6900           T   BEZ   $R6,>+$P
001372 0632 9B80 06C1          LAB   $B1,<MSNEXR          NON-EXISTANT RESOURCE
001373 0634 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001374 0636 D380 0648      $P  LNJ   $B5,<STSHFT
001375 0638 6900           T   BEZ   $R6,>+$Q
001376 0639 9B80 06CC          LAB   $B1,<MSBPTY          BUS PARITY
001377 063B D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001378 063D D380 0648      $Q  LNJ   $B5,<STSHFT
001379 063F 6900           T   BEZ   $R6,>+$R
001380 0640 9B80 06D2          LAB   $B1,<MSUCMR          UNCORRECTED MEMORY ERROR
001381 0642 D380 043B          LNJ   $B5,<ZVTC            CALL ZV$TC
001382 0644 8F80 064B      $R  RSTR  <STSTB5,=Z'7F7F'
       0646 7F7F
001383 0647 8385               JMP   $B5
001384 0648 8756           STSHFT CL   =$R6
001385 0649 7081                   DOL   $R7,1
001386 064A 8385                   JMP   $B5
001387 064B 0000           STSTB5 RESV  7*$AF+7,0
001388 0659 0753 5441 5455 MSSTER TEXT  '7'07','STATUS-MISCOMPARED$'
       065C 532D 4D49 5343
       4F4D 5041 5245
       4424
001389 0663 4445 5620 4E4F MSNDEV TEXT  'DEV NOT READY$'
       0666 5420 5245 4144
       5924
001390 066A 4154 544E 2053 MSSATN TEXT  'ATTN SET$'
       066D 4554 2400
001391 066F 4F56 4552 2D55 MSOVUN TEXT  'OVER-UNDER RUN$'
       0672 4E44 4552 2052
       554E 2400
001392 0677 5752 542D 5052 MSWRPT TEXT  'WRT-PROTECT$'
       067A 4F54 4543 5424
001393 067D 5244 2D45 5252 MSRDER TEXT  'RD-ERR$'
       0680 2400
001394 0681 494C 4C45 4741 MSILSK TEXT  'ILLEGAL SEEK$'
       0684 4C20 5345 454B
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                2400
001395  0688    4D49 5353 4544      MSSYNC TEXT   'MISSED DATA SYNC$'
        068B    2044 4154 4120
                5359 4E43 2400
001396  0691    554E 5355 4345      MSSCHI TEXT   'UNSUCESSFUL SEARCH$'
        0694    5343 4655 4C20
                5345 4152 4348
                2400
001397  069B    4D49 5353 494E      MSNCLK TEXT   'MISSING CLOCK PULSE$'
        069E    4720 434C 4F43
                4B20 5055 4C53
                4524
001398  06A5    4D49 5353 494E      MSNSTR TEXT   'MISSING SECTOR PULSE$'
        06A8    4720 5345 4354
                4F52 2050 554C
                5345 2400
001399  06B0    5345 454B 2D45      MSSKER TEXT   'SEEK-ERR$'
        06B3    5252 2400
001400  06B5    434F 5252 4543      MSCMER TEXT   'CORRECTED MEMORY ERROR$'
        06B8    5445 4420 4D45
                4D4F 5259 2045
                5252 4F52 2400
001401  06C1    4E4F 4E2D 4558      MSNEXR TEXT   'NON-EXISTANT RESOURSE$'
        06C4    4953 5441 4E54
                2052 4553 4F55
                5253 4524
001402  06CC    4255 532D 5041      MSBPTY TEXT   'BUS-PARITY$'
        06CF    5249 5459 2400
001403  06D2    554E 434F 5252      MSUCMR TEXT   'UNCORRECTED MEMORY ERROR$'
        06D5    4543 5445 4420
                4D45 4D4F 5259
                2045 5252 4F52
                2400
001404
001405                              *-----------------------------*
001406                              *   READ RANGE AND CK = 00    *
001407          06DF                CKRNGE EQU    $
001408  06DF    8F00 0773                  SAVE   <CPSAV2,=Z'7F7F'
        06E1    7F7F
001409  06E2    A800 0259                  LDR    $R2,<RRANGE
001410  06E4    A644 0010                  XOR    $R2,$B4.PORTCH
001411  06E6    F3C0 FE70                  LNJ    $B7,SIONAK          PRESET NAK TIMEOUT
001412  06E8    8057                       IO     =$R7,=$R2           READ RANGE
        06E9    0052
001413  06EA    0781 FE79                  BIOF   IONAK
001414  06EC    F3C0 00FD                  LNJ    $B7,IODELY          DELAY
001415  06EE    F900 06FC                  CMR    $R7,<RNGLFT
001416  06F0    0900                T      BE     >+$B
001417  06F1    8600 06FB                  CPL    <RNGERR             SET RANGE ERROR FLAG
001418  06F3    9B80 0700                  LAB    $B1,<MSRNGR
001419  06F5    D380 043B                  LNJ    $B5,<ZVTC           PRINT ERR
001420  06F7    8F80 0773           $B     RSTR   <CPSAV2,=Z'7F7F'
        06F9    7F7F
001421  06FA    8385                       JMP    $B5
001422  06FB    0000                RNGERR RESV   1,0
001423  06FC    0000                RNGLFT RESV   1,0                  REMAINING RANGE
001424  06FD    4F46 5345 5420      MSOFRR TEXT   'OFSET '
001425  0700    5241 4E47 4520      MSRNGR TEXT   'RANGE ERR$'
        0703    4552 5224
001426
001427                              *-----------------------------*
001428                              *   READ OFFSET-RANGE AND     *
001429                              *   CHECK  =  0000            *
001430  0705    8F00 0773                  SAVE   <CPSAV2,=Z'7F7F'
        0707    7F7F
001431  0708    A800 025A                  LDR    $R2,<ROFRGE
001432  070A    A644 0010                  XOR    $R2,$B4.PORTCH
001433  070C    F3C0 FE4A                  LNJ    $B7,SIONAK          PRESET NAK TIMEOUT
001434  070E    8057                       IO     =$R7,=$R2           READ OFFSET RANGE
        070F    0052
001435  0710    0781 FE53                  BIOF   IONAK
001436  0712    F3C0 00D7                  LNJ    $B7,IODELY          DELAY
001437  0714    F900 0722                  CMR    $R7,<OFRLFT
001438  0716    0900                T      BE     >+$B
001439  0717    8600 0721                  CPL    <OFRGER             SET OFFSET RANGE ERROR FLAG
001440  0719    9B80 06FD                  LAB    $B1,<MSOFRR
001441  071B    D380 043B                  LNJ    $B5,<ZVTC           PRINT ERR
001442  071D    8F80 0773           $B     RSTR   <CPSAV2,=Z'7F7F'
        071F    7F7F
001443  0720    8385                       JMP    $B5
001444  0721    0000                OFRGER RESV   1,0                  OFFSET-RANGE ERROR FLAG
001445  0722    0000                OFRLFT RESV   1,0                  REMAINING RANGE
001446                              *-----------------------------*
001447                              *   READ CONFG-WDS + CK       *
001448                              *-----------------------------*
001449          0723                CKCWD  EQU    $
001450  0723    8F00 0773                  SAVE   <CPSAV2,=Z'7F7F'
        0725    7F7F
001451  0726    A800 025B                  LDR    $R2,<RCNFGA
001452  0728    A644 0010                  XOR    $R2,$B4.PORTCH
001453  072A    F3C0 FE2C                  LNJ    $B7,SIONAK          PRESET NAK TIMEOUT
001454  072C    8056                       IO     =$R6,=$R2           READ CONFG WD A
        072D    0052
001455  072E    0781 FE35                  BIOF   IONAK
001456  0730    F3C0 00B9                  LNJ    $B7,IODELY          DELAY
001457  0732    E900 0760                  CMR    $R6,<CWAF
001458  0734    0900                T      BE     >+$B
001459  0735    8A80 0764                  INC    <CWDERR
001460  0737    A800 025C           $B     LDR    $R2,<RCNFGB
001461  0739    A644 0010                  XOR    $R2,$B4.PORTCH
001462  073B    8057                $C     IO     =$R7,=$R2           READ CONFG WD B
        073C    0052
001463  073D    0781 FE26                  BIOF   IONAK
001464  073F    F3C0 00AA                  LNJ    $B7,IODELY          DELAY
001465  0741    F900 0761                  CMR    $R7,<CWBF
001466  0743    0900                T      BE     >+$D
001467  0744    8A80 0764                  INC    <CWDERR
001468  0746    8980 0764           $D     CMZ    <CWDERR
001469  0748    8D00 0762                  SDI    <MSCWDA             SAVE CNFG-WDS
001470  074A    0900                T      BE     >+$E
001471  074B    9B80 0753                  LAB    $B1,<MSCWDR
001472  074D    D380 043B                  LNJ    $B5,<ZVTC
001473  074F    8F80 0773           $E     RSTR   <CPSAV2,=Z'7F7F'
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                0751  7F7F
001474          0752  8385                    JMP     $B5
001475          0753  434F 4E46 472D  MSCWDR  TEXT    'CONFG-WDS MISCOMPARED!',Z'0D0A'
                0756  5744 5320 4D49
                0759  5343 4F4D 5041
                      5245 4421 0D0A
001476          075F  0724                    TEXT    Z'07','$'                    ***** TEMP *****
001477          0760  0000            CWAF    RESV    1,0                          CONFIGURATION-WD-A END VALUE
001478          0761  0000            CWBF    RESV    1,0                          CONFIGURATION-WD-B END VALUE
001479          0762  0000            MSCWDA  RESV    2,0                          "IS" VALUE
001480          0764  0000            CWDERR  RESV    1,0
001481                                ****************************
001482                                *                          *
001483                                *   COMPARE ROUTINE + PRINT  *
001484                                *   MISCOMPARES            *
001485                                *                          *
001486                                ****************************
001487          0765  0000            CPSAV1  RESV    7*$AF+7,0
001488          0773  0000            CPSAV2  RESV    7*$AF+7,0
001489          0781  0000            WDBYTE  RESV    1,0                          WORD-BYTE SW.
001490          0782  0000            BYTENO  RESV    1,0
001491          0783  0000            CPRERR  RESV    1,0                          NO. OF MISCOMPARES
001492                                *   $B1 = ADDRESS OF "SHOULD-BE"
001493                                *   RDBUFR = ADDRESS OF "IS"
001494                                *   $B4,RANGE = RANGE TO COMPARE
001495                                *
001496          0784  8F00 0765       CMPARA  SAVE    <CPSAV1,=Z'7F7F'
                0786  7F7F
001497          0787  0F88                    B       >CMPARB
001498          0788  8F00 0765       CMPARE  SAVE    <CPSAV1,=Z'7F7F'
                078A  7F7F
001499          078B  AB80 0000   X             LAB     $B2,<RDBUFR
001500          078D  8700 0782                 CL      <BYTENO
001501                078F            CMPARB  EQU     $
001502          078F  C844 000E                 LDR     $R4,$B4,RANGE
001503          0791  88D4                      DEC     =$R4
001504          0792  8700 0781                 CL      <WDBYTE
001505                0794            CPAR1   EQU     $
001506          0794  8A80 0782                 INC     <BYTENO
001507          0796  8980 0781                 CMZ     <WDBYTE                      NEW WORD?
001508          0798  0980              T             BNE     >+$A                 NO - BCH
001509          0799  F872                            LDR     $R7,+$B2             IS FIELD
001510          079A  8753                            CL      =$R3                 PREPARE FOR IS OF ZERO
001511          079B  9DC0 FB0D                       CMB     $B1,AZEROS           SEE IF ADDRESS OF THE ZERO WORD
001512          079D  097B              T             BE      >+$A                 SKIP THE POP $B1 FOR A COMPARE TO A FIELD = 0
001513                                *
001514          079E  B871                      LDR     $R3,+$B1                 SB FIELD
001515          079F  8600 0781         $A      CPL     <WDBYTE                  SET BYTE TAKEN
001516          07A1  8752                      CL      =$R2
001517          07A2  8756                      CL      =$R6
001518          07A3  3088                      DOL     $R3,8
001519          07A4  7088                      DOL     $R7,8
001520          07A5  A956                      CMR     $R2,=$R6                 SB = IS
001521          07A6  0980 07AE                 BNE     <CPRDMP
001522          07A8  4700 0794         CPRNXT  BDEC    $R4,<CPAR1
001523          07AA  8F80 0765                 RSTR    <CPSAV1,=Z'7F7F'
                07AC  7F7F
001524          07AD  8385                      JMP     $B5
001525          07AE  8F00 0773         CPRDMP  SAVE    <CPSAV2,=Z'7F7F'
                07B0  7F7F
001526          07B1  D800 0783                 LDR     $R5,<CPRERR              NO. OF ERRORS
001527          07B3  5D07                      CMV     $R5,=7                   MAX. ALLOWED
001528          07B4  0300              T             BG      >+$C
001529          07B5  8980 0826         T             CMZ     <PRTFLG              CK ERROR-PRINT INHIBITED
001530          07B7  09FD              T             BNE     >+$C                 BCH IF YES
001531                                                CALL    ZV$T,ZV$TC,MSBYTE
                07B8  FBC0 0003
                07BA  D380 0000   X
                07BC  0F80
                07BD  07E3
001532                                                CALL    ZV$TH,BYTENO
                07BE  FBC0 0003
                07C0  D380 0000   X
                07C2  0F80
                07C3  0782
001533                                                CALL    ZV$T,MSIS
                07C4  FBC0 0003
                07C6  D380 0000   X
                07C8  0F80
                07C9  07E6
001534                                                CALL    ZV$TH,ZV$THZ,CPSAV2+(7*$AF+1) R6
                07CA  FBC0 0003
                07CC  D380 0000   X
                07CE  0F80
                07CF  077B
001535                                                CALL    ZV$T,MSSBE
                07D0  FBC0 0003
                07D2  D380 0000   X
                07D4  0F80
                07D5  07E8
001536                                                CALL    ZV$TH,ZV$THZ,CPSAV2+(7*$AF+5) R2
                07D6  FBC0 0003
                07D8  D380 0000   X
                07DA  0F80
                07DB  077F
001537          07DC  8F80 0773         $C      RSTR    <CPSAV2,=Z'7F7F'
                07DE  7F7F
001538          07DF  8A80 0783                 INC     <CPRERR
001539          07E1  0F80 07A8                 B       <CPRNXT
001540          07E3  4259 5445 2400    MSBYTE  TEXT    'BYTE$'
001541          07E6  2049 5324         MSIS    TEXT    ' IS$'
001542          07E8  2053 4224         MSSBE   TEXT    ' SB$'
001543                                *---------------------------*
001544                                *   SUBROUTINE TO DELAY FOR  *
001545                                *   INPUT FROM CONTROLLER    *
001546                                *---------------------------*
001547          07EA  8F00 0000   X     IODELY  SAVE    <ZV$SV2,=Z'7F7F'
                07EC  7F7F
001548          07ED  1C10                      LDV     $R1,=X'10'               SET COUNTER=16
001549          07EE  88D1              $A      DEC     =$R1
001550          07EF  19FF                      BNEZ    $R1,>-$A
001551          07F0  8F80 0000   X             RSTR    <ZV$SV2,=Z'7F7F'
                07F2  7F7F
```

```
07F3  8387                    JMP     $B7
                        ******************************
                        *        ERROR   TEST        *
                        ******************************
07F4  DF80 081A         ERRTST  STB     $B5,<ERTSTX+1       STORE RETURN IN EXIT
07F6  8980 05C7                 CMZ     <TIMOUT             TIME-OUT
07F8  0980             T        BNE     >+$A
07F9  8980 05C8                 CMZ     <STATER             STATUS ERROR
07FB  09FD             T        BNE     >+$A
07FC  8980 06FB                 CMZ     <RNGERR             RANGE ERROR
07FE  09FD             T        BNE     >+$A
07FF  8980 0721                 CMZ     <OFRGER             OFFSET-RANGE ERROR
0801  09FD             T        BNE     >+$A
0802  8980 0764                 CMZ     <CWDERR             CONFIGURATION-WDS ERROR
0804  09FD             T        BNE     >+$A
0805  8980 0783                 CMZ     <CPRERR             DATA MISCOMPARE
0807  09FD             T        BNE     >+$A
0808  8980 085B                 CMZ     <ERRFLG             ERROR FLAG
080A  0901 000E                 BE      ERTSTX
080C  8960 0826         $A      CMZ     <PRTFLG             ERROR-PRINT INHIBITED??
080E  0986                      BNE     >RTNA               BCH IF YES
080F  D380 0000        X        LNJ     $B5,<ZV$ER          CALL ZV$ER-SUBR
0811  0F83                      B       >RTNA
0812  0885              MSTADD  DC      <MODEA              ADDRESS OF TEST
      0812              MSTADX  EQU     $-1
0813  0816              MSORU   DC      <MSMPDC             MESSAGE I.D.
0814  0F02              RTNA    NOP     >$+2
                        *        HLT    EELET OPERATOR MAKE DECISION ON WHAT TO DO!!!!!
0815  0F80 012E                 B       <NEXT       WHAT SHOULD WE DO NOW?????
0817  8388 0812                 JMP     *<MSTADD            GO TRY TEST AGAIN
0819  0F80 0000         ERTSTX  B       <RETURN             EXIT TO NEXT TEST
081B  4D50 4443 2400    MSMPDC  TEXT    'MPDC$'
081E  4144 4150 542D    MSADPT  TEXT    'ADAPT-PK$'
0821  504B 2400
0823  4452 4956 4524    MSDRVE  TEXT    'DRIVES'
0826  0000              PRTFLG  RESV    1,0                 INHIBIT ERROR-PRINT FLAG
                        *-----------------------------*
                        *   SET TEST ADDRESS AND      *
                        *   CLEAR ERROR FLAGS         *
                        *-----------------------------*
0827  DF80 0842         SETEST  STB     $B5,<SETSTX+1       SAVE WHERE FROM
0829  DF80 0812                 STB     $B5,<MSTADD         SET TEST ADDRESS
082B  8880 0812                 DEC     <MSTADX
082D  8880 0812                 DEC     <MSTADX
082F  8700 05C7                 CL      <TIMOUT
0831  8700 05C8                 CL      <STATER
0833  8700 06FB                 CL      <RNGERR
0835  8700 0721                 CL      <OFRGER
0837  8700 0764                 CL      <CWDERR
0839  8700 0783                 CL      <CPRERR
083B  8700 085B                 CL      <ERRFLG
083D  8700 0393                 CL      <GOFILL
083F  D380 085C                 LNJ     $B5,<SENSE          CONSOLE BREAK-KEY??
0841  0F80 0000         SETSTX  B       <RETURN             EXIT
                        *-----------------------------*
                        *   HOUSE-KEEPING             *
                        *-----------------------------*
      0843              HOUSKP  EQU     $
0843  8700 0722                 CL      <OFRLFT             REMAINING OFFSET-RANGE
0845  8700 06FC                 CL      <RNGLFT             REMAINING RANGE
0847  8700 0760                 CL      <CWAF               CNFG-WD-A END
0849  8700 0761                 CL      <CWBF               CNFG-WD-B END
084B  8700 0762                 CL      <MSCWDA             CNFG-WD-A IS
084D  8700 0763                 CL      <MSCWDA+1           CNFG-WD-B IS
084F  8385                      JMP     $B5                 RETURN
                        ******************************
                        *        ERROR   DETECTED    *
                        ******************************
0850  DF80 085A         ERROR   STB     $B5,<EROREX+1       STORE RETURN IN EXIT
0852  8600 085B                 CPL     <ERRFLG             SET ERROR FLAG
0854  D380 07F4                 LNJ     $B5,<ERRTST
0856  8700 085B                 CL      <ERRFLG
0858  0000                      HLT
0859  0F80 0000         EROREX  B       <RETURN             EXIT
085B  0000              ERRFLG  RESV    1,0                 ERROR FLAG
                        *--------------------------------*
                        *   CHECK IF CONSOLE BREAK-KEY   *
                        *   TO DO SOMETHING              *
                        *--------------------------------*
085C  DF80 0867         SENSE   STB     $B5,<SENSB5+1
                                CALL    ZV$BRK              CHECK CONSOLE
085E  FBF0 0001
0860  D380 0000        X
0862  8980 0000        X        CMZ     <ZV$BKF             CHECK FLAG (1 = BREAK)
0864  0980 012E                 BNE     <NEXT               BREAK DETECTED
0866  0F80 0000         SENSB5  B       <RETURN             EXIT
                        *------------------------------*
                        * COME HERE IF A NON-EXISTING *
                        * RESOURCE TRAP OCCURS   *
                        *------------------------------*
      0868              NODCU   EQU     $
0868  9B80 086D                 LAB     $B1,<MSNDCU
086A  D380 043B                 LNJ     $B5,<ZVTC
086C  0003                      RTT
086D  4E4F 4E2D 4558    MSNDCU  TEXT    'NON-EXISTING RESOURCE TRAP$'
0870  4953 5449 4E47
      2052 4553 4F55
      5243 4520 5452
      4150 2400
                        ******************************
                        *                            *
                        *   MODE  "T"  TURNAROUND    *
                        *                            *
                        ******************************
                        *   AUTOMATIC MODE TESTS OF THE CONTROLLER + ADAPTER ONLY
                        *   WRITE-READ SCRATCH-PAD AND DATA WRAPAROUND
                        *   NO DRIVE IS USED.  RUNS INDIFINITELY.
                        *
      087B              MODET   EQU     $
087B  DB80 087B                 LAB     $B5,<MODET          QUE LOOPBACK
087D  DF80 0A88                 STB     $B5,<MODETX+1
087F  DB80 0970                 LAB     $B5,<WRAPIT         QUE OUT FIRMWARE
0881  DF80 0935                 STB     $B5,<RWRSPX+1       REV. CHECK
```

```
0883  0F80 088D            B      <MODEAA                  GO EXECUTE
                  *------------------------------*
                  *                              *
                  *        M O D E - "A"         *
                  *                              *
                  *------------------------------*
                  *        AUTOMATIC MODE WHICH WILL TEST THE CONTROLLER
                  *        AND THE ADAPTER PAC THEN ALL FUNCTIONALLITY
                  *        OF THE SUBSYSTEM USING THE PACK ON THE SPINDLE
                  *        ASSIGNED TO THIS CHANNEL.
      0885        MODEA    EQU    $
0885  DB80 094C            LAB    $B5,<DPFIRV              QUE FIRMWARE CHECK
0887  DF80 0935            STB    $B5,<RWRSPX+1
0889  DB80 0AE7            LAB    $B5,<IDTEST              QUE I.D.TEST
088B  DF80 0A88            STB    $B5,<MODETX+1
      088D        MODEAA   EQU    $
088D  D380 0843            LNJ    $B5,<HOUSKP              HOUSEKEEPING
088F  9B80 081B            LAB    $B1,<MSMPDC
0891  9FC0 FF81            STB    $B1,MSORU                SET O.R.U. IN MESGE ID
                  *
                  *------------------------------*
                  * CONTROL WORD OUT-IN TEST     *
                  *------------------------------*
                  * WRITE CONTROL-WORD, READ CONTROL-WORD
                  * DATA OF ZEROS.  (DO NOTHING)
                  * MAKE SURE PCU IS ADDRESSABLE.
0893  D3C0 FF93   CWOTST   LNJ    $B5,SETEST               SET TEST ADDRESS
0895  F380 0557            LNJ    $B7,<SIONAK              SET IO ADDRESS FOR RETRY
0897  8000 02AA            IO     <ZEROS,<WCTL             WRT CONTROL WORD = 00
0899  0000 0274
089B  0781 FCC8            BIOF   IONAK
                  *
089D  F3C0 FCB9            LNJ    $B7,SIONAK               SET IO ADDRESS FOR RETRY
089F  8054                 IO     =$R4,<RCTL               RD CONTROL WORD
08A0  0000 0273
08A2  0781 FCC1            BIOF   IONAK
08A4  F3C0 FF45            LNJ    $B7,IODELY               DELAY
08A6  C900 02AA            CMR    $R4,<ZEROS
08A8  0900         T       BE     >+$A
08A9  F380 0850            LNJ    $B7,<ERROR
08AB  8751        $A       CL     =$R1
08AC  D380 03BB            LNJ    $B5,<INITZ               INITIALIZE SUBSYSTEM
                  *
08AE  D3C0 FF78            LNJ    $B5,SETEST               SET BEGINNING OF TEST
08B0  D800 0278            LDR    $R5,<WRTADD              CLEAR IOLD DIRECTION-BIT
08B2  D570 FFBF            AND    $R5,=Z'FFBF'
08B4  DF00 0278            STR    $R5,<WRTADD
                  **********************************
                  *   READ/WRITE/READ  SCRATCH-PAD  *
                  **********************************
                  * TEST FOR THE ABILITY OF CONTROLLER TO ACCEPT
                  * BOTH INPUT AND OUTPUT COMMANDS.
                  * READ LOCATION, CHECK FOR ZEROS, WRITE ONES,
                  * READ AND CHECK, WRITE ZEROS, READ AND CHECK.
      08B6        RWRSP    EQU    $
08B6  F3C0 FCA0            LNJ    $B7,SIONAK
08B8  8055                 IO     =$R5,<INCMD.$R1
08B9  0010 0254
08BB  0781 FCA8            BIOF   IONAK
08BD  F3C0 FF2C            LNJ    $B7,IODELY               DELAY
08BF  D900 02AA            CMR    $R5,<ZEROS
08C1  0900         T       BE     >+$A
08C2  D380 0936            LNJ    $B5,<SPERR1
08C4  F3C0 FC92   $A       LNJ    $B7,SIONAK
08C6  8000 02A8            IO     <ONES,<OUTCMD.$R1
08C8  0010 0275
08CA  0781 FC99            BIOF   IONAK
08CC  F3C0 FC8A            LNJ    $B7,SIONAK
08CE  8055                 IO     =$R5,<INCMD.$R1
08CF  0010 0254
08D1  0781 FC92            BIOF   IONAK
08D3  F3C0 FF16            LNJ    $B7,IODELY               DELAY
08D5  D900 02A8            CMR    $R5,<ONES
08D7  0900         T       BE     >+$B
08D8  D380 0947            LNJ    $B5,<SPERR2
08DA  F3C0 FC7C   $B       LNJ    $B7,SIONAK
08DC  8000 02AA            IO     <ZEROS,<OUTCMD.$R1
08DE  0010 0275
08E0  0781 FC83            BIOF   IONAK
08E2  F3C0 FC74            LNJ    $B7,SIONAK
08E4  8055                 IO     =$R5,<INCMD.$R1
08E5  0010 0254
08E7  0781 FC7C            BIOF   IONAK
08E9  F3C0 FF00            LNJ    $B7,IODELY               DELAY
08EB  D900 02AA            CMR    $R5,<ZEROS
08ED  0900         T       BE     >+$C
08EE  D380 0936            LNJ    $B5,<SPERR1
08F0  8AD1        $C       INC    =$R1
08F1  1D1C                 CMV    $R1,=X'1C'               END OF SCRATCHPAD?
08F2  0200 08B6            BL     <RWRSP
08F4  D800 0278            LDR    $R5,<WRTADD
08F6  5E40                 ADV    $R5,=X'40'
08F7  DF00 0278            STR    $R5,<WRTADD              PUT DIRECTION-BIT BACK IN IOLD
08F9  D3C0 FF2D            LNJ    $B5,SETEST
08FB  F3C0 FC5B            LNJ    $B7,SIONAK
08FD  8180 1791            IOLD   <WRTBFR,<WRTADD,<TIRTY3 IOLD
08FF  0000 0278
0901  0000 02AE
0903  0781 FC60            BIOF   IONAK
0905  F3C0 FC51            LNJ    $B7,SIONAK
0907  8055                 IO     =$R5,<INMOD
0908  0000 0258
090A  0781 FC59            BIOF   IONAK
090C  F3C0 FEDD            LNJ    $B7,IODELY               DELAY
090E  D900 02AA            CMR    $R5,<ZEROS
0910  0900         T       BE     >+$D
0911  F380 0850            LNJ    $B7,<ERROR
0913  F3C0 FC43   $D       LNJ    $B7,SIONAK
0915  8055                 IO     =$R5,<INADD
0916  0000 0257
0918  0781 FC4B            BIOF   IONAK
091A  9B80 1791            LAB    $B1,<WRTBFR
091C  9F80 1791            STB    $B1,<WRTBFR
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001760  091E  F3C0 FECB                    LNJ   $B7,IODELY          DELAY
001761  0920  5041                         SUR   $R5,1
001762  0921  0900 1791                    CMR   $R5,<WRTBFR+$AF-1
001763  0923  0900              T          BE    >+$E
001764  0924  F3B0 0850                    LNJ   $B7,<ERROR
001765  0926  F3C0 FC30          $E        LNJ   $B7,SIONAK
001766  0928  8055                         IO    =$R5,<RRANGE
        0929  0000 0259
001767  092B  0781 FC38                    BIOF  IONAK
001768  092D  F3C0 FEBC                    LNJ   $B7,IODELY          DELAY
001769  092F  0900 02AE                    CMR   $R5,<IIRTY3
001770  0931  0903                         BE    >RWKSPX             EXIT
001771  0932  F3B0 0850                    LNJ   $B7,<ERROR
001772  0934  0F80 094C          RWKSPX    B     <DPFIRV             EXIT
001773        0936              SPERR1    EQU   $
001774  0936  9970 000B                    CMR   $R1,=Z'000B'        STATUS REGISTER
001775  0938  0980              T          BNE   >+$F
001776  0939  0970 8000                    CMR   $R5,=Z'8000'        DEVICE-READY-BIT
001777  093B  0900              T          BE    >+$H
001778  093C  0970 C000                    CMR   $R5,=Z'C000'        DEV-READY + ATTN
001779  093E  097D              T          BE    >+$H
001780  093F  0F80              T          B     >+$G
001781  0940  1D12          $F            CMV   $R1,=Z'12'          DEV-ID
001782  0941  097D              T          BE    >+$H
001783  0942  1D13                         CMV   $R1,=Z'13'          CHAN-NUMBER
001784  0943  097E              T          BE    >+$H
001785  0944  F3B0 0850          $G        LNJ   $B7,<ERROR
001786  0946  8385              $H        JMP   $B5
001787  0947  1D11              SPERR2    CMV   $R1,=Z'11'          CHANN-MONITOR
001788  0948  097E                         BE    >-$H
001789  0949  F3B0 0850                    LNJ   $B7,<ERROR
001790  094B  8385                         JMP   $B5
001791                          *---------------------------*
001792                          * READ + PRINT FIRMWARE REV. *
001793                          *---------------------------*V-
001794  094C  D3B0 0950          DPFIRV    LNJ   $B5,<FIRMRV
001795  094E  0F80 0970                    B     <WRAPIT
001796        0950              FIRMRV    EQU   $
001797  0950  8F00 0773                    SAVE  <CPSAV2,=Z'7F7F'
        0952  7F7F
001798  0953  D3C0 FED3                    LNJ   $B5,SETEST          SET TEST ADDRESS
001799  0955  A800 0271                    LDR   $R2,<FIRMID         CMD TO READ FIRMWARE-I.D.
001800  0957  A644 0010                    XOR   $R2,$B4.PORTCH      SET PORT NO.
001801  0959  8000 096F          $A        IO    <FIREVN,=$R2        READ SCH-PAD (3D)
        095B  0052
001802  095C  07FD                         BIOF  >-$A
001803  095D  9B80 096B                    LAB   $B1,<MSFREV         MESG "REV. FIRMWARE"
001804  095F  D380 043B                    LNJ   $B5,<ZVTC           PRINT MESG
001805                                    CALL  ZV$TH,ZV$THZ,FIREVN   PRNT REV-NO.
        0961  FBC0 0003
        0963  D380 0000          X
        0965  0F80
        0966  096F
001806  0967  8F80 0773                    RSTR  <CPSAV2,=Z'7F7F'
        0969  7F7F
001807  096A  8385                         JMP   $B5                 EXIT
001808  096B  4657 2052 4556    MSFREV    TEXT  'FW REV$'
        096E  2400
001809  096F  0000              FIREVN    RESV  1,0                 FIRMWARE REVISION NO.
001810                          *****************************
001811                          *                           *
001812                          *      WRAPAROUND  TEST     *
001813                          *                           *
001814                          *****************************
001815                          * TRY THE DATA PATH. FIRST WRAP 1 BYTE OF
001816                          * DATA AROUND THE MOTHERBOARD.THEN 2 BYTES
001817                          * (1 WORD), THEN 10 BYTES.  ZEROS + ONES ARE
001818                          * USED.  PATTERN OF 'AA55'
001819                          *       BYTE-MODE IS THEN TRIED.
001820                          * CHANGE TASK TO WRAP DAUGHTER-BOARD AND
001821                          * REPEAT.
001822                          *  FINALLY, OFFSET-RANGE IS CHECKED.
001823                          *       $R1 = INDEX
001824                          *       $R3 = DATA
001825                          *       $R4 = RANGE
001826  0970  D3C0 FEB6          WRAPIT    LNJ   $B5,SETEST
001827  0972  D3B0 03BB                    LNJ   $B5,<INITZ          INITIALIZE SUBSYSTEM
001828  0974  C870 C100                    LDR   $R4,=Z'C100'        MOTHERBOARD
001829  0976  CF00 0AA6                    STR   $R4,<WRPTSK
001830  0978  A800 0277                    LDR   $R2,<WTASK
001831  097A  A644 0010                    XOR   $R2,$B4.PORTCH
001832  097C  AF00 0ABD                    STR   $R2,<WRPWTK
001833  097E  A800 0278                    LDR   $R2,<WLOAD
001834  0980  A644 0010                    XOR   $R2,$B4.PORTCH
001835  0982  AF00 0ABB                    STR   $R2,<WRPLDW
001836  0984  A800 0294                    LDR   $R2,<RLOAD
001837  0986  A644 0010                    XOR   $R2,$B4.PORTCH
001838  0988  AF00 0ABC                    STR   $R2,<WRPLDR
001839                          *
001840  098A  4C01              WRAPM     LDV   $R4,=X'01'          RANGE 1-BYTE
001841  098B  8751                        CL    =$R1
001842  098C  B380 0A89                    LNJ   $B3,<GOWRAP
001843  098E  4C02                        LDV   $R4,=X'02'          RANGE 2-BYTES
001844  098F  B380 0A89                    LNJ   $B3,<GOWRAP
001845  0991  4C0F                        LDV   $R4,=X'0F'          RANGE 15-BYTES
001846  0992  B380 0A89                    LNJ   $B3,<GOWRAP
001847  0994  4C10                        LDV   $R4,=Z'10'          RANGE 16-BYTES
001848  0995  B380 0A89                    LNJ   $B3,<GOWRAP
001849                          *
001850                          *          WRAP  AA5555AAAA5555AA  DATA PATTERN
001851                          *
001852  0997  D3C0 FE8F                    LNJ   $B5,SETEST
001853  0999  B870 AA55                    LDR   $R3,=Z'AA55'        SPECIAL PATTERN
001854  099B  D380 0A9E                    LNJ   $B5,<LDBUF
001855  099D  3018                        SCL   $R3,8
001856  099E  1C01                        LDV   $R1,=X'01'
001857  099F  BF10 1791          $A        STR   $R3,<WRTBFR.$R1
001858  09A1  1E02                        ADV   $R1,=X'02'
001859  09A2  1D09                        CMV   $R1,=X'09'
001860  09A3  027C                        BL    >-$A
001861  09A4  8751                        CL    =$R1
001862  09A5  D380 0AA7                    LNJ   $B5,<WRTOUT
001863  09A7  D380 0ABE                    LNJ   $B5,<RDIN
```

```
001864  09A9  D380 0AD7            LNJ   $B5,<COMPAR
001865                        *
001866                        *  BYTE-MODE WRAP AROUND
001867                        *  (ODD OUT - ODD IN)
001868                        *
001869  09AB  D3C0 FE7B            LNJ   $B5,SETEST
001870  09AD  9B80 1791            LAB   $B1,<WRTBFR
001871  09AF  4C12                 LDV   $R4,=X'12'
001872  09B0  F870 0102            LDR   $R7,=X'0102'      DATA PATTERN
001873  09B2  D380 047F            LNJ   $B5,<INCBFR       INCREMENTING DATA
001874  09B4  1C01                 LDV   $R1,=X'01'        BYTE-MODE INDEX
001875  09B5  4C10                 LDV   $R4,=X'10'
001876  09B6  D380 0AA7            LNJ   $B5,<WRTOUT
001877  09B8  D380 0ABE            LNJ   $B5,<RDIN
001878  09BA  B870 3302            LDR   $R3,=X'3302'
001879  09BC  BF00 1791            STR   $R3,<WRTBFR
001880  09BE  F3C0 FE2B            LNJ   $B7,IODELY        DELAY
001881  09C0  4C11                 LDV   $R4,=X'11'        COMPARE RANGE (BYTES)
001882  09C1  D380 0AD7            LNJ   $B5,<COMPAR
001883  09C3  F800 0AA6            LDR   $R7,<WRPTSK
001884  09C5  F970 C000            CMR   $R7,=Z'C000'      =DAUGHTERBOARD?
001885  09C7  090B                 BE    >WRAPD
001886  09C8  F870 C000            LDR   $R7,=Z'C000'      DAUGHTERBOARD(PAC)
001887  09CA  FF00 0AA6            STR   $R7,<WRPTSK
001888  09CC  9B80 081E            LAB   $B1,<MSADPT
001889  09CE  9F80 0813            STB   $B1,<MSORU        SET ORU-ID
001890  09D0  0F80 098A            B     <WRAPM
001891                        *
001892                        *     BYTE-MODE  (ODD OUT - EVEN IN)
001893                        *
001894        09D2                WRAPD EQU   $
001895  09D2  D3C0 FE54            LNJ   $B5,SETEST
001896  09D4  9B80 1791            LAB   $B1,<WRTBFR
001897  09D6  4C12                 LDV   $R4,=X'12'        RANGE
001898  09D7  7C01                 LDV   $R7,=X'01'        DATA PATTERN
001899  09D8  D380 047F            LNJ   $B5,<INCBFR
001900  09DA  1C01                 LDV   $R1,=X'01'
001901  09DB  4C10                 LDV   $R4,=X'10'
001902  09DC  D380 0AA7            LNJ   $B5,<WRTOUT
001903  09DE  8751                 CL    =$R1
001904  09DF  D380 0ABE            LNJ   $B5,<RDIN
001905  09E1  9B80 1791            LAB   $B1,<WRTBFR
001906  09E3  4C12                 LDV   $R4,=X'12'
001907  09E4  F870 0102            LDR   $R7,=X'0102'      DATA PATTERN
001908  09E6  D380 047F            LNJ   $B5,<INCBFR
001909  09E8  88D4                 DEC   =$R4
001910  09E9  88D4                 DEC   =$R4              RNGE='0010'
001911  09EA  D380 0AD7            LNJ   $B5,<COMPAR
001912                        *
001913                        *     BYTE-MODE  (EVEN OUT - ODD IN)
001914                        *
001915  09EC  D3C0 FE3A            LNJ   $B5,SETEST
001916  09EE  4C12                 LDV   $R4,=X'12'
001917  09EF  F870 0102            LDR   $R7,=X'0102'
001918  09F1  9B80 1791            LAB   $B1,<WRTBFR
001919  09F3  D380 047F            LNJ   $B5,<INCBFR
001920  09F5  8751                 CL    =$R1
001921  09F6  4C10                 LDV   $R4,=X'10'
001922  09F7  D380 0AA7            LNJ   $B5,<WRTOUT
001923  09F9  8AD1                 INC   =$R1
001924  09FA  D380 0ABE            LNJ   $B5,<RDIN
001925  09FC  9B80 1791            LAB   $B1,<WRTBFR
001926  09FE  4C11                 LDV   $R4,=X'11'
001927  09FF  7C01                 LDV   $R7,=X'01'        DATA PATTERN
001928  0A00  D380 047F            LNJ   $B5,<INCBFR
001929  0A02  F870 3301            LDR   $R7,=X'3301'
001930  0A04  FF00 1791            STR   $R7,<WRTBFR
001931  0A06  D380 0AD7            LNJ   $B5,<COMPAR
001932                        *
001933                        *  OFFSET-RANGE WRAP DAUGHTERBOARD
001934                        *
001935  0A08  D3C0 FE1E            LNJ   $B5,SETEST
001936  0A0A  8751                 CL    =$R1
001937  0A0B  F870 0102            LDR   $R7,=X'0102'      DATA PATTERN
001938  0A0D  4C12                 LDV   $R4,=X'12'
001939  0A0E  9B80 1791            LAB   $B1,<WRTBFR
001940  0A10  D380 047F            LNJ   $B5,<INCBFR
001941  0A12  7C01                 LDV   $R7,=X'01'        DATA PATTERN
001942  0A13  9B80 1799            LAB   $B1,<WRTBFR+8
001943  0A15  D3C0 FA69            LNJ   $B5,INCBFR
001944  0A17  F870 1033            LDR   $R7,=X'1033'
001945  0A19  FF40 0D87            STR   $R7,WRTBFR+16
001946                        *   OFFSET RANGE  01
001947  0A1B  D3C0 FE0B            LNJ   $B5,SETEST
001948  0A1D  4C10                 LDV   $R4,=X'10'        RNGE
001949  0A1E  D380 0AA7            LNJ   $B5,<WRTOUT
001950  0A20  7C01                 LDV   $R7,=X'01'
001951  0A21  D380 03AE            LNJ   $B5,<WTOFRG       WRT OFSET-RNGE
001952  0A23  4C0F                 LDV   $R4,=X'0F'
001953  0A24  CF44 000E            STR   $R4,$B4,RANGE
001954  0A26  D380 0ABE            LNJ   $B5,<RDIN
001955  0A28  D380 06DF            LNJ   $B5,<CKRNGE
001956  0A2A  D380 0705            LNJ   $B5,<CKOFRG
001957  0A2C  9B80 179A            LAB   $B1,<WRTBFR+9
001958  0A2E  D380 0788            LNJ   $B5,<CMPARE
001959  0A30  D380 07F4            LNJ   $B5,<ERRTST
001960                        *   OFFSET RANGE  02
001961  0A32  D3C0 FDF4            LNJ   $B5,SETEST
001962  0A34  4C10                 LDV   $R4,=X'10'
001963  0A35  D3C0 0071            LNJ   $B5,WRTOUT
001964  0A37  7C02                 LDV   $R7,=X'02'
001965  0A38  D3C0 F975            LNJ   $B5,WTOFRG        WRT OFSET RNGE
001966  0A3A  4C0E                 LDV   $R4,=X'0E'
001967  0A3B  CF44 000E            STR   $R4,$B4,RANGE
001968  0A3D  D3C0 0080            LNJ   $B5,RDIN
001969  0A3F  D3C0 FC9F            LNJ   $B5,CKRNGE
001970  0A41  D3C0 FCC3            LNJ   $B5,CKOFRG
001971  0A43  9BC0 0D4E            LAB   $B1,WRTBFR+1
001972  0A45  D3C0 FD42            LNJ   $B5,CMPARE
001973  0A47  D3C0 FDAC            LNJ   $B5,ERRTST
001974                        *   OFFSET RANGE  0F
001975  0A49  D3C0 FDDD            LNJ   $B5,SETEST
001976  0A4B  4C10                 LDV   $R4,=X'10'
```

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001977 0A4C D3C0 005A                  LNJ   $B5,WRTOUT
001978 0A4E 7C0F                       LDV   $R7,=X'0F'
001979 0A4F D3C0 F95E                  LNJ   $B5,WTOFRG
001980 0A51 4C01                       LDV   $R4,=X'01'
001981 0A52 CF44 000E                  STR   $R4,$B4.RANGE
001982 0A54 D3C0 0069                  LNJ   $B5,RDIN
001983 0A56 D3C0 FC88                  LNJ   $B5,CKRNGE
001984 0A58 D3C0 FCAC                  LNJ   $B5,CKOFRG
001985 0A5A 9BC0 0D46                  LAB   $B1,WRTBFR+16
001986 0A5C D3C0 FD2B                  LNJ   $B5,CMPARE
001987 0A5E D3C0 FD95                  LNJ   $B5,ERRTST
001988 0A60 8744 000F                  CL    $B4.OFSTRG       CLEAR OFFSET RANGE
001989                          *
001990                          *  WRAP DAUGHTERBOARD WITH RANDOM DATA
001991                          *
001992 0A62 D3C0 FDC4                  LNJ   $B5,SETEST
001993 0A64 4C10                       LDV   $R4,=X'10'
001994 0A65 CF44 000E                  STR   $R4,$B4.RANGE
001995 0A67 F870 00FF                  LDR   $R7,=Z'00FF'     LOAD NO. OF RANDOM WRAPS
001996      0A69                WRPRDM EQU   $
001997                                 CALL  ZV$FR,WRTBFR,EIGHT  RANDOM DATA
       0A69 FBC0 0003
       0A6B D380 0000       X
       0A6D 0F80
       0A6E 1791
       0A6F 02AC
001998 0A70 D380 0AA7                  LNJ   $B5,<WRTOUT
001999 0A72 D380 0ABE                  LNJ   $B5,<RDIN
002000 0A74 D380 0AD7                  LNJ   $B5,<COMPAR
002001 0A76 7700 0A69                  BDEC  $R7,<WRPRDM      LOOP THE RANDOM DATA WRAP "FF" TIMES
002002                          *
002003 0A78 D3C0 FDAE                  LNJ   $B5,SETEST
002004 0A7A B870 00FF                  LDR   $R3,=Z'00FF'     SENSITIVE DATA PATTERN
002005 0A7C D3C0 0021                  LNJ   $B5,LDBUF        SET PATRN IN WRT-BFR
002006 0A7E F870 07FF                  LDR   $R7,=Z'07FF'     NO. OF WRAPS TO LOOP
002007      0A80                WRPTOM EQU   $
002008 0A80 D3C0 0026                  LNJ   $B5,WRTOUT
002009 0A82 D3C0 003B                  LNJ   $B5,RDIN
002010 0A84 D3C0 0052                  LNJ   $B5,COMPAR
002011 0A86 777A                       BDEC  $R7,>WRPTOM      LOOP WRAP TEST
002012                          *
002013 0A87 0F80 0AE7           MODETX B     <IDTEST           EXIT
002014                          *
002015                          * WRAP SUBROUTINES
002016                          *
002017 0A89 B800 02AA           GOWRAP LDR   $R3,<ZEROS        WRAP ZEROS
002018 0A8B D380 0A9E                  LNJ   $B5,<LDBUF
002019 0A8D D380 0AA7                  LNJ   $B5,<WRTOUT
002020 0A8F D380 0ABE                  LNJ   $B5,<RDIN
002021 0A91 D380 0AD7                  LNJ   $B5,<COMPAR
002022 0A93 B870 FFFF                  LDR   $R3,=Z'FFFF'     WRAP ONES
002023 0A95 D380 0A9E                  LNJ   $B5,<LDBUF
002024 0A97 D380 0AA7                  LNJ   $B5,<WRTOUT
002025 0A99 D380 0ABE                  LNJ   $B5,<RDIN
002026 0A9B D380 0AD7                  LNJ   $B5,<COMPAR
002027 0A9D 8383                       JMP   $B3
002028                          *
002029                          * FILL WRTBFR WITH DATA FROM $R3
002030                          *
002031 0A9E 8751                LDBUF  CL    =$R1
002032 0A9F 9B80 1791                  LAB   $B1,<WRTBFR
002033 0AA1 BF5D                $B     STR   $R3,$B1.+$R1
002034 0AA2 1D09                       CMV   $R1,=X'09'
002035 0AA3 027E                       BL    >-$B
002036 0AA4 8751                       CL    =$R1
002037 0AA5 8385                       JMP   $B5
002038                          *
002039                          * WRAP DATA OUT
002040                          *
002041 0AA6 C100                WRPTSK DC    =Z'C100'          WRAP MOTHER OR DAUGHTER BOARD
002042      0AA7                WRTOUT EQU   $
002043 0AA7 F3C0 FAAF                  LNJ   $B7,SIONAK
002044 0AA9 8190 1791                  IOLD  <WRTBFR.$R1,<WRPLDW,=$R4
       0AAB 0000 0ABB
       0AAD 0054
002045 0AAE 0781 FAB5                  BIOF  IONAK
002046 0AB0 F3C0 FAA6                  LNJ   $B7,SIONAK
002047 0AB2 8000 0AA6                  IO    <WRPTSK,<WRPWTK
       0AB4 0000 0ABD
002048 0AB6 0781 FAAD                  BIOF  IONAK
002049 0AB8 F3C0 FD31                  LNJ   $B7,IODELY       DELAY
002050 0ABA 8385                       JMP   $B5
002051 0ABB 0000                WRPLDW RESV  1,0
002052 0ABC 0000                WRPLDR RESV  1,0
002053 0ABD 0000                WRPWTK RESV  1,0
002054                          *
002055                          * READ WRAPPED DATA BACK
002056                          *
002057      0ABE                RDIN   EQU   $
002058 0ABE DF80 0AD6                  STB   $B5,<RDINX+1
002059 0AC0 D380 0464                  LNJ   $B5,<RDBFIL      FILL BUFR W/ 3333
002060 0AC2 F3C0 FA94                  LNJ   $B7,SIONAK
002061 0AC4 8190 0000           X      IOLD  <RDBUFR.$R1,<WRPLDR,=$R4
       0AC6 0000 0ABC
       0AC8 0054
002062 0AC9 0781 FA9A                  BIOF  IONAK
002063 0ACB F3C0 FA8B                  LNJ   $B7,SIONAK
002064 0ACD 8000 0AA6                  IO    <WRPTSK,<WRPWTK
       0ACF 0000 0ABD
002065 0AD1 0781 FA92                  BIOF  IONAK
002066 0AD3 F3C0 FD16                  LNJ   $B7,IODELY       DELAY
002067 0AD5 0F80 0000           RDINX  B     <RETURN           EXIT
002068                          *
002069                          * COMPARE WRAPPED BACK DATA = DATA SENT
002070                          *
002071 0AD7 DF80 0AE6           COMPAR STB   $B5,<CMPARX+1
002072 0AD9 CF44 000E                  STR   $R4,$B4.RANGE
002073 0ADB D380 06DF                  LNJ   $B5,<CKRNGE      CK RANGE
002074 0ADD D380 0705                  LNJ   $B5,<CKOFRG      CK OFFSET-RANGE
002075 0ADF 9B80 1791                  LAB   $B1,<WRTBFR
002076 0AE1 D380 0788                  LNJ   $B5,<CMPARE      COMPARE BYTES
002077 0AE3 D380 07F4                  LNJ   $B5,<ERRTST      ANY ERROR?
002078 0AE5 0F80 0000           CMPARX B     <RETURN           EXIT
```

```
                                  *************************
                                  *                       *
                                  *       I.D.  TEST      *
                                  *                       *
                                  *************************
                                  * TEST I.D. INSTRUCTION ON PORT ASSIGNED
                                  * CHECK ANSWER IS VALID.  STORE IN
                                  * PORT ID FOR FUTURE REF.
        0AE7                      IDTEST EQU    $
0AE7    D380 03BB                        LNJ    $B5,<INITZ          INITIALIZE SUBSYSTEM
0AE9    D3C0 FD3D                        LNJ    $B5,SETEST
0AEB    D380 04E2                        LNJ    $B5,<GETID          READ I.D.
0AED    6D23                             CMV    $R6,=X'23'          MEDIUM PERFORMNCE DISC CNTRLLR
0AEE    0900                T            BE     >+$B
0AEF    F380 0850                        LNJ    $B7,<ERROR
0AF1    D380 04F4                 $B     LNJ    $B5,<SETPRM         SET PARAMETER-LIMITS IN PORT-TABLE
0AF3    7D30                             CMV    $R7,=X'30'          100TPI CARTRIDGE ONLY
0AF4    9B80 0B0B                        LAB    $B1,<CART10
0AF6    0900                T            BE     >+$C
0AF7    7D31                             CMV    $R7,=X'31'          100TPI CARTRIDGE & FIXED DISC
0AF8    9B80 0B14                        LAB    $B1,<CART1F
0AFA    097C                T            BE     >+$C
0AFB    7D32                             CMV    $R7,=X'32'          200TPI CARTRIDGE ONLY
0AFC    9B80 0B1C                        LAB    $B1,<CART20
0AFE    097C                T            BE     >+$C
0AFF    7D33                             CMV    $R7,=X'33'          200TPI CARTRIDGE & FIXED DISC
0B00    9B80 0B25                        LAB    $B1,<CART2F
0B02    097C                T            BE     >+$C
0B03    F380 0850                        LNJ    $B7,<ERROR
0B05    9B80 0B34                        LAB    $B1,<MSIDNG
0B07    D380 043B                 $C     LNJ    $B5,<ZVTC           PRINT DEVICE-TYPE
0B09    0F80 0B3B                        B      <STATST
                                  *
0B0B    3130 3054 5049            CART10 TEXT   '100TPI CART ONLY$'
0B0E    2043 4152 5420
        4F4E 4C59 2400
0B14    3130 3054 5049            CART1F TEXT   '100TPI CART+FIX$'
0B17    2043 4152 542B
        4649 5824
0B1C    3230 3054 5049            CART20 TEXT   '200TPI CART ONLY$'
0B1F    2043 4152 5420
        4F4E 4C59 2400
0B25    3230 3054 5049            CART2F TEXT   '200TPI CART+FIX$'
0B28    2043 4152 542B
        4649 5824
0B2D    0753 5441 5254            MSUPWR TEXT  Z'07','START DR '
0B30    2044 5220
0B32    2030 2C24                 SPINO  TEXT   ' 0,$'
0B34    494E 5641 4C49            MSIDNG TEXT   'INVALID I.D.$'
0B37    4420 492E 442E
        2400
                                  *-----------------------------*
                                  *  ATTENTION & STATUS TEST    *
                                  *-----------------------------*
        0B3B                      STATST EQU    $
                                  *
                                  *EDO  B     <RSTORE   IF NOT FIRST PASS ON THIS SPNDLE
                                  *
0B3B    D3C0 FCEB                        LNJ    $B5,SETEST
0B3D    F844 0000                        LDR    $R7,$B4.PORTNO      PUT PORT-NUMBER
0B3F    FA80 0B32                        SRM    $R7,<SPINO,=X'0003' IN PRINTOUT
0B41    0003
0B42    9B80 0B2D                        LAB    $B1,<MSUPWR         POWER-UP DRIVE
0B44    D380 043B                        LNJ    $B5,<ZVTC
0B46    D3C0 F8A6                        LNJ    $B5,OPWAIT          SOLICIT, THEN WAIT FOR OPERATOR RESPONSE
0B48    A800 025F                        LDR    $R2,<RSTUS
0B4A    A644 0010                        XOR    $R2,$B4.PORTCH
0B4C    8044 000B                 $A     IO     $B4.STATUS,=$R2     READ STATUS WORD
0B4E    0052
0B4F    07FD                             BIOF   >-$A
0B50    F3C0 FC99                        LNJ    $B7,IODELY          DELAY
0B52    D870 C000                        LDR    $R5,=Z'C000'        DEV-RDY & ATTN
0B54    D944 000B                        CMR    $R5,$B4.STATUS
0B56    0900                T            BE     >+$B
0B57    D380 05D0                        LNJ    $B5,<STSDMP
0B59    0FE2                             B      >STATST
0B5A    8044 000B                 $B     IO     $B4.STATUS,=$R2     READ STATUS WORD
0B5C    0052
0B5D    07FD                             BIOF   >-$B
0B5E    F3C0 FC8B                        LNJ    $B7,IODELY
0B60    D844 000B                 $C     LDR    $R5,$B4.STATUS
0B62    D970 8000                        CMR    $R5,=Z'8000'        NORMAL STATUS
0B64    0900 0B6A                        BE     <RSTORE
0B66    DB80 0B6A                        LAB    $B5,<RSTORE
0B68    0F80 05D0                        B      <STSDMP
                                  *   BASIC FUNCTIONAL TESTS   ********************
                                  *-----------------------------*
                                  *    RECALIBRATE              *
                                  *-----------------------------*V-
0B6A    D3C0 FCBC                 RSTORE LNJ    $B5,SETEST
0B6C    D380 03BB                        LNJ    $B5,<INITZ          INITIALIZE SUBSYSTEM
0B6E    9B80 0823                        LAB    $B1,<MSDRVE
0B70    9F80 0813                        STB    $B1,<MSORU          SET ORU MSGE
0B72    A800 0277                        LDR    $R2,<WTASK
0B74    A644 0010                        XOR    $R2,$B4.PORTCH
0B76    F3C0 F9E0                        LNJ    $B7,SIONAK
0B78    8000 0295                        IO     <RCALBT,=$R2        TASK - RECALIBRATE
0B7A    0052
0B7B    0781 F9E8                        BIOF   IONAK
0B7D    8744 0001                        CL     $B4.CYLNO
0B7F    8744 0002                        CL     $B4.TRKNO
0B81    8744 0003                        CL     $B4.SECTR
0B83    8744 0004                        CL     $B4.PLATER
0B85    8744 0005                        CL     $B4.MINCYL
0B87    8744 0006                        CL     $B4.MINTRK
0B89    8744 0008                        CL     $B4.MAXTRK
0B8B    8AC4 0008                        INC    $B4.MAXTRK
0B8D    D844 000A                        LDR    $R5,$B4.DISCID
0B8F    5D32                             CMV    $R5,=X'32'
0B90    0200                T            BL     >+$B                100-TPI
0B91    9870 0197                        LDR    $R1,=X'0197'        (407)
0B93    0F80                T            B      >+$C
0B94    9870 00CB                 $B     LDR    $R1,=X'00CB'        (203)
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002177  0B9C  9F44 0007          $C      STR     $R1,$B4.MAXCYL
002178                           *
002179  0B9E  D380 0843                  LNJ     $B5,<HOUSKP             CLEAR SUBROUTINE S/BE'S
002180  0BA0  C870 01E0                  LDR     $R4,=480
002181  0BA2  9B80 2515                  LAB     $B1,<MAST24             REINITIALIZE DIAGNOSTIC
002182  0BA4  AB80 2335                  LAB     $B2,<DRIN24             RECORD FOR COMPARES
002183  0BA6  D3C0 F8F6                  LNJ     $B5,MOVEWD              DIAG-REC-1 --> DIAG-REC-3
002184                           *-------------------------------*
002185                           *   FORMAT-WRITE ON HEAD-0      *
002186                           *-------------------------------*
002187                           * THIS IS THE FIRST ATTEMPT TO XFER DATA TO PAK.
002188  0BA8  D3C0 FC84                  LNJ     $B5,SETEST              SET TEST ADDRESS
002189  0BAA  1C17                       LDV     $R1,=X'17'              24-SECTORS
002190  0BAB  9F44 0011                  STR     $R1,$B4.SCTRMX
002191  0BAF  D380 04A2                  LNJ     $B5,<FCWD               FORM CONFG WDS
002192  0BB1  8700 1791                  CL      <WRTBFR
002193  0BB5  8700 1792                  CL      <WRTBFR+1
002194  0BB9  8700 1793                  CL      <WRTBFR+2
002195  0BBD  8700 1794                  CL      <WRTBFR+3               SET WRTBFR=00 00 00 00
002196  0BC1  D380 04CA                  LNJ     $B5,<WRTCWD             WRT CONFG WDS
002197  0BC3  4C08                       LDV     $R4,=X'08'              RANGE = 2 ID
002198  0BC4  D380 0394                  LNJ     $B5,<WIOLD
002199  0BC6  F800 0297                  LDR     $R7,<FMT
002200  0BC8  D380 03A3                  LNJ     $B5,<WRTASK             WRT 1 REC, 256-BYTE
002201  0BCA  D380 054B                  LNJ     $B5,<CKERR
002202  0BCC  D380 07F4                  LNJ     $B5,<ERRTST
002203                           *-------------------------------*
002204                           *   DIAGNOSTIC FORMAT READ      *
002205                           *-------------------------------*
002206                           *  DATA = ALL ZEROS
002207  0BCE  D3C0 FC68                  LNJ     $B5,SETEST              SET TEST ADDRESS
002208  0BD0  D380 04CA                  LNJ     $B5,<WRTCWD             WRT CNFG WDS
002209  0BD2  C870 0133                  LDR     $R4,=X'0133'            RNGE 1-SECTOR
002210  0BD4  D380 037B                  LNJ     $B5,<RIOLD
002211  0BD6  F800 02A5                  LDR     $R7,<FDIAG
002212  0BD8  D380 03A3                  LNJ     $B5,<WRTASK             TASK - FMT DIAGNOSTIC READ
002213  0BDA  D380 054B                  LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002214  0BDC  9B80 2515                  LAB     $B1,<MAST24
002215  0BDE  D380 0788                  LNJ     $B5,<CMPARE
002216  0BE0  D380 07F4                  LNJ     $B5,<ERRTST
002217
002218                           *-------------------------------*
002219                           *   FORMAT READ ID 1-REC        *
002220                           *-------------------------------*
002220  0BE2  D3C0 FC54                  LNJ     $B5,SETEST              SET TEST ADDRESS
002221  0BE4  D380 04CA                  LNJ     $B5,<WRTCWD
002222  0BE6  4C04                       LDV     $R4,=X'04'              RNGE
002223  0BE7  D380 037B                  LNJ     $B5,<RIOLD
002224  0BE9  F800 02A1                  LDR     $R7,<RDID
002225  0BEB  D380 03A3                  LNJ     $B5,<WRTASK             TASK - RD ID
002226  0BED  D380 054B                  LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002227  0BEF  4C04                       LDV     $R4,=X'04'              RNGE
002228  0BF0  9B80 02AA                  LAB     $B1,<ZEROS              ZEROS
002229  0BF2  D380 0788                  LNJ     $B5,<CMPARE
002230  0BF4  D380 07F4                  LNJ     $B5,<ERRTST
002231                           *-------------------------------*
002232                           *   FORMAT-READ 1-ID+DATA       *
002233                           *-------------------------------*V-
002234  0BF6  D3C0 FC40                  LNJ     $B5,SETEST              SET TEST ADDRESS
002235  0BF8  D380 04CA                  LNJ     $B5,<WRTCWD             WRT CNFG WDS
002236  0BFA  C870 0104                  LDR     $R4,=X'0104'            RANGE
002237  0BFC  D380 037B                  LNJ     $B5,<RIOLD
002238  0BFE  F800 0297                  LDR     $R7,<FMT
002239  0C00  D380 03A3                  LNJ     $B5,<WRTASK             FORMAT-READ 1 ID+DATA
002240  0C02  D380 054B                  LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002241  0C04  9B80 02AA                  LAB     $B1,<ZEROS              ZEROS
002242  0C06  D380 0788                  LNJ     $B5,<CMPARE
002243  0C08  D380 07F4                  LNJ     $B5,<ERRTST
002244                           *-------------------------------*
002245                           *  DIAGNOSTIC FORMAT WRITE      *
002246                           *  CREATE CHECK-BYTE ERROR      *
002247                           *-------------------------------*V-
002248  0C0A  D3C0 FC2C                  LNJ     $B5,SETEST              SET TEST ADDRESS
002249  0C0C  D380 04CA                  LNJ     $B5,<WRTCWD             WRT-CNFG-WDS
002250  0C0E  8700 1791                  CL      <WRTBFR
002251  0C10  F870 FFFF                  LDR     $R7,=Z'FFFF'
002252  0C12  FF00 1792                  STR     $R7,<WRTBFR+1
002253  0C14  FF00 2337                  STR     $R7,<DRIN24+2           SB FIELD
002254  0C16  4C04                       LDV     $R4,=X'04'              RANGE
002255  0C17  D380 0394                  LNJ     $B5,<WIOLD
002256  0C19  F800 02A5                  LDR     $R7,<FDIAG
002257  0C1B  D380 03A3                  LNJ     $B5,<WRTASK             DIAG-WRT  SCTR-0
002258  0C1D  D380 054B                  LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002259  0C1F  D380 07F4                  LNJ     $B5,<ERRTST
002260                           *-------------------------------*
002261                           *   DIAG-RD  VERIFY ERROR IS    *
002262                           *   WRITTEN ON DISC             *
002263                           *-------------------------------*V-
002264  0C21  D3C0 FC15                  LNJ     $B5,SETEST              SET TEST ADDRESS
002265  0C23  D380 04CA                  LNJ     $B5,<WRTCWD             WRT CNFG WDS
002266  0C25  4C0A                       LDV     $R4,=X'0A'              RANGE
002267  0C26  D380 037B                  LNJ     $B5,<RIOLD
002268  0C28  F800 02A5                  LDR     $R7,<FDIAG
002269  0C2A  D380 03A3                  LNJ     $B5,<WRTASK             DIAG-FMT-RD
002270  0C2C  D380 054B                  LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002271  0C2E  9B80 2335                  LAB     $B1,<DRIN24
002272  0C30  D380 0788                  LNJ     $B5,<CMPARE
002273  0C32  D380 07F4                  LNJ     $B5,<ERRTST
002274                           *-------------------------------*
002275                           * FORMAT-READ LOOK FOR RD-ERR    *
002276                           *-------------------------------*V-
002277  0C34  D3C0 FC02                  LNJ     $B5,SETEST              SET TEST ADDRESS
002278  0C36  D380 04CA                  LNJ     $B5,<WRTCWD             WRT CNFG WDS
002279  0C38  C870 0104                  LDR     $R4,=X'0104'            RANGE
002280  0C3A  D380 037B                  LNJ     $B5,<RIOLD
002281  0C3C  F800 0297                  LDR     $R7,<FMT
002282  0C3E  D380 03A3                  LNJ     $B5,<WRTASK             FMT-RD   ID+DATA
002283  0C40  F870 8800                  LDR     $R7,=Z'8800'
002284  0C42  FF00 05C9                  STR     $R7,<SBSTUS             EXPECT RD-ERR
002285  0C44  D380 0585                  LNJ     $B5,<CKSTUS             CHECK STATUS FOR RD-ERR
002286  0C46  D380 07F4                  LNJ     $B5,<ERRTST
002287  0C48  F870 8000                  LDR     $R7,=Z'8000'
002288  0C4A  FF00 05C9                  STR     $R7,<SBSTUS             CLEAR EXPECTED STATUS-ERROR
002289                           *-------------------------------*
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002290                          *  FORMAT-WRI / DIAG-FMT-RD  *
002291                          *  TO CHECK THAT CHECK-BYTES *
002292                          *  ARE FORMED CORRECTLY      *
002293                          *----------------------------*V-
002294                          *  ID DATA PATTERN = 0000 FFFF FFFF
002295                          *
002296  0C3C  D3C0 FBEA               LNJ   $B5,SETEST          SET TEST ADDRESS
002297  0C3E  F870 FFFF               LDR   $R7,=Z'FFFF'
002298  0C40  FF00 2338               STR   $R7,<DRIN24+3
002299  0C42  D380 0C63               LNJ   $B5,<WCK
002300                          *
002301                          *  CHG DATA PATERN = FFFF 0000 FFFF
002302                          *
002303  0C44  D3C0 FBE2               LNJ   $B5,SETEST
002304  0C46  8700 1792               CL    <WRTBFR+1
002305  0C48  8700 2337               CL    <DRIN24+2
002306  0C4A  F870 FFFF               LDR   $R7,=Z'FFFF'
002307  0C4C  FF00 1791               STR   $R7,<WRTBFR
002308  0C4E  FF00 2336               STR   $R7,<DRIN24+1
002309  0C50  D380 0C63               LNJ   $B5,<WCK
002310                          *
002311                          *  CHG DATA PATTERN = 8000 8000 0000
002312                          *
002313  0C52  D3C0 FBD4               LNJ   $B5,SETEST
002314  0C54  8700 2338               CL    <DRIN24+3           CK-WD=0000
002315  0C56  F870 8000               LDR   $R7,=Z'8000'
002316  0C58  FF00 1791               STR   $R7,<WRTBFR
002317  0C5A  FF00 1792               STR   $R7,<WRTBFR+1
002318  0C5C  FF00 2336               STR   $R7,<DRIN24+1
002319  0C5E  FF00 2337               STR   $R7,<DRIN24+2
002320  0C60  D380 0C63               LNJ   $B5,<WCK
002321  0C62  0F80          T        B     >+$A
002322                          *
002323  0C63  DFC0 0020       WCK     STB   $B5,WCKX+1
002324  0C65  D380 04CA               LNJ   $B5,<WRTCWD         WRT CNFG WDS
002325  0C67  4C04                    LDV   $R4,=X'04'          RANGE
002326  0C68  D380 0394               LNJ   $B5,<WIOLD
002327  0C6A  F800 0297               LDR   $R7,<FMT
002328  0C6C  D380 03A3               LNJ   $B5,<WRTASK         FMT-WRI
002329  0C6E  D380 054B               LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002330  0C70  D380 07F4               LNJ   $B5,<ERRTST
002331  0C72  D380 04CA               LNJ   $B5,<WRTCWD         WRT CNFG WDS
002332  0C74  4C08                    LDV   $R4,=X'08'          RANGE
002333  0C75  D380 037B               LNJ   $B5,<RIOLD
002334  0C77  F800 02A5               LDR   $R7,<FDIAG
002335  0C79  D380 03A3               LNJ   $B5,<WRTASK         DIAG-FMT-RD
002336  0C7B  D380 054B               LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002337  0C7D  9B80 2335               LAB   $B1,<DRIN24
002338  0C7F  D380 07B8               LNJ   $B5,<CMPARE
002339  0C81  D380 07F4               LNJ   $B5,<ERRTST
002340  0C83  0F80 0000       WCKX    B     <RETURN             EXIT
002341                          *----------------------------*
002342                          *   FORMAT-WRITE 24 SECTORS  *
002343                          *----------------------------*V-
002344  0C85  D3C0 FBA1       $A      LNJ   $B5,SETEST          SET TEST ADDRESS
002345  0C87  D380 04CA               LNJ   $B5,<WRTCWD         WRT CNFG WDS
002346  0C89  4C60                    LDV   $R4,=X'60'          RANGE
002347  0C8A  D380 0394               LNJ   $B5,<WIOLD
002348  0C8C  D380 051F               LNJ   $B5,<LDWBFR         SET UP ID IN WRT-BUFR
002349  0C8E  F800 0297               LDR   $R7,<FMT
002350  0C90  D380 03A3               LNJ   $B5,<WRTASK         FMT-WRI 24 SECTORS 256 BYTE
002351  0C92  D380 054B               LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002352  0C94  D380 07F4               LNJ   $B5,<ERRTST
002353                          *----------------------------*
002354                          *   DIAGNOSTIC-RD 20ND REC   *
002355                          *----------------------------*V-
002356  0C96  D3C0 FB90               LNJ   $B5,SETEST          SET TEST ADDRESS
002357  0C98  8A80 0393               INC   <GOFILL       INHIBIT RD-BUFR 33-FILL
002358  0C9A  D380 0464               LNJ   $B5,<RDBFIL
002359  0C9C  D380 04CA               LNJ   $B5,<WRTCWD         WRT CNFG WDS
002360  0C9E  4C04                    LDV   $R4,=X'04'          RANGE
002361  0C9F  D380 037B               LNJ   $B5,<RIOLD
002362  0CA1  F800 02A1               LDR   $R7,<RDID
002363  0CA3  D380 03A3               LNJ   $B5,<WRTASK         FMT-RD-ID SECTOR-0
002364  0CA5  C870 013B               LDR   $R4,=X'013B'        RANGE
002365  0CA7  D380 037B               LNJ   $B5,<RIOLD
002366  0CA9  F800 029F               LDR   $R7,<DIAG
002367  0CAB  D380 03A3               LNJ   $B5,<WRTASK         DIAG-RD SECTOR-1
002368  0CAD  D380 054B               LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002369  0CAF  9B80 2335               LAB   $B1,<DRIN24         SB VALUE
002370  0CB1  1C01                    LDV   $R1,=X'01'
002371  0CB2  9F00 2337               STR   $R1,<DRIN24+2       SECTOR
002372  0CB4  9F00 2338               STR   $R1,<DRIN24+3       CK-CHAR
002373  0CB6  8700 2336               CL    <DRIN24+1
002374  0CB8  D380 07B8               LNJ   $B5,<CMPARE
002375  0CBA  D380 07F4               LNJ   $B5,<ERRTST
002376  0CBC  8700 0393               CL    <GOFILL
002377                          *----------------------------*
002378                          * FORMAT-READ ID 24 SECTORS  *
002379                          *----------------------------*V-
002380  0CBE  D3C0 FB68               LNJ   $B5,SETEST          SET TEST ADDRESS
002381  0CC0  D380 04CA               LNJ   $B5,<WRTCWD         WRT CNFG WDS
002382  0CC2  4C60                    LDV   $R4,=X'60'          RANGE
002383  0CC3  D380 037B               LNJ   $B5,<RIOLD
002384  0CC5  F800 02A1               LDR   $R7,<RDID
002385  0CC7  D380 03A3               LNJ   $B5,<WRTASK         FORMAT-RD-ID 24-SECTORS
002386  0CC9  D380 054B               LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002387  0CCB  9B80 1791               LAB   $B1,<WRTBFR
002388  0CCD  D380 07B8               LNJ   $B5,<CMPARE
002389  0CCF  D380 07F4               LNJ   $B5,<ERRTST
002390                          *----------------------------*
002391                          *  DIAGNOSTIC-READ SECTOR-23 *
002392                          *----------------------------*
002393  0CD1  D3C0 FB55               LNJ   $B5,SETEST          SET TEST ADDRESS
002394  0CD3  8AC0 F6BF               INC   GOFILL        INHIBIT RD-BUFR 33-FILL
002395  0CD5  D380 0464               LNJ   $B5,<RDBFIL
002396  0CD7  D380 04CA               LNJ   $B5,<WRTCWD         WRT CNFG WDS
002397  0CD9  4C5C                    LDV   $R4,=X'5C'          RANGE
002398  0CDA  D380 037B               LNJ   $B5,<RIOLD
002399  0CDC  F800 02A1               LDR   $R7,<RDID
002400  0CDE  D380 03A3               LNJ   $B5,<WRTASK         RD-ID SECTORS 0->22
002401  0CE0  C870 0120               LDR   $R4,=X'0120'        RANGE
002402  0CE2  D380 037B               LNJ   $B5,<RIOLD
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002403  0CE4  F800 029F            LDR   $R7,<DIAG
002404  0CE6  D380 03A3            LNJ   $B5,<WRTASK          DIAG-RD SECTOR-23
002405  0CE8  D380 054B            LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002406  0CEA  9B80 2335            LAB   $B1,<DRIN24          SB VALUE
002407  0CEC  1C17                 LDV   $R1,=X'17'
002408  0CED  9F00 2337            STR   $R1,<DRIN24+2        SECTOR
002409  0CEF  9F00 2338            STR   $R1,<DRIN24+3        CK-CHAR
002410  0CF1  D380 0788            LNJ   $B5,<CMPARE
002411  0CF3  D380 07F4            LNJ   $B5,<ERRTST
002412  0CF5  8700 0393            CL    <GOFILL              SET RD-BFR 33 FILL
002413                      *----------------------------*
002414                      *  FORMAT-READ  ID & DATA    *
002415                      *  24-SECTORS                *
002416                      *     (BYPASS IF NO MEMORY)  *
002417                      *----------------------------*
002418  0CF7  D3C0 FB2F            LNJ   $B5,SETEST           SET TEST ADDRESS
002419  0CF9  8980 02C5            CMZ   <MEMSZE              CK MEMORY SIZE
002420  0CFB  0900             T   BE    >+$A
002421  0CFC  D380 04CA            LNJ   $B5,<WRTCWD          WRT CONFG-WDS
002422  0CFE  C870 1860            LDR   $R4,=X'1860'         ID&DATA-24SECTRS
002423  0D00  D380 037B            LNJ   $B5,<RIOLD
002424  0D02  F800 0297            LDR   $R7,<FMT             RD ID+DATA
002425  0D04  D380 03A3            LNJ   $B5,<WRTASK
002426  0D06  D380 054B            LNJ   $B5,<CKERR
002427  0D08  D380 07F4            LNJ   $B5,<ERRTST
002428  0D0A  0F00 0000         X  $A    NOP   <RDBUFR
002429  *****      *****SEARCH TESTS - 24 SECTORS*****
002430                      *----------------------------*
002431                      *  SEARCH + READ  SECTOR-0   *
002432                      *----------------------------*V-
002433  0D0C  D3C0 FB1A            LNJ   $B5,SETEST           SET TEST ADDRESS
002434  0D0E  D380 04A2            LNJ   $B5,<FCWD            FORM CNFG-WDS
002435  0D10  D380 04CA            LNJ   $B5,<WRTCWD          WRT CNFG WDS
002436  0D12  C870 0100            LDR   $R4,=X'0100'         RANGE
002437  0D14  D380 037B            LNJ   $B5,<RIOLD
002438  0D16  F800 029B            LDR   $R7,<DATA
002439  0D18  D380 03A3            LNJ   $B5,<WRTASK          READ-DATA SECTOR-0
002440  0D1A  1C01                 LDV   $R1,=X'01'
002441  0D1B  9F00 0761            STR   $R1,<CWBF            SET END-SCTR
002442  0D1D  D380 054B            LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002443  0D1F  9B80 02AA            LAB   $B1,<ZEROS           ZEROS
002444  0D21  D380 0788            LNJ   $B5,<CMPARE
002445  0D23  D380 07F4            LNJ   $B5,<ERRTST
002446                      *----------------------------*
002447                      *  SEARCH + WRITE  SECTOR-0  *
002448                      *----------------------------*V-
002449  0D25  D3C0 FB01            LNJ   $B5,SETEST           SET TEST ADDRESS
002450  0D27  D380 04CA            LNJ   $B5,<WRTCWD          WRT CNFG WDS
002451  0D29  C870 0108            LDR   $R4,=X'0108'         RANGE
002452  0D2B  F800 02A8            LDR   $R7,<ONES
002453  0D2D  D380 0459            LNJ   $B5,<WRTFIL
002454  0D2F  C870 0100            LDR   $R4,=X'0100'         RANGE
002455  0D31  D380 0394            LNJ   $B5,<WIOLD
002456  0D33  F800 029B            LDR   $R7,<DATA
002457  0D35  D380 03A3            LNJ   $B5,<WRTASK          FMT-WRT SECTOR-0
002458  0D37  D380 054B            LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002459  0D39  D380 07F4            LNJ   $B5,<ERRTST
002460                      *----------------------------*
002461                      *  FORMAT-READ  SECTOR 0 + 1 *
002462                      *----------------------------*V-
002463  0D3B  D3C0 FAEB            LNJ   $B5,SETEST           SET TEST ADDRESS
002464  0D3D  D380 04CA            LNJ   $B5,<WRTCWD          WRT CNFG WDS
002465  0D3F  C870 0108            LDR   $R4,=X'0108'         RANGE
002466  0D41  D380 037B            LNJ   $B5,<RIOLD
002467  0D43  F800 0297            LDR   $R7,<FMT             FMT-RD  ID + DATA
002468  0D45  D380 03A3            LNJ   $B5,<WRTASK          SECTR-0 + SECTR-1-ID
002469  0D47  8700 0761            CL    <CWBF
002470  0D49  D380 054B            LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002471  0D4B  8700 1791            CL    <WRTBFR
002472  0D4D  8700 1792            CL    <WRTBFR+1
002473  0D4F  8700 1813            CL    <WRTBFR+130
002474  0D51  1C01                 LDV   $R1,=X'01'
002475  0D52  9F00 1814            STR   $R1,<WRTBFR+131
002476  0D54  9B80 1791            LAB   $B1,<WRTBFR
002477  0D56  D380 0788            LNJ   $B5,<CMPARE
002478  0D58  D380 07F4            LNJ   $B5,<ERRTST
002479                      *----------------------------*
002480                      *  SEARCH+WRITE  SECTOR-1    *
002481                      *----------------------------*V-
002482  0D5A  D3C0 FACC            LNJ   $B5,SETEST           SET TEST ADDRESS
002483  0D5C  1C01                 LDV   $R1,=X'01'
002484  0D5D  9F44 0003            STR   $R1,$B4.SECTR
002485  0D5F  8AD1                 INC   =$R1
002486  0D60  9F00 0761            STR   $R1,<CWBF
002487  0D62  D380 04A2            LNJ   $B5,<FCWD            FORM CNFG WDS
002488  0D64  D380 04CA            LNJ   $B5,<WRTCWD          WRT CNFG WDS
002489  0D66  C870 0100            LDR   $R4,=X'0100'         RANGE
002490  0D68  F870 7101            LDR   $R7,=Z'7101'
002491  0D6A  D380 0459            LNJ   $B5,<WRTFIL          LOAD WRTBFR
002492  0D6C  D380 0394            LNJ   $B5,<WIOLD
002493  0D6E  F800 029B            LDR   $R7,<DATA
002494  0D70  D380 03A3            LNJ   $B5,<WRTASK          SCH-WRT  SECTOR-1
002495  0D72  D380 054B            LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002496  0D74  D380 07F4            LNJ   $B5,<ERRTST
002497                      *----------------------------*
002498                      *  SEARCH + READ  SECTOR-1   *
002499                      *----------------------------*V-
002500  0D76  D3C0 FAB0            LNJ   $B5,SETEST           SET TEST ADDRESS
002501  0D78  D380 04CA            LNJ   $B5,<WRTCWD          WRT CNFG WDS
002502  0D7A  C870 0100            LDR   $R4,=X'0100'         RANGE
002503  0D7C  D380 037B            LNJ   $B5,<RIOLD
002504  0D7E  F800 029B            LDR   $R7,<DATA
002505  0D80  D380 03A3            LNJ   $B5,<WRTASK          SCH-RD SECTOR-1
002506  0D82  D380 054B            LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002507  0D84  9B80 1791            LAB   $B1,<WRTBFR
002508  0D86  D380 0788            LNJ   $B5,<CMPARE
002509  0D88  D380 07F4            LNJ   $B5,<ERRTST
002510                      *----------------------------*
002511                      *  SEARCH+WRITE   SECTOR-17  *
002512                      *----------------------------*V-
002513  0D8A  D3C0 FA9C            LNJ   $B5,SETEST           SET TEST ADDRESS
002514  0D8C  1C17                 LDV   $R1,=X'17'
002515  0D8D  9F44 0003            STR   $R1,$B4.SECTR
```

```
002516  0D8F  8AD1                    INC     =$R1
002517  0D90  9F00 0761               STR     $R1,<CWBF
002518  0D92  D380 04A2               LNJ     $B5,<FCWD           FORM CNFG WDS
002519  0D94  D380 04CA               LNJ     $B5,<WRTCWD         WRT CNFG WDS
002520  0D96  F870 AA55               LDR     $R7,=Z'AA55'
002521  0D98  C870 0100               LDR     $R4,=X'0100'        RANGE
002522  0D9A  D380 0459               LNJ     $B5,<WRTFIL         LOAD WRTBFR
002523  0D9C  D380 0394               LNJ     $B5,<WIOLD
002524  0D9E  F800 029B               LDR     $R7,<DATA
002525  0DA0  D380 03A3               LNJ     $B5,<WRTASK         SCH+WRT SCTR-17
002526  0DA2  D380 054B               LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002527  0DA4  D380 07F4               LNJ     $B5,<ERRTST
002528                        *-----------------------------*
002529                        *  SEARCH+READ  SECTORS 16+17*
002530                        *-----------------------------*V-
002531  0DA6  D3C0 FA80               LNJ     $B5,SETEST          SET TEST ADDRESS
002532  0DA8  1C16                    LDV     $R1,=X'16'
002533  0DA9  9F44 0003               STR     $R1,$B4.SECTR
002534  0DAB  D380 04A2               LNJ     $B5,<FCWD           FORM CNFG WDS
002535  0DAD  D380 04CA               LNJ     $B5,<WRTCWD         WRT CNFG WDS
002536  0DAF  C870 0200               LDR     $R4,=X'0200'        RANGE
002537  0DB1  D380 037B               LNJ     $B5,<RIOLD
002538  0DB3  F800 029B               LDR     $R7,<DATA
002539  0DB5  D380 03A3               LNJ     $B5,<WRTASK         DATA-RD SECTORS 16+17 HEX
002540  0DB7  D380 054B               LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002541  0DB9  C870 0100               LDR     $R4,=X'0100'
002542  0DBB  CF44 000E               STR     $R4,$B4.RANGE
002543  0DBD  9B80 02AA               LAB     $B1,<ZEROS          ZEROS
002544  0DBF  D380 0788               LNJ     $B5,<CMPARE         SCTR-16 = ZEROS
002545  0DC1  9B80 1791               LAB     $B1,<WRTBFR
002546  0DC3  AB80 0000          X    LAB     $B2,<RDBUFR
002547  0DC5  ABC2 0080               LAB     $B2,$B2,128         SECTR-17
002548  0DC7  9870 0080               LDR     $R1,=X'0080'
002549  0DC9  D380 0784               LNJ     $B5,<CMPARA
002550  0DCB  D380 07F4               LNJ     $B5,<ERRTST
002551                        *-----------------------------*
002552                        *  SEARCH+WRITE  ZERO-FILL    *
002553                        *-----------------------------*V-
002554  0DCD  D3C0 FA59               LNJ     $B5,SETEST          SET TEST ADDRESS
002555  0DCF  1C04                    LDV     $R1,=X'04'
002556  0DD0  9F44 0003               STR     $R1,$B4.SECTR
002557  0DD2  8AD1                    INC     =$R1
002558  0DD3  9F00 0761               STR     $R1,<CWBF
002559  0DD5  D380 04A2               LNJ     $B5,<FCWD           FORM CNFG WDS
002560  0DD7  D380 04CA               LNJ     $B5,<WRTCWD         WRT CNFG WDS
002561  0DD9  C870 0100               LDR     $R4,=X'0100'
002562  0DDB  F870 9999               LDR     $R7,=Z'9999'
002563  0DDD  D380 0459               LNJ     $B5,<WRTFIL
002564  0DDF  4C50                    LDV     $R4,=X'50'          RANGE
002565  0DE0  D380 0394               LNJ     $B5,<WIOLD
002566  0DE2  F800 029B               LDR     $R7,<DATA
002567  0DE4  D380 03A3               LNJ     $B5,<WRTASK         SCH+WRT W-ZEROFILL
002568  0DE6  D380 054B               LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002569  0DE8  D380 07F4               LNJ     $B5,<ERRTST
002570                        *-----------------------------*
002571                        *       SEARCH + READ         *
002572                        *-----------------------------*V-
002573  0DEA  D3C0 FA3C               LNJ     $B5,SETEST          SET TEST ADDRESS
002574  0DEC  D380 04CA               LNJ     $B5,<WRTCWD         WRT CNFG WDS
002575  0DEE  C870 0100               LDR     $R4,=X'0100'        RANGE
002576  0DF0  D380 037B               LNJ     $B5,<RIOLD
002577  0DF2  F800 029B               LDR     $R7,<DATA
002578  0DF4  D380 03A3               LNJ     $B5,<WRTASK         READ-DATA
002579  0DF6  D380 054B               LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002580  0DF8  9B80 17B9               LAB     $B1,<WRTBFR+40
002581  0DFA  8757                    CL      =$R7
002582  0DFB  C870 00B0               LDR     $R4,=X'00B0'
002583  0DFD  D380 0471               LNJ     $B5,<FILLIT
002584  0DFF  9BC0 0991               LAB     $B1,WRTBFR
002585  0E01  D380 0788               LNJ     $B5,<CMPARE
002586  0E03  D380 07F4               LNJ     $B5,<ERRTST
002587                        *-----------------------------*
002588                        *   SEARCH & WRITE  2-SECTORS*
002589                        *   (SECTORS 2 + 3)           *
002590                        *-----------------------------*V-
002591  0E05  D3C0 FA21               LNJ     $B5,SETEST          SET TEST ADDRESS
002592  0E07  1C02                    LDV     $R1,=X'02'
002593  0E08  9F44 0003               STR     $R1,$B4.SECTR
002594  0E0A  1E02                    ADV     $R1,=X'02'
002595  0E0B  9F00 0761               STR     $R1,<CWBF
002596  0E0D  D380 04A2               LNJ     $B5,<FCWD           FORM CNFG WDS
002597  0E0F  D380 04CA               LNJ     $B5,<WRTCWD         WRT CNFG WDS
002598  0E11  C870 0200               LDR     $R4,=X'0200'        RANGE
002599  0E13  9B80 1791               LAB     $B1,<WRTBFR
002600  0E15  F870 0102               LDR     $R7,=X'0102'
002601  0E17  D380 047F               LNJ     $B5,<INCBFR
002602  0E19  D380 0394               LNJ     $B5,<WIOLD
002603  0E1B  F800 029B               LDR     $R7,<DATA
002604  0E1D  D380 03A3               LNJ     $B5,<WRTASK         SCH+WRT SECTORS 2+3
002605  0E1F  D380 054B               LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002606  0E21  D380 07F4               LNJ     $B5,<ERRTST
002607                        *-----------------------------*
002608                        *  SEARCH&READ  3-SECTORS     *
002609                        *  (SECTORS 2, 3, 4 )         *
002610                        *-----------------------------*V-
002611  0E23  D3C0 FA03               LNJ     $B5,SETEST          SET TEST ADDRESS
002612  0E25  D380 04CA               LNJ     $B5,<WRTCWD         WRT CNFG WDS
002613  0E27  9844 0003               LDR     $R1,$B4.SECTR
002614  0E29  1E03                    ADV     $R1,=X'03'
002615  0E2A  9F00 0761               STR     $R1,<CWBF
002616  0E2C  C870 0080               LDR     $R4,=X'0080'
002617  0E2E  9B80 0000          X    LAB     $B1,<RDBUFR
002618  0E30  AB80 1891               LAB     $B2,<WRTBFR+256
002619  0E32  D380 0497               LNJ     $B5,<MOVEWD
002620  0E34  C870 0300               LDR     $R4,=X'0300'        RANGE
002621  0E36  D380 037B               LNJ     $B5,<RIOLD
002622  0E38  F800 029B               LDR     $R7,<DATA
002623  0E3A  D380 03A3               LNJ     $B5,<WRTASK         S+R SECTORS 2,3,4
002624  0E3C  D380 054B               LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002625  0E3E  9B80 1791               LAB     $B1,<WRTBFR
002626  0E40  D380 0788               LNJ     $B5,<CMPARE
002627  0E42  D380 07F4               LNJ     $B5,<ERRTST
002628                        ***   *****  HEAD TESTS  *****
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002629                          *      HEADS ARE NUMBERED "0" AND "1" FOR THE REMOVABLE MEDIA
002630                          * AND "2" AND "3" FOR THE FIXED MEDIA.
002631                          * ALL TESTS TO THIS POINT WERE ON HEAD-0.
002632                          *
002633  0E44  D3C0 F6CF                LNJ     $B5,LDPARM
002634                          *---------------------------*
002635                          *    HEAD-1  FORMAT-WRITE   *
002636                          *---------------------------*V-
002637  0E46  D3C0 F9E0                LNJ     $B5,SETEST              SET TEST ADDRESS
002638  0E48  1C01                     LDV     $R1,=X'01'
002639  0E49  9F44 0002                STR     $R1,$B4.TRKNO           TRK=1
002640  0E4B  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
002641  0E4D  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
002642  0E4F  8700 1791                CL      <WRTBFR
002643  0E51  F844 000D                LDR     $R7,$B4.WCWB
002644  0E53  FF00 0761                STR     $R7,<CWBF
002645  0E55  FF00 1792                STR     $R7,<WRTBFR+1
002646  0E57  4C04                     LDV     $R4,=X'04'              RANGE
002647  0E58  D380 0394                LNJ     $B5,<WIOLD
002648  0E5A  F800 0297                LDR     $R7,<FMT
002649  0E5C  D380 03A3                LNJ     $B5,<WRTASK             FMT-WRT
002650  0E5E  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002651  0E60  D380 07F4                LNJ     $B5,<ERRTST
002652                          *---------------------------*
002653                          *    HEAD-1  FORMAT-READ    *
002654                          *---------------------------*V-
002655  0E62  D3C0 F9C4                LNJ     $B5,SETEST              SET TEST ADDRESS
002656  0E64  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
002657  0E66  C870 0104                LDR     $R4,=X'0104'            RANGE
002658  0E68  D380 037B                LNJ     $B5,<RIOLD
002659  0E6A  F800 0297                LDR     $R7,<FMT
002660  0E6C  D380 03A3                LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002661  0E6E  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002662  0E70  1C04                     LDV     $R1,=X'04'
002663  0E71  9F44 000E                STR     $R1,$B4.RANGE
002664  0E73  9B80 1791                LAB     $B1,<WRTBFR
002665  0E75  D380 0788                LNJ     $B5,<CMPARE
002666  0E77  D380 07F4                LNJ     $B5,<ERRTST
002667                          *
002668                          *  CHECK IF FIXED-DISC AVAILABLE
002669                          *
002670  0E79  F844 000A                LDR     $R7,$B4.DISCID
002671  0E7B  7B01 0079                BEVN    $R7,TRKVRY
002672  0E7D  9B80 0E88                LAB     $B1,<MSFXWT
002673  0E7F  D3C0 F5BB                LNJ     $B5,ZVTC                OUTPUT QUES?
002674  0E81  D3C0 F551                LNJ     $B5,YORN                WAIT FOR THE OPERATOR TO "Y" OR "OTHER"
002675  0E83  0900                     BE      >+$P                                                          T
002676  0E84  88C4 000A                DEC     $B4.DISCID
002677  0E86  0F81 006E                B       TRKVRY
002678  0E88  4F4B 2054 4F20  MSFXWT   TEXT    'OK TO USE FIXED$'
        0E8B  5553 4520 4649
              5845 4424
002679  0E90  8AC4 0004        $P      INC     $B4.PLATER
002680                          *---------------------------*
002681                          *    HEAD-2  FORMAT-WRITE   *
002682                          *---------------------------*V-
002683  0E92  D3C0 F994                LNJ     $B5,SETEST              SET TEST ADDRESS
002684  0E94  8744 0002                CL      $B4.TRKNO               TRK=0
002685  0E96  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
002686  0E98  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
002687  0E9A  8740 08F6                CL      WRTBFR
002688  0E9C  8CC4 000C                LDI     $B4.WCWA
002689  0E9E  8D40 F8C1                SDI     CWAF                    SET SB CNFG-WDS
002690  0EA0  FF00 1792                STR     $R7,<WRTBFR+1
002691  0EA2  4C04                     LDV     $R4,=X'04'              RANGE
002692  0EA3  D380 0394                LNJ     $B5,<WIOLD
002693  0EA5  F800 0299                LDR     $R7,<FMTSEK
002694  0EA7  D380 03A3                LNJ     $B5,<WRTASK             FMT-WRT
002695  0EA9  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002696  0EAB  D380 07F4                LNJ     $B5,<ERRTST
002697                          *---------------------------*
002698                          *    HEAD-2  FORMAT-READ    *
002699                          *---------------------------*V-
002700  0EAD  D3C0 F979                LNJ     $B5,SETEST              SET TEST ADDRESS
002701  0EAF  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
002702  0EB1  C870 0104                LDR     $R4,=X'0104'            RANGE
002703  0EB3  D380 037B                LNJ     $B5,<RIOLD
002704  0EB5  F800 0297                LDR     $R7,<FMT
002705  0EB7  D380 03A3                LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002706  0EB9  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002707  0EBB  1C04                     LDV     $R1,=X'04'
002708  0EBC  9F44 000E                STR     $R1,$B4.RANGE
002709  0EBE  9B80 1791                LAB     $B1,<WRTBFR
002710  0EC0  D380 0788                LNJ     $B5,<CMPARE
002711  0EC2  D380 07F4                LNJ     $B5,<ERRTST
002712                          *---------------------------*
002713                          *    HEAD-3  FORMAT-WRITE   *
002714                          *---------------------------*V-
002715  0EC4  D3C0 F962                LNJ     $B5,SETEST              SET TEST ADDRESS
002716  0EC6  1C01                     LDV     $R1,=X'01'
002717  0EC7  9F44 0002                STR     $R1,$B4.TRKNO           TRK=1
002718  0EC9  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
002719  0ECB  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
002720  0ECD  F844 000D                LDR     $R7,$B4.WCWB
002721  0ECF  FF40 F891                STR     $R7,CWBF
002722  0ED1  FF40 08C0                STR     $R7,WRTBFR+1
002723  0ED3  4C04                     LDV     $R4,=X'04'              RANGE
002724  0ED4  D380 0394                LNJ     $B5,<WIOLD
002725  0ED6  F800 0297                LDR     $R7,<FMT
002726  0ED8  D380 03A3                LNJ     $B5,<WRTASK             FMT-WRT
002727  0EDA  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002728  0EDC  D380 07F4                LNJ     $B5,<ERRTST
002729                          *---------------------------*
002730                          *    HEAD-3  FORMAT-READ    *
002731                          *---------------------------*V-
002732  0EDE  D3C0 F948                LNJ     $B5,SETEST              SET TEST ADDRESS
002733  0EE0  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
002734  0EE2  C870 0104                LDR     $R4,=X'0104'            RANGE
002735  0EE4  D380 037B                LNJ     $B5,<RIOLD
002736  0EE6  F800 0297                LDR     $R7,<FMT
002737  0EE8  D380 03A3                LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002738  0EEA  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002739  0EEC  1C04                     LDV     $R1,=X'04'
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```
002740  0EED  9F44 000E          STR     $R1,$B4.RANGE
002741  0EEF  9B80 1791          LAB     $B1,<WRTBFR
002742  0EF1  D380 0788          LNJ     $B5,<CMPARE
002743  0EF3  D380 07F4          LNJ     $B5,<ERRTST
002744                      *
002745  0EF5  8744 0004  TRKVRY CL      $B4.PLATER
002746  0EF7  8744 0002          CL      $B4.TRKNO
002747                      *----------------------------*
002748                      *     HEAD-0  FORMAT-READ    *
002749                      *----------------------------*V-
002750  0EF9  D3C0 F92D          LNJ     $B5,SETEST              SET TEST ADDRESS
002751  0EFB  D380 04A2          LNJ     $B5,<FCWD               FORM CNFG WDS
002752  0EFD  D380 04CA          LNJ     $B5,<WRTCWD             WRT CNFG WDS.
002753  0EFF  8CC4 000C          LDI     $B4.WCWA
002754  0F01  8D00 0760          SDI     <CWAF
002755  0F03  C870 0104          LDR     $R4,=X'0104'            RANGE
002756  0F05  D380 037B          LNJ     $B5,<RIOLD
002757  0F07  F800 0299          LDR     $R7,<FMTSEK
002758  0F09  D380 03A3          LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002759  0F0B  D380 054B          LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002760  0F0D  4C04               LDV     $R4,=X'04'
002761  0F0E  CF44 000E          STR     $R4,$B4.RANGE
002762  0F10  8740 0880          CL      WRTBFR
002763  0F12  8740 087F          CL      WRTBFR+1
002764  0F14  9B80 1791          LAB     $B1,<WRTBFR
002765  0F16  D380 0788          LNJ     $B5,<CMPARE
002766  0F18  D380 07F4          LNJ     $B5,<ERRTST
002767                      *----------------------------*
002768                      *     HEAD-1  FORMAT-READ    *
002769                      *----------------------------*V-
002770  0F1A  8AC4 0002          INC     $B4.TRKNO
002771  0F1C  D3C0 F90A          LNJ     $B5,SETEST              SET TEST ADDRESS
002772  0F1E  D380 04A2          LNJ     $B5,<FCWD               FORM CNFG WDS
002773  0F20  D380 04CA          LNJ     $B5,<WRTCWD             WRT CNFG WDS
002774  0F22  F844 000D          LDR     $R7,$B4.WCWB
002775  0F24  FF40 086D          STR     $R7,WRTBFR+1
002776  0F26  FF40 F83A          STR     $R7,CWBF
002777  0F28  C870 0104          LDR     $R4,=X'0104'            RANGE
002778  0F2A  D380 037B          LNJ     $B5,<RIOLD
002779  0F2C  F800 0297          LDR     $R7,<FMT
002780  0F2E  D380 03A3          LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002781  0F30  D380 054B          LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002782  0F32  1C04               LDV     $R1,=X'04'
002783  0F33  9F44 000E          STR     $R1,$B4.RANGE
002784  0F35  9B80 1791          LAB     $B1,<WRTBFR
002785  0F37  D380 0788          LNJ     $B5,<CMPARE
002786  0F39  D380 07F4          LNJ     $B5,<ERRTST
002787                      *   CHECK IF FIXED-DISC AVAILABLE
002788  0F3B  F844 000A          LDR     $R7,$B4.DISCID
002789  0F3D  7B01 0083          BEVN    $R7,WRTPRT              FIXED-DISC?
002790  0F3F  8AC4 0004          INC     $B4.PLATER
002791                      *----------------------------*
002792                      *     HEAD-2  FORMAT-READ    *
002793                      *----------------------------*V-
002794  0F41  D3C0 F8E5          LNJ     $B5,SETEST              SET TEST ADDRESS
002795  0F43  8744 0002          CL      $B4.TRKNO
002796  0F45  D380 04A2          LNJ     $B5,<FCWD               FORM CNFG WDS
002797  0F47  D380 04CA          LNJ     $B5,<WRTCWD             WRT CNFG WDS
002798  0F49  8CC4 000C          LDI     $B4.WCWA
002799  0F4B  8D00 0760          SDI     <CWAF
002800  0F4D  FF40 0844          STR     $R7,WRTBFR+1
002801  0F4F  C870 0104          LDR     $R4,=X'0104'            RANGE
002802  0F51  D380 037B          LNJ     $B5,<RIOLD
002803  0F53  F800 0299          LDR     $R7,<FMTSEK
002804  0F55  D380 03A3          LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002805  0F57  D380 054B          LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002806  0F59  1C04               LDV     $R1,=X'04'
002807  0F5A  9F44 000E          STR     $R1,$B4.RANGE
002808  0F5C  9B80 1791          LAB     $B1,<WRTBFR
002809  0F5E  D380 0788          LNJ     $B5,<CMPARE
002810  0F60  D380 07F4          LNJ     $B5,<ERRTST
002811                      *----------------------------*
002812                      *     HEAD-3  FORMAT-READ    *
002813                      *----------------------------*V-
002814  0F62  8AC4 0002          INC     $B4.TRKNO
002815  0F64  D3C0 F8C2          LNJ     $B5,SETEST              SET TEST ADDRESS
002816  0F66  D380 04A2          LNJ     $B5,<FCWD               FORM CNFG WDS
002817  0F68  D380 04CA          LNJ     $B5,<WRTCWD             WRT CNFG WDS
002818  0F6A  F844 000D          LDR     $R7,$B4.WCWB
002819  0F6C  FF40 F7F4          STR     $R7,CWBF
002820  0F6E  FF40 0823          STR     $R7,WRTBFR+1
002821  0F70  C870 0104          LDR     $R4,=X'0104'            RANGE
002822  0F72  D380 037B          LNJ     $B5,<RIOLD
002823  0F74  F800 0297          LDR     $R7,<FMT
002824  0F76  D380 03A3          LNJ     $B5,<WRTASK             FMT-RD SECTOR-0
002825  0F78  D380 054B          LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002826  0F7A  1C04               LDV     $R1,=X'04'
002827  0F7B  9F44 000E          STR     $R1,$B4.RANGE
002828  0F7D  9B80 1791          LAB     $B1,<WRTBFR
002829  0F7F  D380 0788          LNJ     $B5,<CMPARE
002830  0F81  D380 07F4          LNJ     $B5,<ERRTST
002831                      *
002832                      * BYPASS SWITCH TESTS IF NOT FIRST PASS ON SAME SPINDLE
002833                      *
002834                      *----------------------------*
002835                      *   WRITE-PROTECT TEST       *
002836                      *     (FIXED MEDIA)          *
002837                      *----------------------------*V-
002838  0F83  D3C0 F8A3          LNJ     $B5,SETEST              SET TEST ADDRESS
002839  0F85  9B80 1015          LAB     $B1,<MSPRTF             FIXED-DISC
002840  0F87  D380 043B          LNJ     $B5,<ZVTC
002841  0F89  9B80 1007          LAB     $B1,<MSPROT
002842  0F8B  D380 043B          LNJ     $B5,<ZVTC
002843  0F8D  D3C0 F45F          LNJ     $B5,OPWAIT              SOLICIT, THEN WAIT FOR OPERATOR RESPONSE
002844  0F8F  D380 04A2          LNJ     $B5,<FCWD               FORM CNFG WDS
002845  0F91  D380 04CA          LNJ     $B5,<WRTCWD             WRT CNFG WDS
002846  0F93  4C08               LDV     $R4,=X'08'              RANGE
002847  0F94  CF40 F767          STR     $R4,RNGLFT              SET END-OF-RANGE
002848  0F96  D380 0394          LNJ     $B5,<WIOLD
002849  0F98  F800 0297          LDR     $R7,<FMT
002850  0F9A  D380 03A3          LNJ     $B5,<WRTASK             FMT-WRT
002851  0F9C  F870 9000          LDR     $R7,=Z'9000'
002852  0F9E  FF00 05C9          STR     $R7,<SBSTUS             EXPECT PROTECT-BIT
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002853  0FA0  D380 0585          LNJ   $B5,<CKSTUS
002854  0FA2  D380 06DF          LNJ   $B5,<CKRNGE
002855  0FA4  D380 07F4          LNJ   $B5,<ERRTST
002856                  *
002857  0FA6  9B80 100E          LAB   $B1,<MSPMIT          PERMIT
002858  0FA8  D380 043B          LNJ   $B5,<ZVTC
002859  0FAA  D3C0 F442          LNJ   $B5,OPWAIT           SOLICIT, THEN WAIT FOR OPERATOR RESPONSE
002860  0FAC  F870 8000          LDR   $R7,=Z'8000'
002861  0FAE  FF00 05C9          STR   $R7,<SBSTUS          CLEAR PROTECT-BIT
002862  0FB0  8740 F74B          CL    RNGLFT               CLEAR EXPECTED RANGE
002863                  *   CHECK IF BACK IN PERMIT
002864                  *
002865  0FB2  D3C0 F874          LNJ   $B5,SETEST
002866  0FB4  D380 04CA          LNJ   $B5,<WRTCWD          WRT CNFG WDS
002867  0FB6  4C08               LDV   $R4,=X'08'           RANGE
002868  0FB7  D380 0394          LNJ   $B5,<WIOLD
002869  0FB9  F800 0297          LDR   $R7,<FMT
002870  0FBB  D380 03A3          LNJ   $B5,<WRTASK          FMT-WRT
002871  0FBD  D380 054B          LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002872  0FBF  D380 07F4          LNJ   $B5,<ERRTST
002873                  *
002874  0FC1                     WRTPRT EQU  $
002875  0FC1  8744 0004          CL    $B4,PLATER
002876  0FC3  8744 0002          CL    $B4,TRKNO
002877                  *----------------------------*
002878                  *   WRITE-PROTECT TEST       *
002879                  *   (REMOVEABLE MEDIA)       *
002880                  *----------------------------*V-
002881  0FC5  D3C0 F861          LNJ   $B5,SETEST           SET TEST ADDRESS
002882  0FC7  9B80 1004          LAB   $B1,<MSPRTC          REMOVEABLE-CART
002883  0FC9  D380 043B          LNJ   $B5,<ZVTC            PUT IN PROTECT
002884  0FCB  D3C0 F421          LNJ   $B5,OPWAIT           SOLICIT, THEN WAIT FOR OPERATOR RESPONSE
002885  0FCD  D380 04A2          LNJ   $B5,<FCWD            FORM CNFG WDS
002886  0FCF  D380 04CA          LNJ   $B5,<WRTCWD          WRT CNFG WDS
002887  0FD1  8CC4 000C          LDI   $B4,WCWA
002888  0FD3  8D00 0760          SDI   <CWAF
002889  0FD5  4C08               LDV   $R4,=X'08'           RANGE
002890  0FD6  CF40 F725          STR   $R4,RNGLFT
002891  0FD8  D380 0394          LNJ   $B5,<WIOLD
002892  0FDA  F800 0299          LDR   $R7,<FMTSEK
002893  0FDC  D380 03A3          LNJ   $B5,<WRTASK          FMT-WRT
002894  0FDE  F870 9000          LDR   $R7,=Z'9000'
002895  0FE0  FF00 05C9          STR   $R7,<SBSTUS          EXPECT PROTECT-BIT
002896  0FE2  D380 0585          LNJ   $B5,<CKSTUS
002897  0FE4  D380 06DF          LNJ   $B5,<CKRNGE
002898  0FE6  D380 07F4          LNJ   $B5,<ERRTST
002899                  *
002900  0FE8  9B80 100E          LAB   $B1,<MSPMIT          PERMIT
002901  0FEA  D380 043B          LNJ   $B5,<ZVTC
002902  0FEC  D3C0 F400          LNJ   $B5,OPWAIT           SOLICIT, THEN WAIT FOR OPERATOR RESPONSE
002903  0FEE  F870 8000          LDR   $R7,=Z'8000'
002904  0FF0  FF00 05C9          STR   $R7,<SBSTUS          CLEAR PROTECT-BIT
002905  0FF2  8740 F709          CL    RNGLFT
002906                  *  CHECK BACK IN PERMIT
002907  0FF4  D3C0 F832          LNJ   $B5,SETEST
002908  0FF6  D380 04CA          LNJ   $B5,<WRTCWD          WRT CNFG WDS
002909  0FF8  4C08               LDV   $R4,=X'08'           RANGE
002910  0FF9  D380 0394          LNJ   $B5,<WIOLD
002911  0FFB  F800 0297          LDR   $R7,<FMT
002912  0FFD  D380 03A3          LNJ   $B5,<WRTASK          FMT-WRT
002913  0FFF  D380 054B          LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002914  1001  D380 07F4          LNJ   $B5,<ERRTST
002915  1003  0F95               B     >NFXPCT
002916  1004  4341 5254 0D0A     MSPRTC TEXT   'CART',Z'0D0A'
002917  1007  0753 4554 2050     MSPROT TEXT   Z'07','SET PROTECT,$'
        100A  524F 5445 4354
              2C24
002918  100E  0753 4554 2050     MSPMIT TEXT   Z'07','SET PERMIT,$'
        1011  4552 4D49 542C
              2400
002919  1015  4649 5845 4424     MSPRTF TEXT   'FIXED$'
002920                  **   ***** CHECK-BYTE ERROR TESTS *****
002921  1018  D380 0514          NFXPCT LNJ    $B5,<LDPARM
002922                  *----------------------------*
002923                  *  DIAGNOSTIC FORMAT WRITE   *
002924                  *  CREATE CHECK-BYTE ERROR   *
002925                  *----------------------------*V-
002926  101A  D3C0 F80C          LNJ   $B5,SETEST           SET TEST ADDRESS
002927  101C  D380 04A2          LNJ   $B5,<FCWD
002928  101E  D380 04CA          LNJ   $B5,<WRTCWD          WRT CNFG WDS
002929  1020  8CC4 000C          LDI   $B4,WCWA
002930  1022  8D00 0760          SDI   <CWAF
002931  1024  D380 051F          LNJ   $B5,<LDWBFR          SET UP I.D. IN WRTBFR
002932  1026  F870 FFFF          LDR   $R7,=Z'FFFF'
002933  1028  FF00 1792          STR   $R7,<WRTBFR+1
002934  102A  FF00 2337          STR   $R7,<DRIN24+2
002935  102C  4C60               LDV   $R4,=X'60'           RANGE
002936  102D  D380 0394          LNJ   $B5,<WIOLD
002937  102F  F800 02A5          LDR   $R7,<FDIAG
002938  1031  D380 03A3          LNJ   $B5,<WRTASK          DIAG-WRT  SCTR=0
002939  1033  D380 054B          LNJ   $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002940  1035  D380 07F4          LNJ   $B5,<ERRTST
002941                  *----------------------------*
002942                  * FORMAT-READ LOOK FOR RD-ERR*
002943                  *----------------------------*V-
002944  1037  D3C0 F7EF          LNJ   $B5,SETEST           SET TEST ADDRESS
002945  1039  D380 04CA          LNJ   $B5,<WRTCWD          WRT CNFG WDS
002946  103B  C870 0104          LDR   $R4,=X'0104'         RANGE
002947  103D  D380 037B          LNJ   $B5,<RIOLD
002948  103F  F800 0297          LDR   $R7,<FMT
002949  1041  D380 03A3          LNJ   $B5,<WRTASK          FMT-RD   ID+DATA
002950  1043  F870 8800          LDR   $R7,=Z'8800'
002951  1045  FF00 05C9          STR   $R7,<SBSTUS          EXPECT RD-ERR
002952  1047  D380 0585          LNJ   $B5,<CKSTUS
002953  1049  D380 07F4          LNJ   $B5,<ERRTST
002954                  *----------------------------*
002955                  *   SEARCH + READ            *
002956                  *   LOOK FOR READ-ERROR AND  *
002957                  *   UNSUCESSFUL SEARCH ERROR *
002958                  *----------------------------*V-
002959  104B  D3C0 F7DB          LNJ   $B5,SETEST           SET TEST ADDRESS
002960  104D  D380 04A2          LNJ   $B5,<FCWD            FORM CNFG WDS
002961  104F  D380 04CA          LNJ   $B5,<WRTCWD          WRT CNFG WDS
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002962  1051  4C04                    LDV     $R4,=X'04'          RANGE
002963  1052  D380 037B                LNJ     $B5,<RIOLD
002964  1054  F800 029B                LDR     $R7,<DATA
002965  1056  D380 03A3                LNJ     $B5,<WRTASK         SCH-RD SECTOR W ERR
002966  1058  F870 8900                LDR     $R7,=Z'8900'
002967  105A  FF00 05C9                STR     $R7,<SBSTUS         EXPECT RD-ERR + UNSUCESS-SCH
002968  105C  D380 0585                LNJ     $B5,<CKSTUS
002969  105E  D380 07F4                LNJ     $B5,<ERRTST
002970  1060  F870 8000                LDR     $R7,=Z'8000'
002971  1062  FF00 05C9                STR     $R7,<SBSTUS         CLEAR EXPECTED ERR-BITS
002972                          *---------------------------*
002973                          *   716-MODE READ-I.D.+DATA  *
002974                          *---------------------------*V-
002975  1064  D3C0 F7C2                LNJ     $B5,SETEST          SET TEST ADDRESS
002976  1066  D380 04A2                LNJ     $B5,<FCWD           FORM CNFG WDS
002977  1068  D380 04CA                LNJ     $B5,<WRTCWD         WRT CNFG WDS
002978  106A  C870 0410                LDR     $R4,=X'0410'        RANGE
002979  106C  D380 037B                LNJ     $B5,<RIOLD
002980  106E  F800 0297                LDR     $R7,<FMT
002981  1070  F670 0080                XOR     $R7,=X'0080'        SET BIT-8 IGNORE RD-ERR (716)
002982  1072  D380 03A3                LNJ     $B5,<WRTASK         FMT-RD
002983  1074  D380 054B                LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
002984  1076  D380 07F4                LNJ     $B5,<ERRTST
002985                          *
002986                          *****    BASIC TESTS FOR 576-BYTE SECTOR *****
002987  1078  D380 0514                LNJ     $B5,<LDPARM         SET PARAMETERS TO TRK-0,SCTR-0
002988                          *---------------------------*
002989                          *  FORMAT WRITE - 1 RECORD  *
002990                          *---------------------------*
002991  107A  D3C0 F7AC                LNJ     $B5,SETEST          SET TEST ADDRESS
002992  107C  1C0B                     LDV     $R1,=X'0B'          12-SECTORS
002993  107D  9F44 0011                STR     $R1,$B4.SCTRMX
002994  107F  D380 04A2                LNJ     $B5,<FCWD           FORM CONFG WDS
002995  1081  8700 1791                CL      <WRTBFR
002996  1083  8700 1792                CL      <WRTBFR+1
002997  1085  D380 04CA                LNJ     $B5,<WRTCWD         WRT CONFG WDS
002998  1087  4C04                     LDV     $R4,=X'04'          RANGE = 1 ID
002999  1088  D380 0394                LNJ     $B5,<WIOLD
003000  108A  F800 0298                LDR     $R7,<FMT12
003001  108C  D380 03A3                LNJ     $B5,<WRTASK         WRT 1 REC, 576-BYTE
003002  108E  D380 054B                LNJ     $B5,<CKERR
003003  1090  D380 07F4                LNJ     $B5,<ERRTST
003004                          *---------------------------*
003005                          *   DIAGNOSTIC FORMAT READ   *
003006                          *---------------------------*
003007                          *   DATA  =  ALL ZEROS
003008  1092  D3C0 F794                LNJ     $B5,SETEST          SET TEST ADDRESS
003009  1094  D380 04CA                LNJ     $B5,<WRTCWD         WRT CNFG WDS
003010  1096  C870 0279                LDR     $R4,=X'0279'        RNGE 1-SECTOR
003011  1098  D380 037B                LNJ     $B5,<RIOLD
003012  109A  F800 02A6                LDR     $R7,<FDIAG2
003013  109C  D380 03A3                LNJ     $B5,<WRTASK         TASK - FMT DIAGNOSTIC READ
003014  109E  D380 054B                LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003015  10A0  9B80 25B8                LAB     $B1,<MAST12
003016  10A2  D380 0788                LNJ     $B5,<CMPARE
003017  10A4  D380 07F4                LNJ     $B5,<ERRTST
003018                          *---------------------------*
003019                          *   FORMAT READ ID 1-REC     *
003020                          *---------------------------*
003021  10A6  D3C0 F780                LNJ     $B5,SETEST          SET TEST ADDRESS
003022  10A8  D380 04CA                LNJ     $B5,<WRTCWD
003023  10AA  4C04                     LDV     $R4,=X'04'          RNGE
003024  10AB  D380 037B                LNJ     $B5,<RIOLD
003025  10AD  F800 02A2                LDR     $R7,<RDID12
003026  10AF  D380 03A3                LNJ     $B5,<WRTASK         TASK - RD ID
003027  10B1  D380 054B                LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003028  10B3  9B80 02AA                LAB     $B1,<ZEROS          ZEROS
003029  10B5  D380 0788                LNJ     $B5,<CMPARE
003030  10B7  D380 07F4                LNJ     $B5,<ERRTST
003031                          *---------------------------*
003032                          *   FORMAT-READ 1-ID+DATA    *
003033                          *---------------------------*V-
003034  10B9  D3C0 F76D                LNJ     $B5,SETEST          SET TEST ADDRESS
003035  10BB  D380 04CA                LNJ     $B5,<WRTCWD         WRT CNFG WDS
003036  10BD  C870 0244                LDR     $R4,=X'0244'        RANGE
003037  10BF  D380 037B                LNJ     $B5,<RIOLD
003038  10C1  F800 0298                LDR     $R7,<FMT12
003039  10C3  D380 03A3                LNJ     $B5,<WRTASK         FORMAT-READ 1 ID+DATA
003040  10C5  D380 054B                LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003041  10C7  9B80 02AA                LAB     $B1,<ZEROS          ZEROS
003042  10C9  D380 0788                LNJ     $B5,<CMPARE
003043  10CB  D380 07F4                LNJ     $B5,<ERRTST
003044                          *---------------------------*
003045                          *   FORMAT-WRITE 12 SECTORS  *
003046                          *---------------------------*V-
003047  10CD  D3C0 F759                LNJ     $B5,SETEST          SET TEST ADDRESS
003048  10CF  D380 04CA                LNJ     $B5,<WRTCWD         WRT CNFG WDS
003049  10D1  4C30                     LDV     $R4,=X'30'          RANGE
003050  10D2  D380 0394                LNJ     $B5,<WIOLD
003051  10D4  D380 051F                LNJ     $B5,<LDWBFR         SET UP ID IN WRT-BUFR
003052  10D6  F800 0298                LDR     $R7,<FMT12
003053  10D8  D380 03A3                LNJ     $B5,<WRTASK         FMT-WRT 12 SECTORS 576 BYTE
003054  10DA  D380 054B                LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003055  10DC  D380 07F4                LNJ     $B5,<ERRTST
003056                          *---------------------------*
003057                          *   DIAGNOSTIC-RD 2OND REC   *
003058                          *---------------------------*V-
003059  10DE  D3C0 F748                LNJ     $B5,SETEST          SET TEST ADDRESS
003060  10E0  8A80 0393                INC     <GOFILL         INHIBIT RD-BUFR 33-FILL
003061  10E2  D380 0464                LNJ     $B5,<RDBFIL
003062  10E4  D380 04CA                LNJ     $B5,<WRTCWD         WRT CNFG WDS
003063  10E6  4C04                     LDV     $R4,=X'04'          RANGE
003064  10E7  D380 037B                LNJ     $B5,<RIOLD
003065  10E9  F800 02A2                LDR     $R7,<RDID12
003066  10EB  D380 03A3                LNJ     $B5,<WRTASK         FMT-RD-ID SECTOR-0
003067  10ED  C870 025B                LDR     $R4,=X'025B'        RANGE
003068  10EF  D380 037B                LNJ     $B5,<RIOLD
003069  10F1  F800 02A0                LDR     $R7,<DIAG12
003070  10F3  D380 03A3                LNJ     $B5,<WRTASK         DIAG-RD SECTOR-1
003071  10F5  D380 054B                LNJ     $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003072  10F7  9B80 23D8                LAB     $B1,<DRIN12         SB VALUE
003073  10F9  1C01                     LDV     $R1,=X'01'
003074  10FA  9F00 23DA                STR     $R1,<DRIN12+2       SECTOR
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003075  10FC  9F00 23DB                    STR    $R1,<DRIN12+3        CK-CHAR
003076  10FE  D380 0788                    LNJ    $B5,<CMPARE
003077  1100  D380 07F4                    LNJ    $B5,<ERRTST
003078  1102  8700 0393                    CL     <GOFILL
003079                              *-----------------------------*
003080                              * FORMAT-READ ID 12 SECTORS    *
003081                              *-----------------------------*V-
003082  1104  D3C0 F722                    LNJ    $B5,SETEST           SET TEST ADDRESS
003083  1106  D380 04CA                    LNJ    $B5,<WRTCWD          WRT CNFG WDS
003084  1108  4C30                        LDV    $R4,=X'30'           RANGE
003085  1109  D380 037B                    LNJ    $B5,<RIOLD
003086  110B  F800 02A2                    LDR    $R7,<RDID12
003087  110D  D380 03A3                    LNJ    $B5,<WRTASK          FORMAT-RD-ID 12-SECTORS
003088  110F  D380 054B                    LNJ    $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003089  1111  9B80 1791                    LAB    $B1,<WRTBFR
003090  1113  D380 0788                    LNJ    $B5,<CMPARE
003091  1115  D380 07F4                    LNJ    $B5,<ERRTST
003092                              *-----------------------------*
003093                              *  DIAGNOSTIC-READ SECTOR-11  *
003094                              *-----------------------------*
003095  1117  D3C0 F70F                    LNJ    $B5,SETEST           SET TEST ADDRESS
003096  1119  8A80 0393                    INC    <GOFILL          INHIBIT RD-BUFR 33-FILL
003097  111B  D380 0464                    LNJ    $B5,<RDBFIL
003098  111D  D380 04CA                    LNJ    $B5,<WRTCWD          WRT CNFG WDS
003099  111F  4C2C                        LDV    $R4,=X'2C'           RANGE
003100  1120  D380 037B                    LNJ    $B5,<RIOLD
003101  1122  F800 02A2                    LDR    $R7,<RDID12
003102  1124  D380 03A3                    LNJ    $B5,<WRTASK          RD-ID SECTORS 0->10
003103  1126  C870 0260                    LDR    $R4,=X'0260'         RANGE
003104  1128  D380 037B                    LNJ    $B5,<RIOLD
003105  112A  F800 02A0                    LDR    $R7,<DIAG12
003106  112C  D380 03A3                    LNJ    $B5,<WRTASK          DIAG-RD SECTOR-11
003107  112E  D380 054B                    LNJ    $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003108  1130  9B80 23D8                    LAB    $B1,<DRIN12          SB VALUE
003109  1132  1C0B                        LDV    $R1,=X'0B'
003110  1133  9F00 23DA                    STR    $R1,<DRIN12+2        SECTOR
003111  1135  9F00 23DB                    STR    $R1,<DRIN12+3        CK-CHAR
003112  1137  D380 0788                    LNJ    $B5,<CMPARE
003113  1139  D380 07F4                    LNJ    $B5,<ERRTST
003114  113B  8700 0393                    CL     <GOFILL              SET RD-BFR 33 FILL
003115                              *-----------------------------*
003116                              *  FORMAT-READ  ID & DATA     *
003117                              *      12 - SECTORS           *
003118                              *    (BYPASS IF NO MEMORY)    *
003119                              *-----------------------------*
003120  113D  D3C0 F6E9                    LNJ    $B5,SETEST           SET TEST ADDRESS
003121  113F  8980 02C5                    CMZ    <MEMSZE              CK MEMORY SIZE
003122  1141  0900                    T   BE     >+$A
003123  1142  D380 04CA                    LNJ    $B5,<WRTCWD          WRT CONFG-WDS
003124  1144  C870 1B30                    LDR    $R4,=X'1B30'         ID&DATA-12SECTRS
003125  1146  D380 037B                    LNJ    $B5,<RIOLD
003126  1148  F800 0298                    LDR    $R7,<FMT12           RD ID+DATA
003127  114A  D380 03A3                    LNJ    $B5,<WRTASK
003128  114C  D380 054B                    LNJ    $B5,<CKERR
003129  114E  D380 07F4                    LNJ    $B5,<ERRTST
003130  1150  0F00 0000                X   $A     NOP    <RDBUFR
003131                              *****     *****SEARCH TESTS - 12 SECTORS*****
003132                              *-----------------------------*
003133                              *  SEARCH + READ  SECTOR-0    *
003134                              *-----------------------------*V-
003135  1152  D3C0 F6D4                    LNJ    $B5,SETEST           SET TEST ADDRESS
003136  1154  D380 04A2                    LNJ    $B5,<FCWD            FORM CNFG-WDS
003137  1156  D380 04CA                    LNJ    $B5,<WRTCWD          WRT CNFG WDS
003138  1158  C870 0240                    LDR    $R4,=X'0240'         RANGE
003139  115A  D380 037B                    LNJ    $B5,<RIOLD
003140  115C  F800 029C                    LDR    $R7,<DATA12
003141  115E  D380 03A3                    LNJ    $B5,<WRTASK          READ-DATA SECTOR-0
003142  1160  1C01                        LDV    $R1,=X'01'
003143  1161  9F00 0761                    STR    $R1,<CWBF            SET END-SCTR
003144  1163  D380 054B                    LNJ    $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003145  1165  9B80 02AA                    LAB    $B1,<ZEROS           ZEROS
003146  1167  D380 0788                    LNJ    $B5,<CMPARE
003147  1169  D380 07F4                    LNJ    $B5,<ERRTST
003148                              *-----------------------------*
003149                              *  SEARCH + WRITE  SECTOR-0   *
003150                              *-----------------------------*V-
003151  116B  D3C0 F6BB                    LNJ    $B5,SETEST           SET TEST ADDRESS
003152  116D  D380 04CA                    LNJ    $B5,<WRTCWD          WRT CNFG WDS
003153  116F  C870 0240                    LDR    $R4,=X'0240'         RANGE
003154  1171  F800 02A8                    LDR    $R7,<ONES
003155  1173  D380 0459                    LNJ    $B5,<WRTFIL
003156  1175  D380 0394                    LNJ    $B5,<WIOLD
003157  1177  F800 029C                    LDR    $R7,<DATA12
003158  1179  D380 03A3                    LNJ    $B5,<WRTASK          FMT-WRT SECTOR-0
003159  117B  D380 054B                    LNJ    $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003160  117D  D380 07F4                    LNJ    $B5,<ERRTST
003161                              *-----------------------------*
003162                              *  FORMAT-READ  SECTOR 0 + 1  *
003163                              *-----------------------------*V-
003164  117F  D3C0 F6A7                    LNJ    $B5,SETEST           SET TEST ADDRESS
003165  1181  D380 04CA                    LNJ    $B5,<WRTCWD          WRT CNFG WDS
003166  1183  C870 0248                    LDR    $R4,=X'0248'         RANGE
003167  1185  D380 037B                    LNJ    $B5,<RIOLD
003168  1187  F800 0298                    LDR    $R7,<FMT12           FMT-RD  ID + DATA
003169  1189  D380 03A3                    LNJ    $B5,<WRTASK          SECTR-0 + SECTR-1-ID
003170  118B  8700 0761                    CL     <CWBF
003171  118D  D380 054B                    LNJ    $B5,<CKERR           CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003172  118F  8740 0601                    CL     WRTBFR
003173  1191  8740 0600                    CL     WRTBFR+1
003174  1193  8740 071F                    CL     WRTBFR+290
003175  1195  1C01                        LDV    $R1,=X'01'
003176  1196  9F40 071D                    STR    $R1,WRTBFR+291
003177  1198  9BC0 05F8                    LAB    $B1,WRTBFR
003178  119A  D3C0 F5ED                    LNJ    $B5,CMPARE
003179  119C  D380 07F4                    LNJ    $B5,<ERRTST
003180                              *-----------------------------*
003181                              *  SEARCH + WRITE SECTOR-1    *
003182                              *-----------------------------*V-
003183  119E  D3C0 F688                    LNJ    $B5,SETEST           SET TEST ADDRESS
003184  11A0  1C01                        LDV    $R1,=X'01'
003185  11A1  9F44 0003                    STR    $R1,$B4.SECTR
003186  11A3  8AD1                        INC    =$R1
003187  11A4  9F00 0761                    STR    $R1,<CWBF
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003188  11A6  D380 04A2          LNJ   $B5,<FCWD          FORM CNFG WDS
003189  11A8  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003190  11AA  C870 0240          LDR   $R4,=X'0240'       RANGE
003191  11AC  F870 7101          LDR   $R7,=Z'7101'
003192  11AE  D380 0459          LNJ   $B5,<WRTFIL        LOAD WRTBFR
003193  11B0  D380 0394          LNJ   $B5,<WIOLD
003194  11B2  F800 029C          LDR   $R7,<DATA12
003195  11B4  D380 03A3          LNJ   $B5,<WRTASK        SCH-WRT SECTOR-1
003196  11B6  D380 054B          LNJ   $B5,<CKERR         CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003197  11B8  D380 07F4-         LNJ   $B5,<ERRTST
003198                        *----------------------------*
003199                        *  SEARCH + READ  SECTOR-1   *
003200                        *----------------------------*V-
003201  11BA  D3C0 F66C          LNJ   $B5,SETEST         SET TEST ADDRESS
003202  11BC  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003203  11BE  C870 0240          LDR   $R4,=X'0240'       RANGE
003204  11C0  D380 037B          LNJ   $B5,<RIOLD
003205  11C2  F800 029C          LDR   $R7,<DATA12
003206  11C4  D380 03A3          LNJ   $B5,<WRTASK        SCH-RD SECTOR-1
003207  11C6  D380 054B          LNJ   $B5,<CKERR         CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003208  11C8  9B60 1791          LAB   $B1,<WRTBFR
003209  11CA  D380 0788          LNJ   $B5,<CMPARE
003210  11CC  D380 07F4          LNJ   $B5,<ERRTST
003211                        *----------------------------*
003212                        *  SEARCH+WRITE   SECTOR-11  *
003213                        *----------------------------*V-
003214  11CE  D3C0 F658          LNJ   $B5,SETEST         SET TEST ADDRESS
003215  11D0  1C0B               LDV   $R1,=X'0B'
003216  11D1  9F44 0003          STR   $R1,$B4.SECTR
003217  11D3  8AD1               INC   =$R1
003218  11D4  9F00 0761          STR   $R1,<CWBF
003219  11D6  D380 04A2          LNJ   $B5,<FCWD          FORM CNFG WDS
003220  11D8  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003221  11DA  F870 AA55          LDR   $R7,=Z'AA55'       LDBFR W/ PATTERN
003222  11DC  C870 0240          LDR   $R4,=X'0240'       RANGE
003223  11DE  D3C0 F27A          LNJ   $B5,WRTFIL
003224  11E0  D380 0394          LNJ   $B5,<WIOLD
003225  11E2  F800 029C          LDR   $R7,<DATA12
003226  11E4  D380 03A3          LNJ   $B5,<WRTASK        SCH+WRT SCTR-11
003227  11E6  D380 054B          LNJ   $B5,<CKERR         CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003228  11E8  D380 07F4          LNJ   $B5,<ERRTST
003229                        *----------------------------*
003230                        *  SEARCH+READ  SECTORS 10+11*
003231                        *----------------------------*V-
003232  11EA  D3C0 F63C          LNJ   $B5,SETEST         SET TEST ADDRESS
003233  11EC  1C0A               LDV   $R1,=X'0A'
003234  11ED  9F44 0003          STR   $R1,$B4.SECTR
003235  11EF  D380 04A2          LNJ   $B5,<FCWD          FORM CNFG WDS
003236  11F1  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003237  11F3  C870 0480          LDR   $R4,=X'0480'       RANGE
003238  11F5  D380 037B          LNJ   $B5,<RIOLD
003239  11F7  F800 029C          LDR   $R7,<DATA12
003240  11F9  D380 03A3          LNJ   $B5,<WRTASK        DATA-RD SECTORS 10+11
003241  11FB  D380 054B          LNJ   $B5,<CKERR         CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003242  11FD  C870 0240          LDR   $R4,=X'0240'
003243  11FF  CF44 000E          STR   $R4,$B4.RANGE
003244  1201  9BC0 F0A8          LAB   $B1,ZEROS
003245  1203  D3C0 F584          LNJ   $B5,CMPARE
003246  1205  9BC0 058B          LAB   $B1,WRTBFR
003247  1207  AB80 0000       X  LAB   $B2,<RDBUFR
003248  1209  ABC2 0120          LAB   $B2,$B2.288        SECTR-11
003249  120B  9870 0120          LDR   $R1,=X'0120'
003250  120D  D3C0 F576          LNJ   $B5,CMPARA
003251  120F  D380 07F4          LNJ   $B5,<ERRTST
003252                        *----------------------------*
003253                        *  SEARCH+WRITE  ZERO-FILL   *
003254                        *----------------------------*V-
003255  1211  D3C0 F615          LNJ   $B5,SETEST         SET TEST ADDRESS
003256  1213  1C04               LDV   $R1,=X'04'
003257  1214  9F44 0003          STR   $R1,$B4.SECTR
003258  1216  8AD1               INC   =$R1
003259  1217  9F40 F549          STR   $R1,CWBF
003260  1219  D380 04A2          LNJ   $B5,<FCWD          FORM CNFG WDS
003261  121B  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003262  121D  C870 0240          LDR   $R4,=X'0240'
003263  121F  F870 9999          LDR   $R7,=Z'9999'
003264  1221  D3C0 F237          LNJ   $B5,WRTFIL
003265  1223  4C50               LDV   $R4,=X'50'         RANGE
003266  1224  D380 0394          LNJ   $B5,<WIOLD
003267  1226  F800 029C          LDR   $R7,<DATA12
003268  1228  D380 03A3          LNJ   $B5,<WRTASK        SCH+WRT W-ZEROFILL
003269  122A  D380 054B          LNJ   $B5,<CKERR         CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003270  122C  D380 07F4          LNJ   $B5,<ERRTST
003271                        *----------------------------*
003272                        *      SEARCH + READ         *
003273                        *----------------------------*V-
003274  122E  D3C0 F5F8          LNJ   $B5,SETEST         SET TEST ADDRESS
003275  1230  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003276  1232  C870 0240          LDR   $R4,=X'0240'       RANGE
003277  1234  D380 037B          LNJ   $B5,<RIOLD
003278  1236  F800 029C          LDR   $R7,<DATA12
003279  1238  D380 03A3          LNJ   $B5,<WRTASK        READ-DATA
003280  123A  D380 054B          LNJ   $B5,<CKERR         CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003281  123C  9BC0 057C          LAB   $B1,WRTBFR+40
003282  123E  8757               CL    =$R7
003283  123F  C870 01F0          LDR   $R4,=X'01F0'
003284  1241  D3C0 F22F          LNJ   $B5,FILLIT
003285  1243  9BC0 054D          LAB   $B1,WRTBFR
003286  1245  D3C0 F542          LNJ   $B5,CMPARE
003287  1247  D380 07F4          LNJ   $B5,<ERRTST
003288                        *----------------------------*
003289                        *   SEARCH & WRITE  2-SECTORS*
003290                        *   (SECTORS  2 + 3)         *
003291                        *----------------------------*V-
003292  1249  D3C0 F5DD          LNJ   $B5,SETEST         SET TEST ADDRESS
003293  124B  1C02               LDV   $R1,=X'02'
003294  124C  9F44 0003          STR   $R1,$B4.SECTR
003295  124E  1E02               ADV   $R1,=X'02'
003296  124F  9F40 F511          STR   $R1,CWBF
003297  1251  D380 04A2          LNJ   $B5,<FCWD          FORM CNFG WDS
003298  1253  D380 04CA          LNJ   $B5,<WRTCWD        WRT CNFG WDS
003299  1255  C870 0480          LDR   $R4,=X'0480'       RANGE
003300  1257  9BC0 0539          LAB   $B1,WRTBFR
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003301  1259  F870 0102                LDR     $R7,=X'0102'
003302  125B  D3C0 F223                LNJ     $B5,INCBFR
003303  125D  D380 0394                LNJ     $B5,<WIOLD
003304  125F  F800 029C                LDR     $R7,<DATA12
003305  1261  D380 03A3                LNJ     $B5,<WRTASK             SCH+WRT SECTORS 2+3
003306  1263  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003307  1265  D380 07F4                LNJ     $B5,<ERRTST
003308                          *----------------------------*
003309                          *  SEARCH&READ  3-SECTORS    *
003310                          *  (SECTORS 2, 3, 4)         *
003311                          *----------------------------*V-
003312  1267  D3C0 F5BF                LNJ     $B5,SETEST              SET TEST ADDRESS
003313  1269  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003314  126B  9844 0003                LDR     $R1,$B4.SECTR
003315  126D  1E03                     ADV     $R1,=X'03'
003316  126E  9F40 F4F2                STR     $R1,CWBF
003317  1270  C870 0120                LDR     $R4,=X'0120'
003318  1272  9B80 0000          X     LAB     $B1,<RDBUFR
003319  1274  AB80 19D1                LAB     $B2,<WRTBFR+576
003320  1276  D3C0 F220                LNJ     $B5,MOVEWD
003321  1278  C870 06C0                LDR     $R4,=X'06C0'            RANGE
003322  127A  D380 037B                LNJ     $B5,<RIOLD
003323  127C  F800 029C                LDR     $R7,<DATA12
003324  127E  D380 03A3                LNJ     $B5,<WRTASK             SCH-RD SECTORS 2, 3, 4
003325  1280  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003326  1282  9BC0 050E                LAB     $B1,WRTBFR
003327  1284  D3C0 F503                LNJ     $B5,CMPARE
003328  1286  D380 07F4                LNJ     $B5,<ERRTST
003329                          *----------------------------*
003330                          *  DIAGNOSTIC FORMAT WRITE   *
003331                          *  CREATE CHECK-BYTE ERROR   *
003332                          *----------------------------*V-
003333  1288  8744 0003                CL      $B4.SECTR
003334  128A  8740 F4D6                CL      CWBF
003335  128C  D3C0 F59A                LNJ     $B5,SETEST              SET TEST ADDRESS
003336  128E  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003337  1290  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003338  1292  D380 051F                LNJ     $B5,<LDWBFR             SET UP I.D. IN WRTBFR
003339  1294  F870 FFFF                LDR     $R7,=Z'FFFF'
003340  1296  FF40 04FB                STR     $R7,WRTBFR+1
003341  1298  FF40 1141                STR     $R7,DRIN12+2
003342  129A  4C30                     LDV     $R4,=X'30'              RANGE
003343  129B  D380 0394                LNJ     $B5,<WIOLD
003344  129D  F800 02A6                LDR     $R7,<FDIAG2
003345  129F  D380 03A3                LNJ     $B5,<WRTASK             FMT-RD 12 SECTORS
003346  12A1  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003347  12A3  D380 07F4                LNJ     $B5,<ERRTST
003348                          *----------------------------*
003349                          * FORMAT-READ LOOK FOR RD-ERR*
003350                          *----------------------------*V-
003351  12A5  D3C0 F581                LNJ     $B5,SETEST              SET TEST ADDRESS
003352  12A7  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003353  12A9  C870 0244                LDR     $R4,=X'0244'            RANGE
003354  12AB  D380 037B                LNJ     $B5,<RIOLD
003355  12AD  F800 0298                LDR     $R7,<FMT12
003356  12AF  D380 03A3                LNJ     $B5,<WRTASK             FMT-RD  ID+DATA
003357  12B1  F870 8800                LDR     $R7,=Z'8800'
003358  12B3  FF40 F315                STR     $R7,SBSTUS              SET EXPECT RD-ERR
003359  12B5  D380 0585                LNJ     $B5,<CKSTUS             CK STATUS, EXPECT RD-ERR
003360  12B7  D380 07F4                LNJ     $B5,<ERRTST
003361                          *----------------------------*
003362                          *   LOOK FOR READ-ERROR AND  *
003363                          *   UNSUCESSFUL SEARCH ERROR *
003364                          *----------------------------*V-
003365  12B9  D3C0 F56D                LNJ     $B5,SETEST              SET TEST ADDRESS
003366  12BB  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003367  12BD  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003368  12BF  4C04                     LDV     $R4,=X'04'              RANGE
003369  12C0  D380 037B                LNJ     $B5,<RIOLD
003370  12C2  F800 029C                LDR     $R7,<DATA12
003371  12C4  D380 03A3                LNJ     $B5,<WRTASK             SCH-RD SECTOR W ERR
003372  12C6  F870 8900                LDR     $R7,=Z'8900'
003373  12C8  FF40 F300                STR     $R7,SBSTUS
003374  12CA  D380 0585                LNJ     $B5,<CKSTUS             EXPECT RD-ERR+UNSUCSFUL-SCH
003375                          *
003376                          * NOTE:  IF FIRMWARE IS LESS THAN REV. 001B, MISSED DATA SYNC
003377                          *  WILL ALSO SET.  THIS IS VALID.
003378                          *
003379  12CC  D380 07F4                LNJ     $B5,<ERRTST
003380  12CE  F870 8000                LDR     $R7,=Z'8000'
003381  12D0  FF40 F2F8                STR     $R7,SBSTUS              CLEAR EXPECTED ERRORS
003382                          *----------------------------*
003383                          *   FORMAT 12-SECTORS        *
003384                          *----------------------------*V-
003385  12D2  D3C0 F554                LNJ     $B5,SETEST
003386  12D4  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003387  12D6  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003388  12D8  D380 051F                LNJ     $B5,<LDWBFR
003389  12DA  4C30                     LDV     $R4,=X'30'              RANGE
003390  12DB  D380 0394                LNJ     $B5,<WIOLD
003391  12DD  F800 0298                LDR     $R7,<FMT12
003392  12DF  D380 03A3                LNJ     $B5,<WRTASK             FMT 12 SECTORS
003393  12E1  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003394  12E3  D380 07F4                LNJ     $B5,<ERRTST
003395                          ******************************
003396                          *                            *
003397                          *       SEEK  TESTS          *
003398                          *                            *
003399                          ******************************
003400  12E5                    SMPLSK  EQU     $                       SIMPLE SEEKS
003401  12E5  D3C0 F541                LNJ     $B5,SETEST
003402                          *
003403                          *   SEEK OUT TO CYL CA (202) + WRT IT
003404                          *
003405  12E7  F870 00CA                LDR     $R7,=X'00CA'
003406  12E9  FF44 0001                STR     $R7,$B4.CYLNO
003407  12EB  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003408  12ED  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003409  12EF  F800 0296                LDR     $R7,<SEK
003410  12F1  D380 03A3                LNJ     $B5,<WRTASK             SEEK TO CYL-00CA
003411  12F3  8CC4 000C                LDI     $B4.WCWA
003412  12F5  8D40 049B                SDI     WRTBFR
003413  12F7  8D00 0760                SDI     <CWAF                   SET FINAL CNFG-WDS
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003414  12F9  D380 0585            LNJ   $B5,<CKSTUS          CK TIMEOUT,STATUS
003415                        *
003416  12FB  4C04                 LDV   $R4,=X'04'          RANGE
003417  12FC  D380 0394            LNJ   $B5,<WIOLD
003418  12FE  F800 0297            LDR   $R7,<FMI
003419  1300  D380 03A3            LNJ   $B5,<WRTASK         FMT-WRITE
003420  1302  D380 054B            LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003421  1304  D380 07F4            LNJ   $B5,<ERRTST
003422                        *
003423                        *    SEEK BACK TO ZERO AND READ IT
003424                        *
003425  1306  8744 0001            CL    $B4.CYLNO
003426  1308  8700 0760            CL    <CWAF
003427  130A  D380 04A2            LNJ   $B5,<FCWD           FORM CNFG WDS
003428  130C  D380 04CA            LNJ   $B5,<WRTCWD         WRT CNFG WDS
003429  130E  F800 0296            LDR   $R7,<SEK
003430  1310  D380 03A3            LNJ   $B5,<WRTASK         SEEK TO 0000
003431  1312  D380 0585            LNJ   $B5,<CKSTUS
003432  1314  4C04                 LDV   $R4,=X'04'          RANGE
003433  1315  D380 037B            LNJ   $B5,<RIOLD
003434  1317  F800 0298            LDR   $R7,<FMT12
003435  1319  D380 03A3            LNJ   $B5,<WRTASK         FMT-RD
003436  131B  D380 054B            LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003437  131D  9B80 02AA            LAB   $B1,<ZEROS          CYL-00,TRK-00
003438  131F  D380 0788            LNJ   $B5,<CMPARE
003439  1321  D380 07F4            LNJ   $B5,<ERRTST
003440                        *
003441                        *    SEEK OUT TO CYL-00CA + READ IT
003442                        *
003443  1323  F870 00CA            LDR   $R7,=X'00CA'
003444  1325  FF44 0001            STR   $R7,$B4.CYLNO
003445  1327  D380 04A2            LNJ   $B5,<FCWD           FORM CNFG WDS
003446  1329  D380 04CA            LNJ   $B5,<WRTCWD         WRT CNFG WDS
003447  132B  8CC4 000C            LDI   $B4.WCWA
003448  132D  8D00 0760            SDI   <CWAF
003449  132F  F800 0296            LDR   $R7,<SEK
003450  1331  D380 03A3            LNJ   $B5,<WRTASK         SEEK CYL-00CA
003451  1333  D380 0585            LNJ   $B5,<CKSTUS
003452  1335  4C04                 LDV   $R4,=X'04'          RANGE
003453  1336  D380 037B            LNJ   $B5,<RIOLD
003454  1338  F800 0297            LDR   $R7,<FMI
003455  133A  D380 03A3            LNJ   $B5,<WRTASK         FMT-RD
003456  133C  D380 054B            LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003457  133E  9B80 1791            LAB   $B1,<WRTBFR
003458  1340  D380 0788            LNJ   $B5,<CMPARE
003459  1342  D380 07F4            LNJ   $B5,<ERRTST
003460                        *----------------------------*
003461                        *       IMPLIED  SEEKS       *
003462                        *----------------------------*
003463  1344  D3C0 F4E2            LNJ   $B5,SETEST
003464                        *
003465                        *    SEEK BACK TO ZERO AND READ IT
003466                        *
003467  1346  8744 0001            CL    $B4.CYLNO
003468  1348  8700 0760            CL    <CWAF               CLEAR CNFG-WD
003469  134A  D380 04A2            LNJ   $B5,<FCWD           FORM CNFG WDS
003470  134C  D380 04CA            LNJ   $B5,<WRTCWD         WRT CNFG WDS
003471  134E  4C04                 LDV   $R4,=X'04'          RANGE
003472  134F  D380 037B            LNJ   $B5,<RIOLD
003473  1351  F800 029A            LDR   $R7,<FMTSK2
003474  1353  D380 03A3            LNJ   $B5,<WRTASK         FMT-RD
003475  1355  D380 054B            LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003476  1357  9B80 02AA            LAB   $B1,<ZEROS          CYL-00,TRK-00
003477  1359  D380 0788            LNJ   $B5,<CMPARE
003478  135B  D380 07F4            LNJ   $B5,<ERRTST
003479                        *
003480                        *    SEEK OUT TO CYL-00CA + READ IT
003481                        *
003482  135D  F870 00CA            LDR   $R7,=X'00CA'
003483  135F  FF44 0001            STR   $R7,$B4.CYLNO
003484  1361  D380 04A2            LNJ   $B5,<FCWD           FORM CNFG WDS
003485  1363  D380 04CA            LNJ   $B5,<WRTCWD         WRT CNFG WDS
003486  1365  8CC4 000C            LDI   $B4.WCWA
003487  1367  8D00 0760            SDI   <CWAF
003488  1369  4C04                 LDV   $R4,=X'04'          RANGE
003489  136A  D380 037B            LNJ   $B5,<RIOLD
003490  136C  F800 0299            LDR   $R7,<FMTSEK
003491  136E  D380 03A3            LNJ   $B5,<WRTASK         FMT-RD
003492  1370  D380 054B            LNJ   $B5,<CKERR          CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003493  1372  9B80 1791            LAB   $B1,<WRTBFR
003494  1374  D380 0788            LNJ   $B5,<CMPARE
003495  1376  D380 07F4            LNJ   $B5,<ERRTST
003496                        *----------------------------*
003497                        *     GO FORMAT THE PACK     *
003498                        *----------------------------*
003499  1378  D3C0 F4AE            LNJ   $B5,SETEST
003500  137A  D380 04F4            LNJ   $B5,<SETPRM         SET PAK PARAMETERS
003501  137C  D3C0 0003            LNJ   $B5,PKFMT
003502  137E  0F80 13B9            B     <SEKTST
003503                        *--------------------------*
003504                        *   FORMAT-WRITE ROUTINE   *
003505                        *--------------------------*
003506        1380            PKFMT EQU   $
003507  1380  8F00 13AB            SAVE  <FMTSAV,=Z'7F7F'
      1382  7F7F
003508  1383  D380 0332            LNJ   $B5,<RECALB
003509  1385  D380 0514            LNJ   $B5,<LDPARM
003510  1387  D380 04A2      FORMTR LNJ   $B5,<FCWD
003511  1389  D380 051F            LNJ   $B5,<LDWBFR
003512  138B  D380 04CA            LNJ   $B5,<WRTCWD
003513  138D  4C60                 LDV   $R4,=X'60'          24-SECTOR CAELUS
003514  138E  D380 0394            LNJ   $B5,<WIOLD
003515  1390  F800 0299            LDR   $R7,<FMTSEK
003516  1392  D380 03A3            LNJ   $B5,<WRTASK         SEK&FMT WRT
003517  1394  D380 0585            LNJ   $B5,<CKSTUS
003518  1396  B844 0002            LDR   $R3,$B4.TRKNO
003519  1398  B944 0008            CMR   $R3,$B4.MAXTRK
003520  139A  0284                 BGE   >FNXCYL
003521  139B  8AC4 0002            INC   $B4.TRKNO
003522  139D  0FEA                 B     >FORMTR
003523  139E  8AC4 0001      FNXCYL INC   $B4.CYLNO
003524  13A0  8744 0002            CL    $B4.TRKNO
003525  13A2  B844 0001            LDR   $R3,$B4.CYLNO
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003526  13A4  B944 0007          CMR    $R3,$B4.MAXCYL
003527  13A6  03E1               BLE    >FORMTR
003528  13A7  8F80 13AB          RSTR   <FMTSAV,=Z'7F7F'
        13A9  7F7F
003529  13AA  8385               JMP    $B5
003530  13AB  0000          FMTSAV RESV   7*$AF+7,0
003531                              *----------------------------*
003532                              *                            *
003533                              *   SEEK TO ALL CYLINDERS    *
003534                              *                            *
003535                              *----------------------------*
003536        13B9              SEKTST EQU    $
003537  13B9  D3C0 F46D              LNJ    $B5,SETEST
003538  13BB  D380 0332              LNJ    $B5,<RECALB
003539  13BD  D380 0514              LNJ    $B5,<LDPARM
003540  13BF  E855                   LDR    $R6,=$R5
003541  13C0  BAD6          SKXCYL   INC    =$R6
003542  13C1  EF44 0001              STR    $R6,$B4.CYLNO
003543  13C3  D380 034A              LNJ    $B5,<SEKID              SEEK + READ ID
003544  13C5  D380 0585              LNJ    $B5,<CKSTUS
003545  13C7  E900 0000  X           CMR    $R6,<RDBUFR
003546  13C9  0900        T          BE     >+$C
003547  13CA  F380 0850              LNJ    $B7,<ERROR
003548  13CC  8744 0001     $C       CL     $B4.CYLNO
003549  13CE  D380 034A              LNJ    $B5,<SEKID              SEEK 00 + READ ID
003550  13D0  D380 0585              LNJ    $B5,<CKSTUS
003551  13D2  8980 0000  X           CMZ    <RDBUFR                 CK FOR CYL 00
003552  13D4  0900        T          BE     >+$D
003553  13D5  F380 0850              LNJ    $B7,<ERROR
003554  13D7  E944 0007     $D       CMR    $R6,$B4.MAXCYL
003555  13D9  0267                   BL     >SKXCYL
003556  13DA  D380 0332              LNJ    $B5,<RECALB
003557  13DC  D380 0514              LNJ    $B5,<LDPARM
003558                              *----------------------------*
003559                              *   SEARCH AND WRITE W/      *
003560                              *   TRACK SWITCHING          *
003561                              *----------------------------*V-
003562  13DE  D3C0 F448              LNJ    $B5,SETEST              SET TEST ADDRESS
003563  13E0  F870 0017              LDR    $R7,=X'0017'
003564  13E2  FF44 0003              STR    $R7,$B4.SECTR
003565  13E4  F870 0101              LDR    $R7,=X'0101'
003566  13E6  FF00 0761              STR    $R7,<CWBF
003567  13E8  8700 0760              CL     <CWAF
003568  13EA  D380 04A2              LNJ    $B5,<FCWD               FORM CNFG WDS
003569  13EC  D380 04CA              LNJ    $B5,<WRTCWD             WRT CNFG WDS
003570  13EE  C870 0114              LDR    $R4,=X'0114'            RANGE
003571  13F0  F870 2468              LDR    $R7,=X'2468'
003572  13F2  D380 0459              LNJ    $B5,<WRTFIL
003573  13F4  D380 0394              LNJ    $B5,<WIOLD
003574  13F6  F800 029B              LDR    $R7,<DATA
003575  13F8  D380 03A3              LNJ    $B5,<WRTASK             WRT-DATA + TRK-SWITCH
003576  13FA  D380 054B              LNJ    $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003577  13FC  D380 07F4              LNJ    $B5,<ERRTST
003578                              *----------------------------*
003579                              *   SEARCH + READ TO CHECK   *
003580                              *   FOR TRACK SWITCH         *
003581                              *----------------------------*V-
003582  13FE  D3C0 F428              LNJ    $B5,SETEST              SET TEST ADDRESS
003583  1400  7C01                   LDV    $R7,=X'01'
003584  1401  FF44 0002              STR    $R7,$B4.TRKNO
003585  1403  8744 0003              CL     $B4.SECTR
003586  1405  D380 04A2              LNJ    $B5,<FCWD               FORM CNFG WDS
003587  1407  D380 04CA              LNJ    $B5,<WRTCWD             WRT CNFG WDS
003588  1409  4C20                   LDV    $R4,=X'20'              RANGE
003589  140A  D380 037B              LNJ    $B5,<RIOLD
003590  140C  F800 029B              LDR    $R7,<DATA
003591  140E  D380 03A3              LNJ    $B5,<WRTASK             SCH-RD
003592  1410  D380 054B              LNJ    $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003593  1412  9BC0 0408              LAB    $B1,WRTBFR+138          BUFFER AREA OF INTERREST
003594  1414  8757                   CL     =$R7                    TO BE FILLED WITH THE VALUE ZERO
003595  1415  C870 0200              LDR    $R4,=512                FOR A RANGE OF 512 BYTES
003596  1417  D3C0 F059              LNJ    $B5,FILLIT              BY THIS SUBROUTINE
003597  1419  9B80 1811              LAB    $B1,<WRTBFR+128
003598  141B  D380 0788              LNJ    $B5,<CMPARE
003599  141D  D380 07F4              LNJ    $B5,<ERRTST
003600                              *----------------------------*
003601                              *   SEARCH AND READ  W/      *
003602                              *   TRACK SWITCHING          *
003603                              *----------------------------*V-
003604  141F  D3C0 F407              LNJ    $B5,SETEST              SET TEST ADDRESS
003605  1421  8744 0002              CL     $B4.TRKNO
003606  1423  7C17                   LDV    $R7,=X'17'
003607  1424  FF44 0003              STR    $R7,$B4.SECTR
003608  1426  D380 04A2              LNJ    $B5,<FCWD               FORM CNFG WDS
003609  1428  D380 04CA              LNJ    $B5,<WRTCWD             WRT CNFG WDS
003610  142A  C870 0200              LDR    $R4,=X'0200'            RANGE
003611  142C  D380 037B              LNJ    $B5,<RIOLD
003612  142E  F800 029B              LDR    $R7,<DATA
003613  1430  D380 03A3              LNJ    $B5,<WRTASK             SCH-RD
003614  1432  D380 054B              LNJ    $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003615  1434  9B80 1791              LAB    $B1,<WRTBFR
003616  1436  D380 0788              LNJ    $B5,<CMPARE
003617  1438  D380 07F4              LNJ    $B5,<ERRTST
003618                              *----------------------------*
003619                              *   SEARCH AND WRITE  W/     *
003620                              *   CYLINDER SWITCHING       *
003621                              *----------------------------*V-
003622  143A  8AC4 0002              INC    $B4.TRKNO
003623  143C  D3C0 F3EA              LNJ    $B5,SETEST              SET TEST ADDRESS
003624  143E  D380 04A2              LNJ    $B5,<FCWD               FORM CNFG WDS
003625  1440  D380 04CA              LNJ    $B5,<WRTCWD             WRT CNFG WDS
003626  1442  6C01                   LDV    $R6,=X'01'
003627  1443  F856                   LDR    $R7,=$R6
003628  1444  8D00 0760              SDI    <CWAF                   SET END-CNFG-WDS
003629  1446  C870 0114              LDR    $R4,=X'0114'            RANGE
003630  1448  D380 0394              LNJ    $B5,<WIOLD
003631  144A  F800 029B              LDR    $R7,<DATA
003632  144C  D380 03A3              LNJ    $B5,<WRTASK             SCH-WRI  W-CYL SWITCH
003633  144E  D380 054B              LNJ    $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003634  1450  D380 07F4              LNJ    $B5,<ERRTST
003635                              *----------------------------*
003636                              *   SEARCH+READ TO CHECK FOR *
003637                              *   CYLINDER+TRACK SWITCH    *
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003638                          *-----------------------------*V-
003639  1452  8744 0002                CL      $B4.TRKNO
003640  1454  8744 0003                CL      $B4.SECTR
003641  1456  8AC4 0001                INC     $B4.CYLNO
003642  1458  D3C0 F3CE                LNJ     $B5,SETEST              SET TEST ADDRESS
003643  145A  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003644  145C  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003645  145E  4C20                     LDV     $R4,=X'20'              RANGE
003646  145F  D380 037B                LNJ     $B5,<RIOLD
003647  1461  F800 029D                LDR     $R7,<DATSEK
003648  1463  D380 03A3                LNJ     $B5,<WRTASK             SCH-RD
003649  1465  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003650  1467  9B80 1811                LAB     $B1,<WRTBFR+128
003651  1469  D380 0788                LNJ     $B5,<CMPARE
003652  146B  D380 07F4                LNJ     $B5,<ERRTST
003653                          *-----------------------------*
003654                          *   SEARCH AND READ  W/       *
003655                          *   CYLINDER+TRACK SWITCHING  *
003656                          *-----------------------------*V-
003657  146D  8744 0001                CL      $B4.CYLNO
003658  146F  8AC4 0002                INC     $B4.TRKNO
003659  1471  7C17                     LDV     $R7,=X'17'
003660  1472  FF44 0003                STR     $R7,$B4.SECTR
003661  1474  D3C0 F3B2                LNJ     $B5,SETEST              SET TEST ADDRESS
003662  1476  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003663  1478  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003664  147A  C870 0200                LDR     $R4,=X'0200'            RANGE
003665  147C  D380 037B                LNJ     $B5,<RIOLD
003666  147E  F800 029D                LDR     $R7,<DATSEK
003667  1480  D380 03A3                LNJ     $B5,<WRTASK             SCH+RD  W-CYL SWITCH
003668  1482  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003669  1484  9B80 1791                LAB     $B1,<WRTBFR
003670  1486  D380 0788                LNJ     $B5,<CMPARE
003671  1488  D380 07F4                LNJ     $B5,<ERRTST
003672                          *-----------------------------*
003673                          *   SEARCH + WRITE TO SET     *
003674                          *   TRACK WITH DATA FOR THE   *
003675                          *   MAX-OFFSET RANGE TEST     *
003676                          *   DATA COMPARE              *
003677                          *-----------------------------*V-
003678  148A  D3C0 F39C                LNJ     $B5,SETEST              SET TEST ADDRESS
003679  148C  7C05                     LDV     $R7,=X'05'
003680  148D  FF44 0001                STR     $R7,$B4.CYLNO           CYL-5
003681  148F  8744 0002                CL      $B4.TRKNO               TRK-0
003682  1491  7C0F                     LDV     $R7,=X'0F'
003683  1492  FF44 0003                STR     $R7,$B4.SECTR           SCTR-16
003684  1494  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003685  1496  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003686  1498  8CC4 000C                LDI     $B4.WCWA
003687  149A  8AD7                     INC     =$R7
003688  149B  8D00 0760                SDI     <CWAF                   SET FINAL CNFG-WDS
003689  149D  C870 0100                LDR     $R4,=X'0100'
003690  149F  F870 8899                LDR     $R7,=Z'8899'
003691  14A1  D380 0459                LNJ     $B5,<WRTFIL
003692  14A3  F870 88AA                LDR     $R7,=Z'88AA'             DATA BYTE 'AA'
003693  14A5  FF00 1810                STR     $R7,<WRTBFR+127
003694  14A7  9870 0100                LDR     $R1,=X'0100'            RANGE
003695  14A9  D380 0394                LNJ     $B5,<WIOLD
003696  14AB  F800 029D                LDR     $R7,<DATSEK
003697  14AD  D380 03A3                LNJ     $B5,<WRTASK
003698  14AF  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003699  14B1  D380 07F4                LNJ     $B5,<ERRTST
003700                          *-----------------------------*
003701                          *   SEARCH AND READ   W/      *
003702                          *   MAX-OFFSET-RANGE          *
003703                          *-----------------------------*V-
003704  14B3  8744 0001                CL      $B4.CYLNO
003705  14B5  8744 0002                CL      $B4.TRKNO
003706  14B7  8744 0003                CL      $B4.SECTR
003707  14B9  D3C0 F36D                LNJ     $B5,SETEST              SET TEST ADDRESS
003708  14BB  D380 04A2                LNJ     $B5,<FCWD               FORM CNFG WDS
003709  14BD  D380 04CA                LNJ     $B5,<WRTCWD             WRT CNFG WDS
003710  14BF  F870 FFFF                LDR     $R7,=Z'FFFF'            MAXIMUM OFFSET
003711  14C1  D380 03AE                LNJ     $B5,<WTOFRG             WRITE OFFSET RANGE
003712  14C3  4C01                     LDV     $R4,=X'01'              RANGE
003713  14C4  D380 037B                LNJ     $B5,<RIOLD
003714  14C6  F800 029D                LDR     $R7,<DATSEK
003715  14C8  D380 03A3                LNJ     $B5,<WRTASK
003716  14CA  D380 054B                LNJ     $B5,<CKERR              CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003717  14CC  E870 AA00                LDR     $R6,=Z'AA00'
003718  14CE  EF00 1791                STR     $R6,<WRTBFR
003719  14D0  9B80 1791                LAB     $B1,<WRTBFR
003720  14D2  D380 0788                LNJ     $B5,<CMPARE
003721  14D4  D380 07F4                LNJ     $B5,<ERRTST
003722  14D6  8744 000F                CL      $B4.OFSTRG              CLEAR THE OFF-SET RANGE
003723                          *-----------------------------*
003724                          *   SEARCH AND WRITE  W/      *
003725                          *   SENSITIVE DATA PATTERN    *
003726                          *-----------------------------*
003727  14D8  D3C0 F34E                LNJ     $B5,SETEST
003728  14DA  D3C0 EFC7                LNJ     $B5,FCWD                FORM CONFG-WDS
003729  14DC  D3C0 EFED                LNJ     $B5,WRTCWD              WRT CNFG-WDS
003730  14DE  7C17                     LDV     $R7,=X'17'
003731  14DF  8756                     CL      =$R6
003732  14E0  8D00 0760                SDI     <CWAF                   SET FINAL CNFG-WDS
003733  14E2  C870 1700                LDR     $R4,=X'1700'            23 SECTORS
003734  14E4  F870 00FF                LDR     $R7,=Z'00FF'            SENSITIVE DATA WORD
003735  14E6  D380 0459                LNJ     $B5,<WRTFIL             FILL WRITE-BUFR
003736  14E8  D380 0394                LNJ     $B5,<WIOLD
003737  14EA  F840 EDB2                LDR     $R7,DATSEK              S+WRT
003738  14EC  D380 03A3                LNJ     $B5,<WRTASK
003739  14EE  D380 054B                LNJ     $B5,<CKERR
003740  14F0  D380 07F4                LNJ     $B5,<ERRTST
003741                          *-----------------------------*
003742                          *   SEARCH AND READ  W/       *
003743                          *   SENSITIVE DATA PATTERN    *
003744                          *-----------------------------*
003745  14F2  C870 003F                LDR     $R4,=X'003F'            LOOPS
003746  14F4  CF00 1510                STR     $R4,<WOPTOM
003747                          * ERE-DO "TOM" SO CAN LOOP INDEFINITELY!!!!
003748          14F6            REDO    EQU     $
003749  14F6  D3C0 F330                LNJ     $B5,SETEST
003750  14F8  D3C0 EFD1                LNJ     $B5,WRTCWD              WRT CONFG-WDS
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003751  14FA  C870 1700              LDR     $R4,=X'1700'          23-SECTRS
003752  14FC  D380 037B              LNJ     $B5,<RIOLD
003753  14FE  F800 029D              LDR     $R7,<DATSEK
003754  1500  D380 03A3              LNJ     $B5,<WRTASK           S+RD
003755  1502  D380 054B              LNJ     $B5,<CKERR            CK TIMOUT,STUS,END-RNGE,CNFG-WDS
003756  1504  9B60 1791              LAB     $B1,<WRTBFR           DATA S/BE
003757  1506  D380 0788              LNJ     $B5,<CMPARE
003758  1508  D380 07F4              LNJ     $B5,<ERRTST
003759  150A  8880 1510              DEC     <WOPTOM
003760  150C  8980 1510              CMZ     <WOPTOM
003761  150E  0368                   BG      >REDO                 LOOP TEST
003762  150F  0F82                   B       >WTPROG               EXIT
003763  1510  0000          WOPTOM  RESV    1,0                   NO. OF LOOPS
003764                      *-------------------------*
003765                      *   SEARCH AND WRITE  W/    *
003766                      *   MAXIMUM RANGE           *
003767                      *WRT FROM MEMORY LOCATION0000*
003768                      *-------------------------*V-
003769        1511          WTPROG  EQU     $
003770  1511  D3C0 F315              LNJ     $B5,SETEST            SET TEST ADDRESS
003771  1513  D380 04A2              LNJ     $B5,<FCWD             FORM CNFG WDS
003772  1515  D380 04CA              LNJ     $B5,<WRTCWD           WRT CNFG WDS
003773  1517  9BC0 EAE8              LAB     $B1,ZERO
003774  1519  9F80 039B              STB     $B1,<WOLDB+1          SET WRT ADD = ZERO
003775  151B  9B80 0000        X     LAB     $B1,<ZV$HR            HI MEM
003776  151D  1C00                   LDV     $R1,=$AF-1            SAF/LAF
003777  151E  C811                   LDR     $R4,$B1.$R1           RANGE
003778  151F  4001                   SUL     $R4,1                 WDS --> BYTES
003779  1520  CF00 1543              STR     $R4,<SRNGVL           SAVE RANGE FOR S+R
003780  1522  D380 0394              LNJ     $B5,<WIOLD
003781  1524  F800 029D              LDR     $R7,<DATSEK
003782  1526  D380 03A3              LNJ     $B5,<WRTASK
003783  1528  D380 0585              LNJ     $B5,<CKSTUS           CK TIMEOUT + STATUS
003784  152A  D380 0705              LNJ     $B5,<CKOFRG           CK OFFSET RANGE
003785  152C  D380 06DF              LNJ     $B5,<CKRNGE           CK RANGE
003786  152E  9B60 1791              LAB     $B1,<WRTBFR
003787  1530  9F80 039B              STB     $B1,<WOLDB+1          RESET WRITE ADDRESS
003788  1532  D3C0 F2C1              LNJ     $B5,ERRTST
003789                      *-------------------------*
003790                      *   SEARCH AND READ  W/     *
003791                      *   MAXIMUM RANGE           *
003792                      *-------------------------*V-
003793  1534  D3C0 F2F2              LNJ     $B5,SETEST            SET TEST ADDRESS
003794  1536  8A80 0393              INC     <GOFILL         INHIBIT RD-BUFR 33-MEMORY-FILL
003795  1538  E800 0812              LDR     $R6,<MSTADD           SAVE TEST ADDRESS
003796  153A  D380 04A2              LNJ     $B5,<FCWD             FORM CNFG WDS
003797  153C  D380 04CA              LNJ     $B5,<WRTCWD           WRT CNFG WDS
003798  153E  9BC0 EAC1              LAB     $B1,ZERO
003799  1540  9F80 0384              STB     $B1,<RIOLDB+1         SET RD-ADD = ZERO
003800  1542  C870 3FFF              LDR     $R4,='3FFF'           RANGE (SAME AS S+W)
003801        1543          SRNGVL  EQU     $-1
003802  1544  D380 037B              LNJ     $B5,<RIOLD
003803  1546  F800 029D              LDR     $R7,<DATSEK
003804  1548  D380 03A3              LNJ     $B5,<WRTASK
003805  154A  A800 0256              LDR     $R2,<RTASK
003806  154C  A644 0010              XOR     $R2,$B4.PORTCH
003807  154E  8057          $A      IO      =$R7,=$R2             RD-TASK
        154F  0052
003808  1550  07FE                   BIOF    >-$A                  HANG TIL XFER DONE
003809  1551  D380 0585              LNJ     $B5,<CKSTUS           CK TIMEOUT + STATUS
003810  1553  D380 0705              LNJ     $B5,<CKOFRG           CK OFFSET RANGE
003811  1555  D380 06DF              LNJ     $B5,<CKRNGE           CK RANGE
003812  1557  EF00 0812              STR     $R6,<MSTADD           RESTORE TEST ADDRESS
003813  1559  D380 07F4              LNJ     $B5,<ERRTST
003814                      *
003815  155B  8740 EE37              CL      GOFILL
003816  155D  9B80 1791              LAB     $B1,<WRTBFR
003817  155F  9F80 039B              STB     $B1,<WOLDB+1          RESET WRITE ADDRESS
003818  1561  8700 0760              CL      <CWAF                 CLEAR CNFG-WD-A
003819  1563  8700 0761              CL      <CWBF                 CLEAR CNFG-WD-B
003820  1565  9B80 0000        X     LAB     $B1,<RDBUFR
003821  1567  9F80 0384              STB     $B1,<RIOLDB+1         RESTORE IOLD ADDRESS
003822                      *  NOTE: RESET READ-BUFR 33-FILL IF UNSUCESSFUL READ
003823                      *-------------------------*
003824                      *  BOOTSTRAP-TEST     *
003825                      * SIMULATE FIRMWARE BOOTSTRAP*
003826                      *-------------------------*V-
003827  1569  D3C0 F2BD              LNJ     $B5,SETEST            SET TEST ADDRESS
003828  156B  4C01                   LDV     $R4,=1
003829  156C  CF00 0761              STR     $R4,<CWBF             END SECTOR=1
003830  156E  D380 03BB              LNJ     $B5,<INITZ            INITIALIZE DISC SUBSYSTEM
003831  1570  C870 0100              LDR     $R4,=X'0100'          RANGE = 1-SECTOR
003832  1572  D380 037B              LNJ     $B5,<RIOLD            LOAD ADDRESS + RANGE
003833  1574  F800 029B              LDR     $R7,<DATA
003834  1576  D380 03A3              LNJ     $B5,<WRTASK           TASK= RD DATA
003835  1578  D380 054B              LNJ     $B5,<CKERR            CK TIMEOUT,STATUS,END-RNGE,CNFG-WDS
003836  157A  9B80 0000              LAB     $B1,<ZERO             SB COMPARE FIELD LOCATION
003837  157C  D380 0788              LNJ     $B5,<CMPARE           DATA= BOOT-RECORD?
003838  157E  D380 07F4              LNJ     $B5,<ERRTST           ANY ERRORS?
003839                      * ------------------------------------------------------------------------------
003840                      *       INTERRUPT TEST  --  --  IF THE CPU IS A 6/34 OR /36 AT REV 2.1 OR
003841                      *                               OLDER, THIS TEST MAY FAIL WHEN THE CPU AND
003842                      *                               THE DISC CONTROLLER ARE AT THE SAME INTERRUPT
003843                      *                               LEVEL. THE RESULT IS THE CPU DROPS TO LEVEL 63.
003844  1580  D3C0 F2A6              LNJ     $B5,SETEST
003845  1582  D380 04A2              LNJ     $B5,<FCWD
003846  1584  D380 04CA              LNJ     $B5,<WRTCWD
003847                      * THIS TEST CHECKS THAT INTERRUPTS ARE GENERATED ON THE
003848                      *  CORRECT LEVEL.  EVERY LEVEL IS CHECKED.
003849  1586  AB80 0000        X     A       LAB     $B2,<ZHISAZ
003850  1588  BB80 1650              LAB     $B3,<ISARD            SAVE AREA FOR ALL LEVELS
003851  158A  BFF2                   STB     $B3,+$B2              SET UP ALL LEVELS
003852  158B  AD80 1638              CMB     $B2,<HOOBF            DONE YET?
003853  158D  027D                   BL      >B                    NO - KEEP GOING
003854  158E  9B80 1665              LAB     $B1,<DEVIH            ADDRESS OF RUPT HANDLER
003855  1590  9F80 1653              STB     $B1,<ISARP            PUT INTO SAVE AREA
003856  1592  CF80 1656              STB     $B4,<ISARX            SAVE PORT
003857  1594  CF80 1642              STB     $B4,<ISATX
003858  1596  6C3F                   LDV     $R6,=63               STARTING LEVEL FOR PROGRAM
003859  1597  8700 0000        X     C       CL      <ZHIAFB       RESET ALL ACTIVITY FLAGS
003860  1599  8700 0001        X             CL      <ZHIAFB+1
003861  159B  8700 0002        X             CL      <ZHIAFB+2
003862  159D  8700 0003        X             CL      <ZHIAFB+3
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003663  159F  9800 1632          LDR   $R1,<LVQC          QUICK LEVEL CHANGE
003664  15A1  9456               OR    $R1,=$R6           GET READY FOR LEVEL CHANGE
003665  15A2  8E51               LEV   =$R1               MAKE THE CHANGE
003666  15A3  9570 003F          AND   $R1,=Z'003F'       LOOK AT LEVEL ONLY
003667  15A5  8AD1               INC   =$R1               GO BACK TO OLD LEVEL
003668  15A6  8810 0000     X    LBF   <ZH1AFB.$R1        AND RESET ACTIVITY FLAG FOR THAT LVL
003669  15A8  9856               LDR   $R1,=$R6           GET CURRENT LEVEL BACK
003670  15A9  9270 003F          SUB   $R1,=63            IS THIS FIRST TIME THRU?
003671  15AB  1986               BNEZ  $R1,>D             - BRANCH
003672  15AC  9B80 163A          LAB   $B1,<ISATD
003673  15AE  9F80 003F     X    STB   $B1,<ZH1SAZ+63*$AF SETUP SAVE AREA AFTER LEV INSTR
003674  15B0  0F87               B     >E                 SKIP THIS CODE NOW
003675  15B1  9856          D    LDR   $R1,=$R6           RESTORE CURRENT LEVEL
003676  15B2  8AD1               INC   =$R1               LOOK AT OLD LEVEL
003677  15B3  9B80 1650          LAB   $B1,<ISARD
003678  15B5  9F90 0000     X    STB   $B1,<ZH1SAZ.$R1
003679  15B7  5C3E          E    LDV   $R5,=62            INITIAL LEVEL FOR DISC
003680  15B8  8700 1633     F    CL    <DEVSEM            RESET SEMAPHORE
003681  15BA  D400 1634          OR    $R5,<CPCHAN        STICK IN CP CHANNEL NUMBER
003682  15BC  A800 0275          LDR   $R2,<WINUPT        GET WR1-INTUPT-CMD
003683  15BE  A644 0010          XOR   $R2,$B4,PORTCH     ADD PORT CHANNEL
003684  15C0  8055               IO    =$R5,=$R2          SET NEW DEVICE INTERRUPT LEVEL
        15C1  0052
003685  15C2  07FE               BIOF  >G                 WAIT FOR I/O
003686  15C3  DF00 1635          STR   $R5,<DLVL          STORE IT AWAY
003687  15C5  EF00 1637          STR   $R6,<PLVL          STORE PROGRAM LEVEL
003688  15C7  EF00 1636          STR   $R6,<CLVL          **********
003689  15C9  C870 0000          LDR   $R4,=0             RANGE=0
003690  15CB  D380 0394          LNJ   $B5,<WIOLD         IOLD
003691  15CD  A800 0277          LDR   $R2,<WTASK         GET TASK-CMD
003692  15CF  A644 0010          XOR   $R2,$B4,PORTCH     ADD PORT
003693  15D1  8000 029B     H    IO    <DATA,=$R2         WRT-TASK
        15D3  0052
003694  15D4  07FD               BIOF  >H
003695  15D5  F870 0100          LDR   $R7,=X'0100'       SETUP FOR TIME DELAY
003696                    *
003697  15D7  7701 FFFF          BDEC  $R7,$              WAIT HERE FOR A WHILE FOR RUPT
003698  15D9  0F01 FFFF          NOP   $                  MAY COME HERE AFTER RUPT
003699                    *
003900  15DB  D570 003F          AND   $R5,=Z'003F'       LOOK AT DEVICE LEVEL ONLY
003901  15DD  9855               LDR   $R1,=$R5           PUT DEVICE LEVEL INTO R1
003902  15DE  1901 004B          BEZ   $R1,M              LEVEL ZERO CANT RUPT
003903  15E0  9256               SUB   $R1,=$R6           SEE WHICH LEVEL WAS HIGHEST
003904  15E1  1889               BGEZ  $R1,>J             DEVICE SHOULDN'T HAVE RUPTED - BRANCH
003905  15E2  8980 1633          CMZ   <DEVSEM            DID A RUPT HAPPEN?
003906  15E4  0981 0047          BNE   N                  YES - EVERYTHINGS OK *********
003907                    *
003908  15E6  9870 2016          LDR   $R1,=Z'2016'       ERROR CODE
003909  15E8  D3C0 F267          LNJ   $B5,ERROR          SHOULD HAVE RUPTED BUT DID NOT
003910                    *
003911  15EA  8980 1633     J    CMZ   <DEVSEM            HAS RUPT HAPPENED?
003912  15EC  0905               BE    >K                 NO - ITS OK
003913                    *
003914  15ED  9870 2017          LDR   $R1,=Z'2017'       ERROR CODE
003915  15EF  D3C0 F260          LNJ   $B5,ERROR          RUPT HAPPENED WHEN IT SHOULDN'T HAVE
003916                    *
003917  15F1  5901 0038     K    BEZ   $R5,M              SKIP THIS LEVEL ZERO CAN'T RUPT
003918  15F3  5D3F               CMV   $R5,=63            IS DEVICE AT LEVEL 63?
003919  15F4  0901 0035          BE    M                  YES - SKIP SINCE 63 CANT RUPT
003920  15F6  EF00 1636          STR   $R6,<CLVL          CURRENT PROGRAM LEVEL
003921  15F8  9870 003F          LDR   $R1,=63            SET FUTURE LEVEL
003922  15FA  9F00 1637          STR   $R1,<PLVL          STORE IN PROGRAM LEVEL
003923  15FC  9470 8000          OR    $R1,=Z'8000'       ACTION FOR LEV INSTR
003924  15FE  9B80 1603          LAB   $B1,<K1            CCHANGE ADDRESS IN ISA
003925  1600  9F80 1653          STB   $B1,<ISARP         STORE IN P COUNTER
003926  1602  8E51               LEV   =$R1               DROP TO 63 TO ENABLE PENDING RUPT
003927  1603  0F01 FFFF     K1    NOP   $                  RETURN TO HERE
003928  1605  7C3F               LDV   $R7,=63            SET UP FOR DELAY
003929  1606  7701 FFFF          BDEC  $R7,$              WAIT HERE FOR WHILE
003930  1608  D800 1635          LDR   $R5,<DLVL          RESTORE DEVICE LEVEL TO R5
003931  160A  8800 0003     X    LBF   <ZH1AFB+3,=Z'0001' SHUT OFF LEVEL 63 BIT
        160C  0001
003932  160D  8C52               STS   =$R2
003933  160E  A570 003F          AND   $R2,=Z'003F'
003934  1610  A955               CMR   $R2,=$R5
003935  1611  0905               BE    >K2
003936                    *
003937  1612  9870 2018          LDR   $R1,=Z'2018'
003938  1614  D3C0 F23B          LNJ   $B5,ERROR          NO RUPT WHEN CP LEV TO 63 TO ALLOW RUPT
003939                    *
003940  1616  D900 1636     K2   CMR   $R5,<CLVL          ARE THE PROG AND DEV AT SAME LVL?
003941  1618  0906               BE    >K3                YES - NO NEED FOR LEV
003942  1619  C870 8080          LDR   $R4,=Z'8080'
003943  161B  C400 1636          OR    $R4,<CLVL
003944  161D  8E54               LEV   =$R4
003945  161E  9B80 1665     K3   LAB   $B1,<DEVIH         RESTORE POINTER TO HANDLER
003946  1620  9FC0 0032          STB   $B1,ISARP
003947  1622  E800 1636     L    LDR   $R6,<CLVL          RESTORE PROG LEVEL TO R6
003948  1624  9856               LDR   $R1,=$R6           PUT INTO R1
003949  1625  9B80 163A          LAB   $B1,<ISATD         ISA FOR PROGRAM
003950  1627  9F90 0000     X    STB   $B1,<ZH1SAZ.$R1    RESTORE INTERRUPT VECTOR
003951  1629  0F83               B     >N                 SKIP AROUND INITIALIZE
003952  162A  0F00 03BB     M    NOP   <INITZ
003953  162C  5700 15B8     N    BDEC  $R5,<F             CHANGE DEVICE LEVEL AND BRANCH
003954  162E  6700 1597          BDEC  $R6,<C             CHANGE PROGRAM LEVEL AND BRANCH
003955  1630  0F80 16B5          B     <NICEA
003956                    *
003957                    *
003958  1632  0080          LVQC DC    Z'0080'
003959  1633  0000          DEVSEM DC  =0
003960  1634  0000          CPCHAN DC  =0
003961  1635  003F          DLVL DC    =63                DEVICE LEVEL
003962  1636  003F          CLVL DC    =63                **********
003963  1637  003F          PLVL DC    =63                PROGRAM LEVEL
003964  1638        003F  X   H00BF DC   <ZH1SAZ+(63*$AF)  ADDRESS OF LAST RUPT VECTOR
003965                    *
003966                    *
003967                    *
003968  1639  0000          ISAT   RESV $AF,0            ISA FOR BACKGROUND PROGRAM
003969  163A  0000          ISATD  DC   =X'0000'
003970  163B  FFFF                 DC   Z'FFFF'
003971  163C  0000                 DC   Z'0000'
003972  163D  16B0                 DC   <1SATIH
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003973          163D                ISATP   EQU     $-1
003974  163E    4000                        DC      X'4000'
003975  163F    0000                        RESV    3*$AF,0
003976  1642    0000                ISATX   RESV    4*$AF+9,0
003977                              *
003978                              *
003979  164F    0000                ISAR    RESV    $AF,0                   ISA FOR DEVICE LEVEL
003980  1650    0000                ISARD   DC      =X'0000'
003981  1651    FFFF                        DC      Z'FFFF'
003982  1652    0000                        DC      Z'0000'
003983  1653    0000                ISARP   RESV    $AF,0
003984  1654    4000                        DC      X'4000'
003985  1655    0000                        RESV    3*$AF,0
003986  1658    0000                ISARX   RESV    4*$AF+9,0
003987                              *
003988                              *
003989  1665    8A80 163D           DEVIH   INC     <ISATP                  RESET RETURN LOCATION
003990  1667    8A80 163D                   INC     <ISATP
003991  1669    8A80 1633                   INC     <DEVSEM                 SET SEMAPHORE
003992  166B    D800 1635                   LDR     $R5,<DLVL               DEVICE LEVEL TO R5
003993  166D    E800 1637                   LDR     $R6,<PLVL               PROGRAM LEVEL TO R6
003994  166F    D400 02A7                   OR      $R5,<CHANEL             STICK IN CHANNEL NUMBER
003995  1671    D644 0010                   XOR     $R5,$B4,PORTCH          SET PORT
003996  1673    A800 1650                   LDR     $R2,<ISARD              LOOK AT RUPTING DEVICE
003997  1675    8852                        LBF     =$R2,=Z'0040'           SHUT OFF I/O BIT
        1676    0040
003998  1677    A955                        CMR     $R2,=$R5                WAS IT THE DISC?
003999  1678    0905                        BE      >DEVIH1                 YES - OK
004000                              *
004001  1679    9870 2019                   LDR     $R1,=Z'2019'            ERROR CODE
004002  167B    D3C0 F1D4                   LNJ     $B5,ERROR               RUPTING DEVICE WAS NOT DISC
004003                              *
004004  167D    D800 1635           DEVIH1  LDR     $R5,<DLVL               DEVICE LEVEL TO R5
004005  167F    6955                        LBT     =$R5,=Z'4000'           SET PRIVELEGE BIT
        1680    4000
004006  1681    8C52                        STS     =$R2                    STORE THE "S" REGISTER
004007  1682    A955                        CMR     $R2,=$R5                IS IT RIGHT?
004008  1683    0905                        BE      >DEVIH2                 YES - GO ON
004009                              *
004010  1684    9870 2020                   LDR     $R1,=Z'2020'            ERROR CODE
004011  1686    D3C0 F1C9                   LNJ     $B5,ERROR               S-REG WRONG IN SAVE AREA
004012                              *
004013  1688    D570 003F           DEVIH2  AND     $R5,=Z'003F'            LOOK AT DEVICE LEVEL
004014  168A    8752                        CL      =$R2                    RESET INDEX
004015  168B    82A0 0000       X   DEVIH3  LB      <ZHIAFB,$R2             LOOK AT NEXT FLAG
004016  168D    A955                        CMR     $R2,=$R5                IS THIS FLAG THE DEVICE LEVEL?
004017  168E    0909                        BE      >DEVIH5                 YES - BRANCH
004018  168F    A956                        CMR     $R2,=$R6                IS THIS THE PROGRAM LEVEL FLAG
004019  1690    0907                        BE      >DEVIH5                 YES - BRANCH
004020  1691    0502                        BBT     >DEVIH4                 IF FLAG IS ON - BRANCH (SHOULDN'T BE)
004021  1692    0F8F                        B       >DEVIH7                 OK FLAG IS OFF
004022                              *
004023  1693    9870 2021           DEVIH4  LDR     $R1,=Z'2021'            ERROR CODE
004024  1695    D3C0 F1BA                   LNJ     $B5,ERROR               ACTIVITY FLAG IS ON WHEN IT SHOULDN'T BE
004025                              *
004026  1697    0586                DEVIH5  BBF     >DEVIH6                 FLAG IS OFF (SHOULDN'T BE)
004027  1698    A956                        CMR     $R2,=$R6                IS THIS THE PROGRAM LEVEL?
004028  1699    0908                        BE      >DEVIH7                 YES - BRANCH
004029  169A    8820 0000       X           LBF     <ZHIAFB,$R2             NO - RESET DEVICE LEVEL FLAG
004030  169C    0F85                        B       >DEVIH7                 CONTINUE
004031                              *
004032  169D    9870 2022           DEVIH6  LDR     $R1,=Z'2022'            ERROR CODE
004033  169F    D3C0 F1B0                   LNJ     $B5,ERROR               FLAG IS OFF - SHOULD BE ON
004034                              *
004035  16A1    A970 003F           DEVIH7  CMR     $R2,=63                 IS THAT ALL THE FLAGS?
004036  16A3    0282                        BGE     >DEVIH8                 YES - BRANCH
004037  16A4    27E7                        BINC    $R2,>DEVIH3             NO BUMP AND BRANCH
004038  16A5    C870 8000           DEVIH8  LDR     $R4,=Z'8000'            GET READY FOR LEV **********
004039  16A7    C400 1636                   OR      $R4,<CLVL               *********
004040  16A9    D900 1636                   CMR     $R5,<CLVL               ARE LEVELS EQUAL?
004041  16AB    0901 FF57                   BE      K1                      YES - DONT LEV
004042  16AD    8E54                        LEV     =$R4                    GO BACK TO PROGRAM
004043  16AE    0F81 FFB6                   B       DEVIH                   BRANCH TO START OF HANDLER
004044                              *
004045                              *
004046                              *
004047                              *
004048  16B0    9870 2023           ISATIH  LDR     $R1,=Z'2023'            **********
004049  16B2    D3C0 F19D                   LNJ     $B5,ERROR
004050  16B4    0FFC                        B       >ISATIH                 **********
004051          16B5                NICEA   EQU     $
004052  16B5    D380 03BB                   LNJ     $B5,<INITZ              INITIALIZE
004053  16B7    D380 0843                   LNJ     $B5,<HOUSKP             HOUSEKEEPING
004054  16B9    9B80 02BF                   LAB     $B1,<MSEOPS
004055  16BB    D380 043B                   LNJ     $B5,<ZVTC               PRINT "END OF PASS"
004056                              *
004057  16BD    0F80 01F7                   B       <DONE                   END OF TEST
004058                              *    CLEAR MODE OUT
004059                              *    GO DO NEXT TASK
004060                              *
004061          16BF                MODEF   EQU     $
004062  16BF    D3C0 F167                   LNJ     $B5,SETEST
004063  16C1    0F80 012E                   B       <NEXT
004064                              * ------------------------------------------------------------------------
004065                              *       DATA DISCRIMINATOR ADJUSTMENT AID
004066                              *
004067  16C3    9870 2C50           MODEG   LDR     $R1,='.P'               FIX UP A MESSAGE/FLAG WORD
004068  16C5    9F40 009C                   STR     $R1,MHMSGB
004069  16C7    1C03                        LDV     $R1,=3                  AND THE INPUT RANGE
004070  16C8    0F81 0059                   B       MHB                     GO TO SHARE CODE IN MODE H
004071                              *
004072                              *       AFTER THE COMMON CODE, RETURN HERE TO MAYBE WRITE, BUT READ ANYWAY
004073                              *
004074  16CA    9BC0 004D           MGRET   LAB     $B1,MGMSGC              ASK IF TRACK TO BE WRITTEN
004075  16CC    D3C0 ED6E                   LNJ     $B5,ZVTC
004076  16CE    D3C0 ED04                   LNJ     $B5,YORN                ACCEPT ON CHARACTERR
004077  16D0    09A6                        BNE     >MGREAC                 BRANCH IF NOT WRITE
004078                              *
004079                                      CALL    ZV$T.ZV$QC.MGMSGD       ASK FOR DATA PATTERN
        16D1    FBC0 0003
        16D3    D380 0000       X
        16D5    0F80
        16D6    171A
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004080                                        CALL   ZV$1H,MGDATA          ACCEPT ONE WORD
        16D7  FBC0 0003
        16D9  D380 0000       X
        16DB  0F80
        16DC  1717
004081  16DD  D3C0 EE41                       LNJ    $B5,LDWBFR            LOAD WRITE BUFFER FOR FORMAT
004082  16DF  4C30                           LDV    $R4,=48               RANGE IS 12*4
004083  16E0  D3C0 ECB3                       LNJ    $B5,WIOLD             OUTPUT A WRITE RANGE/ADDRESS
004084  16E2  F840 EBB5                       LDR    $R7,FMT12             GET TASK WORD TO FORMAT 12 SECTORS
004085  16E4  D3C0 ECBE                       LNJ    $B5,WRTASK            OUTPUT IT TO START BUSY
004086                                *
004087  16E6  D3C0 ECE3                       LNJ    $B5,INSTUS            WAIT UNTIL NOT BUSY
004088                                *
004089  16E8  F840 002E                       LDR    $R7,MGDATA            TAKE THE DATA WORD
004090  16EA  C870 1800                       LDR    $R4,=6912             FOR  A WHOLE TRACK (BYTES)
004091  16EC  D3C0 ED6C                       LNJ    $B5,WRTFIL            AND FILL THE WRITE BUFFER
004092  16EE  D3C0 ECA5                       LNJ    $B5,WIOLD             OUTPUT A WRITE RANGE/ADDRESS
004093  16F0  F840 EBAB                       LDR    $R7,DATA12            TASK WORD TO WRITE
004094  16F2  D3C0 ECB0                       LNJ    $B5,WRTASK            OUTPUT IT TO START BUSY
004095                                *
004096  16F4  D3C0 ECD5                       LNJ    $B5,INSTUS            WAIT FOR NOT BUSY
004097                                *
004098  16F6  D3C0 ED3F               MGREAC  LNJ    $B5,ZVCRLF            ACKNOWLEDGE THE OPERATOR KEYSTROKE
004099                                *
004100  16F8  8744 0003               MGREAD  CL     $B4.SECTR             START WITH SECTOR ZERO
004101                                *
004102  16FA  D3C0 EDA7               MGREAE  LNJ    $B5,FCWD              FORM THE CONFIGURATION WORDS
004103  16FC  D3C0 EDCD                       LNJ    $B5,WRTCWD            AND OUTPUT THEM TO THE CONTROLLER
004104  16FE  C870 0100                       LDR    $R4,=256              RANGE IN BYTES
004105  1700  D3C0 EC7A                       LNJ    $B5,RIOLD             OUTPUT THE READ RANGE/ADDRESS
004106  1702  F840 EB99                       LDR    $R7,DATA12            TASK WORD TO READ DATA FROM 12 X 576 FORMAT
004107  1704  D3C0 EC9E                       LNJ    $B5,WRTASK            OUTPUT TASK TO START BUSY
004108                                *
004109  1706  D380 0585                       LNJ    $B5,<CKSTUS           WAIT UNTIL CONTROLLER NOT BUSY
004110                                *                  THEN CHECK FOR STATUS-ERROR.
004111                                *
004112  1708  4C81                           LDV    $R4,=-127             THEN WAIT FOR A FEW
004113  1709  CA70 0001               MGA     ADD    $R4,=1                HUNDRED MICROSECONDS
004114  170B  4AFE                           BLEZ   $R4,>MGA
004115                                *
004116  170C  8AC4 0003                       INC    $B4.SECTR             BUMP THE SECTOR TWICE
004117  170E  8AC4 0003                       INC    $B4.SECTR             SO WE READ SECTORS 0, 2, 4, 6, 8, 10
004118  1710  C844 0003                       LDR    $R4,$B4.SECTR         AND SKIP OVER      1, 3, 5, 7, 9, 11
004119  1712  4D0C                           CMV    $R4,=12
004120  1713  0267                           BL     >MGREAE               OK, STILL IN THE ONE REV LOOP
004121                                *
004122  1714  D3C0 F147                       LNJ    $B5,SENSE             CHECK IF OPERATOR HIT THE BREAK KEY
004123  1716  0FE2                           B      >MGREAD               DO ANOTHER REV OF THE DISC
004124                                *
004125  1717  AAAA                   MGDATA  DC     Z'AAAA'               OPERATOR CAN OVERIDE THE DATA WORD
004126  1718  5752 5424              MGMSGC  TEXT   'WR1$'
004127  171A  4441 5441 2400        MGMSGD  TEXT   'DATA$'
004128                                *-------------------------  HEAD - ALIGNMENT - AID  ---------------------
004129                                *  THIS SUBROUTINE IS DESIGNED TO ALLOW THE USER TO SET THE DRIVE ON
004130                                * A SELECTED CYLINDER AND TRACK AND TO ISSUE A DIAGNOSTIC-READ HANG.
004131                                * ERRORS ARE IGNORED.    PROGRAM HANGS UNTIL THE "BREAK-KEY" IS HIT.
004132                                * TO SELECT A DIFFERENT CYLINDER/TRACK, RE-ENTER THE "H" MODE AT THE
004133                                * QUESTION "NEXT"
004134  171D  8740 0044               MODEH   CL     MHMSGB                SHORTEN MESSAGE/CLEAR FLAG
004135  171F  8744 0003                       CL     $B4.SECTR             SET FOR PLATTER ZERO
004136  1721  1C02                           LDV    $R1,=2                FIX UP THE INPUT RANGE
004137                                *
004138  1722  9F40 003A               MHB     STR    $R1,MHRNG             EITHER 2 OR 3 WORDS
004139                                        CALL   ZV$1.ZV$QC,MHMSGA     ASK FOR CYL,HEAD(,PLATTER)
        1724  FBC0 0003
        1726  D380 0000       X
        1728  0F80
        1729  175E
004140  172A  DBC4 0001                       LAB    $B5,$B4.CYLNO         PREPARE TO ACCEPT 2(3) WORDS
004141  172C  DFC0 0006                       STB    $B5,MHA               FROM THE CONSOLE INTO THE
004142                                        CALL   ZV$1H,ZERO,MHRNG      AREA $B5 POINTS TO
        172E  FBC0 0003
        1730  D380 0000       X
        1732  0F80
        1733  0000
        1734  175D
004143          1733                  MHA     EQU    $-2*$AF
004144                                *
004145  1735  8751                           CL     =$R1                  ALWAYS START AT SECTOR ZERO
004146  1736  9E44 0003                       SWR    $R1,$B4.SECTR         GET PLATTER (OR ZERO)
004147  1738  9F44 0004                       STR    $R1,$B4.PLATER        AND PLACE IN CORRECT SPOT
004148  173A  D3C0 ED67                       LNJ    $B5,FCWD              FORM CONFIGURATION WORDS
004149  173C  D3C0 ED8D                       LNJ    $B5,WRTCWD            OUTPUT THEM TO CONTROLLER
004150  173E  D3C0 EBFF                       LNJ    $B5,FSEK              SEEK THE REQUESTED CYLINDER
004151  1740  89C0 0021                       CMZ    MHMSGB                SEE IF MODE "H" OR "G"
004152  1742  0981 FF87                       BNE    MGRET                 BRANCH ON MODE "G"
004153                                *
004154  1744  4C06                   MHREAD  LDV    $R4,=6                RANGE IN BYTES (NEVER SATISFIED)
004155  1745  D3C0 EC35                       LNJ    $B5,RIOLD             OUTPUT RANGE/ADDRESS FOR READ
004156  1747  F870 1E00                       LDR    $R7,=Z'1E00'          OFFSET RANGE VALUE
004157  1749  D3C0 EC64                       LNJ    $B5,WTOFRG            OUTPUT OFFSET RANGE
004158  174B  A840 EB2B                       LDR    $R2,WTASK             GET CHAN
004159  174D  A644 0010                       XOR    $R2,$B4.PORTCH        PLUS PORT FOR THE OUPUT TASK
004160  174F  8070 8B00                       IO     =Z'8B00',=$R2         TASK IS SPECIAL DIAG FORMAT READ
        1751  0052
004161                                *
004162                                MHC     CALL   ZV$BRK                CONTROLLER REMAINS BUSY UNTIL
        1752  FBF0 0001
        1754  D380 0000       X
004163  1756  89C0 0000       P               CMZ    ZV$BKF                AN INIT. TO QUIT, HIT THE
004164  1758  097A                           BE     >MHC                  CONSOLE BREAK
004165                                *
004166  1759  D3C0 EC61                       LNJ    $B5,INITZ             END BUSY, RECAL
004167  175B  0F81 E9BB                       B      RESTRT
004168                                *
004169  175D  0002                   MHRNG   DC     2                     RANGE OF 2 (3) INPUT WORDS
004170  175E  4359 4C2C 4845          MHMSGA  TEXT   'CYL,HEAD'
        1761  4144
004171  1762  2A2A 4C41 5424          MHMSGB  TEXT   '**LAT$'
004172                                * ------------------------------------------------------------------------
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004173                                  *       SERVO/VELOCITY ADJUSTMENT AID
004174                                  *
004175  1765  D3C0 F0C1                  MODEV   LNJ     $B5,SETEST              CLEAN UP, REMEMBER ADDRESS
004176  1767  D3C0 EC53                          LNJ     $B5,INITZ              RECAL, INIT THE CONTROLLER
004177                                            CALL    ZV$I.ZV$QC,MVMSGA      ASK FOR TWO CYLINDERS
        1769  FBC0 0003
        176B  D380 0000       X
        176D  0F80
        176E  176C
004178                                            CALL    ZV$IH,MVCYLS,MVTWO     ACCEPT TWO HEX WORDS
        176F  FBC0 0003
        1771  D380 0000       X
        1773  0F80
        1774  178A
        1775  1789
004179                                  *
004180  1776  9840 0014                          LDR     $R1,MVCYLS+1           MAKE THE SITUATION
004181  1778  9F44 0001                          STR     $R1,$B4,CYLNO          APPEAR AS IF A SEEK
004182  177A  9840 000F                          LDR     $R1,MVCYLS             HAD JUST BEEN COMPLETED
004183                                  *
004184  177C  D3C0 EC4D                  MVA     LNJ     $B5,INSTUS             WAIT FOR THE CONTROLLER NOT BUSY
004185  177E  9E44 0001                          SWR     $R1,$B4,CYLNO          PUT IN THE OTHER CYLINDER NUMBER
004186  1780  D3C0 ED21                          LNJ     $B5,FCWD               FORM CONFIGURATION WORDS
004187  1782  D3C0 ED47                          LNJ     $B5,WRTCWD             OUTPUT THEM
004188                                  *
004189  1784  D3C0 EBB9                          LNJ     $B5,FSEK               START A SEEK
004190                                  *
004191  1786  D3C0 F0D5                          LNJ     $B5,SENSE              CHECK FOR A CONSOLE BREAK
004192  1788  0FF4                              B       >MVA                   KEEP GOING
004193                                  *
004194  1789  0002                      MVTWO   DC      2                      RANGE FOR TWO WORD INPUT
004195  178A  0000                      MVCYLS  RESV    2,0                    INNER AND OUTER CYLINDERS
004196  178C  4359 4C2C 4359            MVMSGA  TEXT    'CYL,CYL$'
        178F  4C24
004197                                  **------------------------------*
004198                                  *   OUTPUT  -  INPUT  BUFFERS  *
004199                                  *------------------------------*
004200  1790  0000                              RESV    1,0
004201        1791                      WRTBFR  EQU     $
004202                                            CALL    ZV$RD,FORMAT
        1791  FBC0 0003
        1793  D380 0000       X
        1795  0F80
        1796  17B7
004203                                            CALL    ZV$I.ZV$TC,FORMAV      TELL USER TO SAVE FIXED DISC DATA, ETC.
        1797  FBC0 0003
        1799  D380 0000       X
        179B  0F80
        179C  17C9
004204                                            CALL    ZV$I.ZV$TC,FORMAU      DISPLAY SECOND HALF OF MESSAGE
        179D  FBC0 0003
        179F  D380 0000       X
        17A1  0F80
        17A2  17DF
004205  17A3  DB80 0868                          LAB     $B5,<NODCU             SET UP TRAP FOR
004206  17A5  DF80 0000       X                  STB     $B5,<ZHNRES            UNAVAILABLE RESOURCES
004207  17A7  F800 0100                          LDR     $R7,<START             DISABLE BRANCH TO WRTBFR
004208  17A9  FF00 0104                          STR     $R7,<FIRSTM            AFTER FIRST PROGRAM LOAD
004209  17AB  D380 021A                          LNJ     $B5,<MODPCU            GET CHANNEL + MODIFY INSTRUCTIONS
004210  17AD  9870 3000                          LDR     $R1,=Z'3000'
004211  17AF  9900 0000       X                  CMR     $R1,<ZV$HR             MEMORY-SIZE
004212  17B1  0300 0117                          BG      <RESTRT
004213  17B3  9F00 02C5                          STR     $R1,<MEMSZE
004214  17B5  0F80 0117                          B       <RESTRT
004215  17B7  4341 5254 2044            FORMAT  TEXT    'CART DISC TEST'
        17BA  4953 4320 5445
              5354
004216                                            IFEV    $AF,LAF
004217  17BE  2043 4455 5331                      TEXT    ' CDUS1'
004220                                  SAF     NULL
004221  17C1  2037 2D32 382D                      TEXT    ' 7-28-77'
        17C4  3737
004222  17C5  2052 4556 2D30                      TEXT    ' REV-07$'
        17C8  3724
004223  17C9  7361 7665 2066            FORMAV  TEXT    'SAVE FIXED DISC DATA',Z'0D0A'
        17CC  6978 6564 2064
        17CF  6973 6320 6461
              7461 0D0A
004224  17D4  6D6F 756E 7420                      TEXT    'MOUNT WORK CART(S)',Z'0D0A0000'
        17D7  776F 726B 2063
        17DA  6172 7428 7329
              0D0A 0000
004225  17DF  766F 6C20 3020            FORMAU  TEXT    'VOL 0 = PLAT 0 = CART ',Z'0D0A'
        17E2  3D20 706C 6174
        17E5  2030 203D 2063
              6172 7420 0D0A
004226  17E8  2022 2020 3120                      TEXT    ' "  1 =  "   1 = FIXED',Z'0D0A0000'
        17EB  3D20 2022 2020
        17F1  2031 203D 2066
              6978 6564 0D0A
              0000
004227  2335                                    ORG     WRTBFR+3460-163-317
004228                                  *
004229                                  *       256-BYTE DIAGNOSTIC RECORD FOR COMPARES
004230                                  *
004231        2335                      DRIN24  EQU     $                      163 DECIMAL WORDS
004232  2335  FAAA                              DC      =Z'FAAA'
004233  2336  0000                              RESV    2,0
004234  2338  0000                              RESV    1,0
004235  2339  FFFF                              DC      =Z'FFFF'
004236  233A  0000                              RESV    9,0
004237  2343  FDDD                              DC      =Z'FDDD'
004238  2344  0000                              RESV    128,0
004239  23C4  0000                              RESV    1,0
004240  23C5  FFFF                              DC      =Z'FFFF'
004241  23C6  0000                              RESV    9,0
004242  23CF  0000                              RESV    9,0
004243                                  *
004244                                  *       576-BYTE DIAGNOSTIC RECORD FIELD
004245                                  *
004246        23D8                      DRIN12  EQU     $                      317 DECIMAL WORDS
004247  23D8  FAAA                              DC      =Z'FAAA'
004248  23D9  0000                              RESV    2,0
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004249  23DB  0000                    RESV   1,0                  ID EDC
004250  23DC  FFFF                    DC     =Z'FFFF'
004251  23DD  0000                    RESV   9,0
004252  23E6  FDDD                    DC     =Z'FDDD'
004253  23E7  0000                    RESV   288,0
004254  2507  0000                    RESV   1,0
004255  2508  FFFF                    DC     =Z'FFFF'
004256  2509* 0000                    RESV   12,0
004257                          *
004258                          *      256-BYTE DIAGNOSTIC RECORD FIELD
004259                          *
004260        2515              MAST24 EQU    $                    154 DECIMAL WORDS
004261  2515  FAAA                    DC     =Z'FAAA'             SW1
004262  2516  0000                    RESV   2,0                  SECTOR-I.D.
004263  2518  0000                    RESV   1,0                  ID-EDC
004264  2519  FFFF                    DC     =Z'FFFF'             POST-AMBLE
004265  251A  0000                    RESV   9,0                  GAP 2
004266  2523  FDDD                    DC     =Z'FDDD'             SW2
004267  2524  0000                    RESV   128,0
004268  25A4  0000                    RESV   1,0                  DATA EDC
004269  25A5  FFFF                    DC     =Z'FFFF'
004270  25A6  0000                    RESV   9,0                  GAP3
004271  25AF  0000                    RESV   9,0
004272                          *
004273                          *      576-BYTE DIAGNOSTIC RECORD FIELD
004274                          *
004275        25B8              MAST12 EQU    $                    317 DECIMAL WORDS
004276  25B8  FAAA                    DC     =Z'FAAA'
004277  25B9  0000                    RESV   2,0
004278  25BB  0000                    RESV   1,0                  ID EDC
004279  25BC  FFFF                    DC     =Z'FFFF'
004280  25BD  0000                    RESV   9,0
004281  25C6  FDDD                    DC     =Z'FDDD'
004282  25C7  0000                    RESV   288,0
004283  26E7  0000                    RESV   1,0                  EDC
004284  26E8  FFFF                    DC     =Z'FFFF'
004285  26E9  0000                    RESV   12,0
004286  26F5  0F01 0000               NOP    $+1
004287        0000              X      RDBUFR EQU    ZV$RDT               READ-BUFFER STARTS ABOVE LIBRARY
004288  26F7  0100                    END    CDUS1,START
0000  ERR COUNT
```



```
  491  $A      493B   573B   584B   631B   635B   706B   965B  1017B  1021B  1033B
              1083B  1107B  1120B  1200B  1226B  1285B  1508B  1512B  1550B  1558B
              1560B  1562B  1564B  1566B  1568B  1694B  1716B  1802B  1860B  2135B
              2321B  2420B  3122B  3808B

  575  $A
  586  $A
  626  $A
  703  $A
  967  $A
 1009  $A
 1035  $A
 1081  $A
 1097  $A
 1118  $A
 1203  $A
 1228  $A
 1299  $A
 1515  $A
 1549  $A
 1571  $A
 1696  $A
 1718  $A
 1801  $A
 1857  $A
 2134  $A
 2344  $A
 2428  $A
 3130  $A
 3807  $A
       $AF     499C   500C   501C   502C   911    1039   1149   1238   1272   1306
              1387   1487   1488   1534   1536   1762   3530   3776   3873C  3964
              3968   3975   3976   3979   3983   3985   3986   4143   4216   4218
  510  $B      512B   628B   716B  1101B  1298B  1301B  1322B  1416B  1438B  1458B
              1726B  2035B  2092B  2139B  2143B  2173B

  638  $B
  713  $B
 1104  $B
 1304  $B
 1325  $B
 1420  $B
 1442  $B
 1460  $B
 1728  $B
 2033  $B
 2094  $B
 2142  $B
 2176  $B
       $B1      522    563    588    695    702    704C   712    714C   983    989B
              1015   1032   1035C  1057   1066   1081C  1097C  1118   1223   1229C
              1230C  1266   1296   1319   1323   1327   1331   1335   1339   1343
              1347   1351   1355   1359   1363   1368   1372   1376   1380   1418
              1440   1471   1511   1514   1640   1675   1676C  1758   1759C  1803
              1870   1888   1889C  1896   1905   1918   1925   1939   1942   1957
              1971   1985   2032   2033C  2075   2096   2099   2102   2105   2108
              2129   2156   2157C  2181   2214   2228   2241   2271   2337   2369
              2387   2406   2443   2476   2507   2543   2545   2580   2584   2599
              2617   2625   2664   2672   2709   2741   2764   2784   2808   2828
              2839   2841   2857   2882   2900   3015   3028   3041   3072   3089
              3108   3145   3177   3208   3244   3246   3281   3285   3300   3318
              3326   3437   3457   3476   3493   3593   3597   3615   3650   3669
              3719   3756   3773   3774C  3775   3777   3786   3787C  3798   3799C
              3816   3817C  3820   3821C  3836   3854   3855C  3872   3873C  3877
              3878C  3924   3925C  3945   3946C  3949   3950C  4054   4074
       $B2     1119C  1499   1509   2182   2546   2547   2547   2618   3247   3248
              3248   3319   3849   3851C  3852
       $B3     1139B  1148B  1228B  1235B  1842B  1844B  1846B  1848B  2027B  3850
              3851C
       $B4      498    572    623    649    651    653    655    671    697    878
               888    900    905    917   921C    931   935C    942    953   957C
               975    976   1134   1136  1138C   1143   1145  1147C  1156   1158
              1161   1170  1178C   1191   1192   1193   1194  1196C  1198C  1205C
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	1213	1214C	1215	1216C	1217C	1224C	1225	1227C	1231	1232
	1234C	1283	1284	1300	1318	1410	1432	1452	1461	1502
	1800	1831	1834	1837	1953C	1967C	1981C	1988C	1994C	2072C
	2127	2133	2134	2138	2142	2145	2159	2163C	2164C	2165C
	2166C	2167C	2168C	2169C	2170C	2171	2177C	2190C	2484C	2515C
	2533C	2542C	2556C	2593C	2613	2639C	2643	2663C	2670	2676C
	2679C	2684C	2688	2708C	2717C	2720	2740C	2745C	2746C	2753
	2761C	2770C	2774	2783C	2788	2790C	2795C	2798	2807C	2814C
	2818	2827C	2875C	2876C	2887	2929	2993C	3185C	3216C	3234C
	3243C	3257C	3294C	3314	3333C	3406C	3411	3425C	3444C	3447
	3467C	3483C	3486	3518	3519	3521C	3523C	3524C	3525	3526
	3542C	3548C	3554	3564C	3584C	3585C	3605C	3607C	3622C	3639C
	3640C	3641C	3657C	3658C	3660C	3680C	3681C	3683C	3686	3704C
	3705C	3706C	3722C	3806	3856C	3857C	3883	3892	3995	4100C
	4116C	4117C	4118	4135C	4140	4146C	4147C	4159	4181C	4185C
$B5	503	504C	508B	511B	520B	531B	564B	569B	587B	593B
	597C	598B	662B	692C	696B	882B	892B	897B	898B	910B
	915C	924B	936B	946B	958B	967B	969B	978B	983	997C
	1000B	1016B	1025B	1031C	1034C	1046C	1058B	1060B	1068B	1070B
	1085B	1109B	1122B	1141B	1164B	1179B	1207B	1218B	1237B	1245C
	1246B	1247B	1248B	1249B	1267B	1297B	1303B	1305B	1320B	1321B
	1324B	1325B	1328B	1329B	1332B	1333B	1336B	1337B	1340B	1341B
	1344B	1345B	1348B	1349B	1352B	1353B	1356B	1357B	1360B	1361B
	1364B	1365B	1366B	1369B	1370B	1373B	1374B	1377B	1378B	1381B
	1383B	1386B	1419B	1421B	1441B	1443B	1472B	1474B	1524B	1556C
	1573B	1591C	1592C	1603B	1615B	1619C	1621B	1630C	1641B	1654
	1655C	1656	1657C	1669	1670C	1671	1672C	1674B	1684B	1697B
	1699B	1717B	1727B	1737B	1744B	1786B	1790B	1794B	1798B	1804B
	1807B	1826B	1827B	1852B	1854B	1862B	1863B	1864B	1869B	1873B
	1876B	1877B	1882B	1895B	1899B	1902B	1904B	1908B	1911B	1915B
	1919B	1922B	1924B	1928B	1931B	1935B	1940B	1943B	1947B	1949B
	1951B	1954B	1955B	1956B	1958B	1959B	1961B	1963B	1965B	1968B
	1969B	1970B	1972B	1973B	1975B	1977B	1979B	1982B	1983B	1984B
	1986B	1987B	1992B	1998B	1999B	2000B	2003B	2005B	2008B	2009B
	2010B	2018B	2019B	2020B	2021B	2023B	2024B	2025B	2026B	2037B
	2050B	2058C	2059B	2071C	2073B	2074B	2076B	2077B	2088B	2089B
	2090B	2094B	2109B	2126B	2130B	2131B	2140B	2148	2154B	2155B
	2179B	2183B	2188B	2191B	2196B	2198B	2200B	2201B	2202B	2207B
	2208B	2210B	2212B	2213B	2215B	2216B	2220B	2221B	2223B	2225B
	2226B	2229B	2230B	2234B	2235B	2237B	2239B	2240B	2242B	2243B
	2248B	2249B	2255B	2257B	2258B	2259B	2264B	2265B	2267B	2269B
	2270B	2272B	2273B	2277B	2278B	2280B	2282B	2285B	2286B	2296B
	2299B	2303B	2309B	2313B	2320B	2323C	2324B	2326B	2328B	2329B
	2330B	2331B	2333B	2335B	2336B	2338B	2339B	2344B	2345B	2347B
	2348B	2350B	2351B	2352B	2356B	2358B	2359B	2361B	2363B	2365B
	2367B	2368B	2374B	2375B	2380B	2381B	2383B	2385B	2386B	2388B
	2389B	2393B	2395B	2396B	2398B	2400B	2402B	2404B	2405B	2410B
	2411B	2418B	2421B	2423B	2425B	2426B	2427B	2433B	2434B	2435B
	2437B	2439B	2442B	2444B	2445B	2449B	2450B	2453B	2455B	2457B
	2458B	2459B	2463B	2464B	2466B	2468B	2470B	2477B	2478B	2482B
	2487B	2488B	2491B	2492B	2494B	2495B	2496B	2500B	2501B	2503B
	2505B	2506B	2508B	2509B	2513B	2518B	2519B	2522B	2523B	2525B
	2526B	2527B	2531B	2534B	2535B	2537B	2539B	2540B	2544B	2549B
	2550B	2554B	2559B	2560B	2563B	2565B	2567B	2568B	2569B	2573B
	2574B	2576B	2578B	2579B	2583B	2585B	2586B	2591B	2596B	2597B
	2601B	2602B	2604B	2605B	2606B	2611B	2612B	2619B	2621B	2623B
	2624B	2626B	2627B	2633B	2637B	2640B	2641B	2647B	2649B	2650B
	2651B	2655B	2656B	2658B	2660B	2661B	2665B	2666B	2673B	2674B
	2683B	2685B	2686B	2692B	2694B	2695B	2696B	2700B	2701B	2703B
	2705B	2706B	2710B	2711B	2715B	2718B	2719B	2724B	2726B	2727B
	2728B	2732B	2733B	2735B	2737B	2738B	2742B	2743B	2750B	2751B
	2752B	2756B	2758B	2759B	2765B	2766B	2771B	2772B	2773B	2778B
	2780B	2781B	2785B	2786B	2794B	2796B	2797B	2802B	2804B	2805B
	2809B	2810B	2812B	2816B	2817B	2822B	2824B	2825B	2829B	2830B
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		1728B	1731B	1734B	1745B	1748B	1751B	1754B	1755B	1760B	1764B
		1765B	1768B	1771B	1785B	1789B	1880B	2043B	2046B	2049B	2060B
		2063B	2066B	2093B	2107B	2136B	2144B	2160B	3547B	3553B	
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1329	$C										
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2145	$C										
2177	$C										
3548	$C										
1333	$D	1330B	1466B	1753B	3552B						
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3554	$D										
1337	$E	1334B	1470B	1763B							
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1765	$E										
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1781	$F										
1345	$G	1342B	1780B								
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1786	$H										
1353	$J	1350B									
1357	$K	1354B									
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1365	$M	1362B									
1370	$N	1367B									
1374	$P	1371B	2675B								
2679	$P										
1378	$Q	1375B									
1382	$R	1379B									
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		671	672	674C	701C	704C	705	707C	714C	715	1013
		1014B	1047C	1078C	1081C	1082	1548	1549C	1550B	1696C	1712
		1719	1722	1729	1732	1738C	1739	1774	1781	1783	1787
		1841C	1856	1857C	1858	1859	1861C	1874	1900	1903C	1920C
		1923C	1936C	2031C	2033C	2034	2036C	2044	2061	2174	2176
		2177C	2189	2190C	2370	2371C	2372C	2407	2408C	2409C	2440
		2441C	2474	2475C	2483	2484C	2485C	2486C	2514	2515C	2516C
		2517C	2532	2533C	2548	2555	2556C	2557C	2558C	2592	2593C
		2594	2595C	2613	2614	2615C	2638	2639C	2662	2663C	2707
		2708C	2716	2717C	2739	2740C	2782	2783C	2806	2807C	2826
		2827C	2992	2993C	3073	3074C	3075C	3109	3110C	3111C	3142
		3143C	3175	3176C	3184	3185C	3186C	3187C	3215	3216C	3217C
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		3865	3866	3867C	3868	3869	3870	3871B	3875	3876C	3878C
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		4210	4211	4213C							
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		917	919	930	931	933	941	942	944	952	953
		955	974	975	976	1136	1145	1155	1156	1158	1160
		1161	1169	1170	1172	1282	1283	1284	1409	1410	1412
		1431	1432	1434	1451	1452	1454	1460	1461	1462	1516C
		1520	1799	1800	1801	1830	1831	1832C	1833	1834	1835C
		1836	1837	1838C	2132	2133	2134	2142	2158	2159	2161
		3805	3806	3807	3882	3883	3884	3891	3892	3893	3932
		3933	3934	3996	3997	3998	4006	4007	4014C	4015	4016
		4018	4027	4029	4035	4037B	4158	4159	4160		
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		626	629	630	632C	638C	639	1134	1135	1137	1138C
		1143	1144	1146	1147C	1230C	1510C	1514	1518	1853	1855
		1857C	1878	1879C	2004	2017	2022	2033C	3518	3519	3525
		3526									
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		1225	1229C	1299	1300	1502	1503C	1522B	1690	1693	1828
		1829C	1840	1843	1845	1847	1871	1875	1881	1897	1901
		1906	1909C	1910C	1916	1921	1926	1938	1948	1952	1953C
		1962	1966	1967C	1976	1980	1981C	1993	1994C	2044	2061
		2072C	2180	2197	2209	2222	2227	2236	2254	2266	2279
		2325	2332	2346	2360	2364	2382	2397	2401	2422	2436
		2451	2454	2465	2489	2502	2521	2536	2541	2542C	2561
		2564	2575	2582	2598	2616	2620	2646	2657	2691	2702
		2723	2734	2755	2760	2761C	2777	2801	2821	2846	2847C
		2867	2889	2890C	2909	2935	2946	2962	2978	2998	3010
		3023	3036	3049	3063	3067	3084	3099	3103	3124	3138
		3153	3166	3190	3203	3222	3237	3242	3243C	3262	3265
		3276	3283	3299	3317	3321	3342	3353	3368	3389	3416
		3432	3452	3471	3488	3513	3570	3588	3595	3610	3629
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		3779C	3800	3828	3829C	3831	3889	3942	3943	3944	4038
		4039	4042	4082	4090	4104	4112	4113	4114B	4118	4119
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		714C	717	718	719C	720	721C	1011	1012C	1194	1199
		1213	1214C	1215	1216C	1231	1232	1279C	1292C	1293	1526
		1527	1700	1701	1702C	1712	1715	1722	1725	1732	1735
		1741	1742	1743C	1749	1752	1756	1761	1762	1766	1769
		1776	1778	2137	2138	2145	2146	2171	2172	3540	3879
		3881	3884	3886C	3900	3901	3917B	3918	3930	3934	3940
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		552	555	558	560	589C	599	601	603	605	607
		987	988	1174C	1189C	1258	1259C	1280C	1289C	1290	1322B
		1326B	1330B	1334B	1338B	1342B	1346B	1350B	1354B	1358B	1362B
		1367B	1371B	1375B	1379B	1384C	1454	1457	1517C	1520	2091
		3540	3541C	3542C	3545	3554	3626	3627	3717	3718C	3731C
		3795	3812C	3858	3864	3869	3875	3887C	3888C	3903	3920C
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4162  MHC       4164B
4170  MHMSGA    4139
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4154  MHREAD
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 837  MINCYL    1193    1215    2167C
 838  MINTRK    1213    2168C
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 678  MODE       491C     510     576C    626     639     674C
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4067  MODEG      545
4134  MODEH      548
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1653  MODET      553     1654
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1116  MOVEWD    2183B   2619B   3320B
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1402  MSBPTY    1376
1540  MSBYTE    1531
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1585  MSDRVE    2156
 823  MSEOPS    4054
1808  MSFREV    1803
2678  MSFXWT    2672
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1397  MSNCLK    1355
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1391  MSOVUN    1331
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2917  MSPROT    2841
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2919  MSPRTF    2839
1393  MSRDER    1339
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1425  MSRNGR    1418
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1542  MSSBE     1535
1396  MSSCHI    1351
1399  MSSKER    1363
1388  MSSTER    1319
1395  MSSYNC    1347
1575  MSTADD    1581B   1592C   3795    3812C
1576  MSTADX    1593C   1594C
1313  MSTIMR    1296
1403  MSUCMR    1380
2116  MSUPWR    2129
1392  MSWRPT    1335
1039  MSZVTC    1035C
4184  MVA       4192B
4195  MVCYLS    4178     4180    4182
4196  MVMSGA    4177
4194  MVTWO     4178
3953  N         3906B   3951B
1269  NAKEXT    1257C   1265B
1270  NAKFLG    1259C   1263C   1264
1272  NAKSAV    1256C   1260
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 513  NEXTA
 520  NEXTB      615B
 528  NEXTE      534B    577B    661B    666B
 613  NEXTF      530B
 622  NEXTG      503     675B
 811  NEXTST
2921  NFXPCT    2915B
4051  NICEA     3955B
1639  NODCU     4205
1227  NXSCTR    1233B
1238  OBSAVE    1222C   1236
1444  OFRGER    1439C   1563    1598C
1445  OFRLFT    1437    1609C
 847  OFSTRG     957C    1988C   3722C
 812  ONES       664     1719    1725    2452    3154
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 997  OPWAIT    2131B   2843B   2859B   2884B   2902B
 755  OUTCMD     712     1719    1729
 688  PASS1
3506  PKFMT     3501B
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3963  PLVL      3887C   3922C   3993
 851  PORT0      498      651     697
 855  PORT1      653
 859  PORT2      655
 863  PORT3      649
 848  PORTCH     878      888     900     905     917     931     942     953     975    1156
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 832  PORTNO     572      623     671     833     834     835     836     837     838     839
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 785 RCALBT   880    2161
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 735 RCNFGB   1460
 752 RCTL     709C   1690
1065 RDBFIL   924B   2059B  2358B  2395B  3061B  3097B
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 797 RDID     2224   2362   2384   2399
 798 RDID12   3025   3065   3086   3101
 745 RDIUNT   1169
 799 RDIDSK   907
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2067 RDINX    2058C
1284 RDSTUS   1288B  1291B  1294B
 876 RECALB   3508B  3538B  3556B
3748 REDO     3761B
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 748 RINPTY
 727 RINUPT
 915 RIOLD    2210B  2223B  2237B  2267B  2280B  2333B  2361B  2365B  2383B  2398B
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 919 RIOLDB   3799C  3821C
 925 RIOLDX   915C   923B
 780 RLOAD    719C   899    916    1836
1422 RNGERR   1417C  1561   1597C
1423 RNGLFT   1415   1610C  2847C  2862C  2890C  2905C
 733 ROFRGE   1431
 732 RRANGE   1409   1766
2154 RSTORE   2147B  2148
 781 RSTUS    974    1282   2132
 738 RSTUS1   781
 729 RTASK    3805
1578 RTNA     1572B  1574B
 683 RTRFLG   516C   625C   633    634C   636C
1710 RWRSP    1740B
1772 RWRSPX   1657C  1670C  1770B
4220 SAF      4218
1306 SAVTIM   963C   968    1278C  1304
1312 SBSTUS   1299   2284C  2288C  2852C  2861C  2895C  2904C  2951C  2967C  2971C
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 849 SCTRMX   1198C  1232   2190C  2993C
 835 SECTR    1143   1192   1217C  1224C  1227C  1231   1234C  2165C  2484C  2515C
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 686 SEQN2    501C   656B
 687 SEQN3    502C   650B
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1387 STSTB5   1317C  1382
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1308 TIME2    1290
1307 TIME3    1293
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 933  wOLDB    3774C  3787C  3817C
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6 CROSS REF VERSION L - 24 SEPT, 1976
RS LINKER VERSION 2.34 07/28/77  0206.9 EDT THU
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 CURRENT        2E2B
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